Appendix B
Previous Studies

Protected Species Habitat Assessment

Dallas – Fort Worth National Cemetery
2000 Mountain Creek Parkway
Dallas, Dallas County, Texas

August 1, 2018
Terracon Project No. 9418P078

Prepared for:
U.S. Department of Veterans Affairs National Cemetery Administration
Dallas-Fort Worth National Cemetery
Dallas County, Texas

Prepared by:
Terracon Consultants, Inc.
Dallas, Texas

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1.0 INTRODUCTION

Terracon Consultants, Inc. (Terracon) was retained by U.S. Department of Veterans Affairs National Cemetery Administration - Dallas-Fort Worth National Cemetery (client) to perform a Protected Species Habitat Assessment on two tracts of land (approximately 67.2 acres) located at 2000 Mountain Creek Parkway, in Dallas, Dallas County, Texas, hereafter referred to as the study area. The study area is depicted on *Exhibit 1.0* in *Appendix A*. This report has been prepared in accordance with the Master Subconsultant Agreement, VA CFM Nat. Cemetery IDIQ #VA101F-17-D-2827 executed on May 23, 2018. The purpose of performing the Protected Species Habitat Assessment was to characterize the existing landcover conditions within the study area, observe the study area for protected species and/or their suitable habitats, provide an opinion regarding whether or not proposed development within the study area may affect species/habitat listed under the Endangered Species Act (ESA), and provide an opinion as to whether or not proposed development within the study area is likely to impact species protected under the Texas Parks and Wildlife Code (TPWD Code), Bald and Golden Eagle Protection Act (BGEPA), and/or Migratory Bird Treaty Act (MBTA).

2.0 REGULATORY REVIEW

Relevant laws for this assessment are summarized below.

2.1 Endangered Species Act (ESA)

The U.S. Fish and Wildlife Service (USFWS) has the 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 CFR Part 17. The federal process identifies potential candidates based on biological vulnerability. The vulnerability assessment considers several factors affecting a species within its range and is linked to the best scientific data available to the USFWS. Species listed as endangered or threatened by the USFWS are afforded full protection under the ESA, including the prohibition of indirect take such as the destruction of designated critical habitat.

2.2 Texas Parks and Wildlife Code (TPWD Code)

Texas enacted state-level endangered species legislation in 1973, and subsequent amendments to this legislation have established a regulatory program for the management and protection of endangered species (i.e. species in danger of extinction) and threatened species (i.e. species likely to become endangered in the foreseeable future). Chapters 67 and 68 of the TPWD Code

authorize TPWD to formulate lists of threatened and endangered fish and wildlife and regulate take and possession of listed species. Under this statutory authority, TPWD regulates the taking, possession, transport, export, processing, selling or offering for sale, or shipping of threatened or endangered species.

2.3 Bald and Golden Eagle Protection Act

Bald and golden eagles, having been delisted under the ESA, are still afforded federal protections under the BGEPA (16 U.S.C. 668-668c), enacted in 1940. Under the BGEPA it is unlawful to take, possess, sell, purchase, barter, offer to sell, possess, transport, export or import, and bald or golden eagle, alive or dead, including any part (including feathers), nest (including inactive nests), or egg, unless allowed by permit. A "take" under the BGEPA is defined as to "pursue, shoot, shoot at, poison, wound, capture, trap, collect, molest or disturb." The term "disturb", as defined in a final rule published in the Federal Register on June 5, 2007 (Volume 72, page 31332) means to "agitate or bother a bald or golden eagle to a degree that causes, or is likely to cause, based on the scientific information available (1) injury to an eagle, (2) a decrease in its productivity, by substantially interfering with normal breeding, feeding, or sheltering behavior, or (3) nest abandonment, by substantially interfering with normal breeding, feeding, or sheltering behavior."

2.4 Migratory Bird Treaty Act (MBTA)

ESA and State-listed avian species, as well as any other migratory birds, are protected under the MBTA. The 1918 MBTA establishes a Federal prohibition "to pursue, hunt, capture, kill, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg, without a permit" issued in accordance with the policies and regulations of the MBTA. Take is defined as "to pursue, hunt, shoot, wound, kill, trap, capture, or collect, or attempt to pursue, hunt, shoot, wound, kill, trap, capture, or collect migratory birds". The MBTA does not prohibit the destruction of the bird nest alone (without birds or eggs) provided that no possession of the nest occurs during destruction. There are no provisions for allowing the take of migratory birds that are unintentionally killed or injured. The USFWS is the lead agency determining permitting requirements for nest removal or destruction.

In December 2017, Memorandum M-37050 (the "M-Opinion") 26 was issued by the Department of Interior (DOI) Office of the Solicitor. The M-Opinion reversed the previous prohibition of incidental take under the MBTA. The USFWS is subject to the M-Opinion and issued a Guidance Memorandum which concurs with the M-Opinion and describes how it applies to its enforcement of the MBTA moving forward. The USFWS guidance reiterates that the MBTA does not prohibit the incidental take of migratory birds when the ultimate purpose of an action is something other than the purposeful take of migratory birds, their eggs or their nests. However, the same guidance letter states that impacts to migratory birds must still be considered under NEPA. Therefore, for

projects that have a federal nexus, impacts to migratory birds (including incidental take) must still be documented and evaluated.

3.0 DATABASE REVIEW

Literature and agency file searches were conducted to identify the potential occurrence of federally listed T&E species, and their designated critical habitats, in the vicinity of the proposed project. In the past, informal consultation with the U.S. Fish and Wildlife Service (USFWS) was often conducted (via a letter request) for projects determined to be unlikely to affect T&E species or their critical habitats. Following their review, the USFWS (if they agreed with Terracon's assessment) would then provide its concurrence that a proposed project would not be likely to jeopardize the continued existence of federally-listed T&E species or result in the destruction or adverse modification of their critical habitats. However, some the USFWS' Texas field offices have discontinued providing concurrences with "no effect" determinations for proposed projects. Their current policy makes it incumbent on the developer to ascertain the potential for effects to T&E species for each project and then notify the USFWS for formal consultation if a proposed project "may affect" a listed species or its critical habitat. The USFWS notes that "a qualified biologist should use the USFWS website and other current information to make this determination." For non-federally funded projects that "may affect" or are likely to adversely affect T&E species or their habitat, a Section 10(a)(1)(B) permit would be required. The USFWS also notes that for those projects with a federal (government) nexus, it is the responsibility of the federal action agency [under Section (7)(a)] to determine if a proposed project "may affect" T&E species or their habitat. Terracon reviewed available information to determine whether the project "may affect" T&E species or their habitat and is discussed below.

3.1 Topographic Maps & Aerial Photography

The 1959, 1973, and 1995 U.S. Geological Survey (USGS) 7.5-Minute Topographic Maps (Duncanville, Texas Quadrangle) of the study area were reviewed to characterize historic land use/landcover and terrain within the study area. The USGS topographic maps depict study area elevations between 500-550 feet above mean sea level sloping generally southwest. The majority of the study area is depicted as unimproved land with significant canopy coverage in the southern half, as evidenced by green shading. A utility line and Right of Way easement transects the southern central portion of the study area. The perimeter of the Dallas/Fort Worth National Cemetery is depicted on the topographic map beginning in 1995. The topographic maps are provided as *Exhibits 2.0 – 2.2* in *Appendix A*.

Terracon reviewed aerial photographs to characterize historic and recent land use/landcover within the study area, which could assist in preliminarily identifying potential suitable habitat for T&E species. The study area appears to have remained relatively unchanged from 1996 to 2016. The majority of the study area appears to be undeveloped with new development progressing adjacent to the western boundary. The majority of the study area appears to dominated by a

shrub/sapling woody community, with smaller areas of apparent herbaceous vegetation interspersed. The 2004 and 2016 photographs depict an apparent utility line easement transecting the south-central portion of the study area. For reference, the aerial photographs can be seen as *Exhibits 6.0 – 6.2* in *Appendix A.*

3.2 Vegetation

According to TPWD, the site is located in the Texas Blackland Prairies Ecological Region, characterized by flat to gently rolling plains dissected by drainages with the most significant ridges associated with harder chalk formations. Soils are typically Vertisols occurring on calcareous clays but may also occur on loams, clay loams, or even sandy clay loams. Rainfall can be moderate, but somewhat erratic, therefore, moisture is often limited during part of the growing season. Drought, grazing, and fire are the primary natural processes that affect this system. Overgrazing and conversion to agriculture, along with fire suppression, have led to the invasion of some areas by problematic brush species. By evaluating the Ecological Mapping System of Texas, three categories were identified within the study area and are described below and can be seen in *Exhibit 4.0* in *Appendix A*.

- *Native Invasive: Deciduous Woodland*

This broadly-defined type may have sugarberry *(Celtis laevigata),* water oak *(Quercus nigra),* cedar elm *(Ulmus crassifolia),* sweetgum *(Liquidambar styraciflua)*, yaupon *(Ilex vomitoria),* ashes (*Fraxinus* spp.), and honey mesquite (*Prosopis glandulosa*) among the dominants. Post oak, (*Quercus stellata*), coastal live oak (*Quercus virginiana*), and plateau live oak (*Quercus fusiformis*) may be important. Eastern redcedar (*Juniperus virginiana*), Texas persimmon (*Diospyros texana*), and loblolly pine (*Pinus taeda*) may also be present

- *Edwards Plateau: Oak/ Hardwood Slope Forest*

Forest or woodland on slopes generally greater than 20 percent on steep rocky sites with significant deciduous canopy cover. These sites tend to be somewhat more mesic than similar sites dominated by evergreen canopy. The overstory may be diverse, with species such as Texas oak (*Quercus buckleyi*), Lacey oak (*Quercus laceyi*), white shin oak (*Quercus sinuata* var. *breviloba*), chinkapin oak (*Quercus muehlenbergii*), cedar elm (*Ulmus crassifolia*), netleaf hackberry (*Celtis laevigata* var. *reticulate*), Texas ash (*Fraxinus texensis*), escarpment black cherry (*Prunus serotina* var. *eximia*), Arizona walnut (*Juglans major*), and others. This system may occupy slopes on cretaceous limestone or chalk occurring north and east of the Edwards Plateau. In these situations, Shumard oak (*Quercus shumardii*), chinkapin oak (*Quercus muehlenbergii*), Slippery elm (*Ulmus rubra*), and/or black walnut (*Juglans nigra*) may be present in the canopy, and may represent significant components of it. Plateau live oak (*Quercus fusiformis*), and Ashe juniper (*Juniperus ashei*) may be present, often reaching large size under these conditions. Species such as red buckeye (Aesculus pavia var. flavescens), Texas redbud (*Cercis canadensis* var. *texensis*), rough-leaf dogwood (*Cornus drummondii*), elbowbush

(*Forestiera pubescens*), Mexican buckeye (*Ungnadia speciosa*), Carolina buckthorn (*Frangula caroliniana*), rusty blackhaw (*Viburnum rufidulum*), and grapes (*Vitis* spp.), tend to occur in the shrub layer more frequently in this vegetation type than in the evergreen vegetation types of this system. Though dense canopy, rocky substrate, and significant litter accumulation results in a sparse herbaceous layer, forbs such as widowstears (*Tinantia anomala*), silver-puff (*Chaptalia texana*), baby blue-eyes (*Nemophila phacelioides*), cedar sage (*Salvia roemeriana*), and various ferns may be present, if patchy.

- *Urban Low intensity*

This type includes areas that are built-up but not entirely covered by impervious cover, and includes most of the non-industrial areas within cities and towns.

3.3 IPaC Report

T&E species are listed on the USFWS Information, Planning, and Conservation System (IPaC) (accessed July 2018, Consultation Code: 02ETAR00-2018-SLI-1403). The USFWS has record of an official species request made through the USFWS' IPaC by Terracon on July 6, 2018. An official species list document, dated July 6, 2018 was generated by IPaC and transmitted to Terracon on behalf of the Arlington Ecological Services Field Office. The response letter states "a 'no effect' determination does not require Section 7 (ESA) consultation and no coordination or contact with the Service is necessary." The list of T&E species compiled by the USFWS on the IPaC for Dallas County, Texas includes five species that should be considered in an effects analysis; however, two of the five species should be considered only under certain conditions (reference *USFWS IPaC Official Species List* in *Appendix B*). *Table 1* (below) includes the species listed by the USFWS in Dallas County, Texas, their federal status, habitat descriptions, habitat present, special conditions, and findings.

Table 1: USFWS Species Listed for Dallas County, Texas

Species	USFWS Status	Habitat Description	Habitat Present	Condition(s)	Findings
Dendroica chyrsoparia (Golden-cheeked Warbler)	Endangered	Juniper-oak woodlands; dependent on Ashe juniper for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer	No; absence of suitable habitat within or near the study area (adequate juniper shrub habitat was not observed from aerial review or site reconnaissance)	-	No effect
Sterna antillarum (Least Tern)	Endangered	Nests along sand and gravel bars within braided streams, rivers; also known to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc.)	No; absence of suitable habitat within or near the study area.	-	No effect

Table 1: USFWS Species Listed for Dallas County, Texas					
Species	**USFWS Status**	**Habitat Description**	**Habitat Present**	**Condition(s)**	**Findings**
Charadrius melodus (Piping Plover)	Threatened	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud flats	No; absence of suitable habitat within or near the study area.	Species need only be considered for potential effects in this region for Wind Energy Projects	No effect
Calidris canatus rufa (Red Knot)	Threatened	Migrate long distances in flocks northward through the U.S. mainly April to June, southward July to October. Prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters; Primarily inhabits seacoasts on tidal flats and beaches, herbaceous wetlands, and tidal flat/shore	No; absence of suitable habitat within or near the study area.	Species need only be considered for potential effects in this region for Wind Energy Projects	No effect
Grus americana (Whooping Crane)	Endangered	Potential migrant via plains throughout most of Texas to the coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. Breeds, migrates, winters, and forages in a variety of wetland and other habitats; During migration, a variety of habitats are used; however, wetland mosaics appear to be the most suitable	No; absence of suitable habitat within or near the study area	-	No effect

Source: USFWS IPaC Official Species List requested and received July 2018.
Site visit/survey of study area.

3.4 TPWD Species List

The list of Rare, Threatened, and Endangered Species compiled by the TPWD for Dallas County, Texas includes 34 species (see TPWD Annotated County List of Rare Species in *Appendix B*). Terracon did not observe the state listed species onsite. State regulations do not require habitat protection for state listed T&E species; therefore, state listed T&E species are typically only a development constraint if individual species are identified onsite. Individual species of the state listed T&E species were not observed during the site reconnaissance." *Table 2* (below) includes the species listed by the TPWD in Dallas County, Texas, their state status, habitat descriptions, habitat present, and findings.

Table 2: TPWD Species Listed for Dallas County, Texas				
Species	**TPWD Status**	**Habitat Description**	**Habitat Present**	**Findings**
Birds				
Dendroica chyrsoparia (Golden-cheeked Warbler)	Endangered	Juniper-oak woodlands; dependent on Ashe juniper for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary	See Table 1, above	See Table 1, above

Table 2: TPWD Species Listed for Dallas County, Texas				
Species	**TPWD Status**	**Habitat Description**	**Habitat Present**	**Findings**
		nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer		
Sterna antillarum (Least Tern)	Endangered	Nests along sand and gravel bars within braided streams, rivers; also known to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc.)	See Table 1, above	See Table 1, above
Charadrius melodus (Piping Plover)	Threatened	Wintering migrant along the Texas Gulf Coast; beaches and bayside mud flats	See Table 1, above	See Table 1, above
Grus americana (Whooping Crane)	Endangered	Potential migrant via plains throughout most of Texas to the coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties. Breeds, migrates, winters, and forages in a variety of wetland and other habitats; During migration, a variety of habitats are used; however, wetland mosaics appear to be the most suitable	See Table 1, above	See Table 1, above
Falco peregrinus anatum (American Peregrine Falcon)	Threatened	year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No; absence of suitable habitat within or near the study area	No impact
Falco peregrinus tundrius (Arctic Peregrine Falcon)	-	migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No; absence of suitable habitat within or near the study area	No effect
Haliaeetus leucocephalus (Bald Eagle)	Threatened	found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds	Based on prior field experience on adjoining properties east of Nursery Road and the confluence of Delaware Creek and the West Fork Trinity River some bald eagles have been observed. Bald eagle nest has not been observed in the project vicinity. If Bald Eagles presence is observed in the study area it would be considered incidental.	No impact

Table 2: TPWD Species Listed for Dallas County, Texas				
Species	**TPWD Status**	**Habitat Description**	**Habitat Present**	**Findings**
Vireo atricapilla (Black-capped Vireo)	Endangered	oak-juniper woodlands with distinctive patchy, two-layered aspect; shrub and tree layer with open, grassy spaces; requires foliage reaching to ground level for nesting cover; return to same territory, or one nearby, year after year; deciduous and broad-leaved shrubs and trees provide insects for feeding; species composition less important than presence of adequate broad-leaved shrubs, foliage to ground level, and required structure; nesting season March-late summer	No; absence of suitable habitat within or near the study area	No impact
Ammodramus henslowii (Henslow's Sparrow)	-	wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking	No; absence of suitable habitat within or near the study area	No impact
Sterna antillarum athalassos (Interior Least Tern)	Endangered	subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony	No; absence of suitable habitat within or near the study area	No impact
Falco peregrinus (Peregrine Falcon)	Threatened	both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	No; absence of suitable habitat within or near the study area	No impact
Anthus spragueii (Sprague's Pipit)	-	only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	No; absence of suitable habitat within or near the study area	No impact
Athene cunicularia hypugaea (Western Burrowing Owl)	-	open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows	No; absence of suitable habitat within or near the study area	No impact

Table 2: TPWD Species Listed for Dallas County, Texas				
Species	**TPWD Status**	**Habitat Description**	**Habitat Present**	**Findings**
Plegadis chihi (White-faced Ibis)	Threatened	prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats	No; absence of suitable habitat within or near the study area	No impact
Mycteria americana (Wood Stork)	Threatened	forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960	No; absence of suitable habitat within or near the study area	No impact
Insects				
Lordithon niger (Black Lordithon rove beetle)	-	historically known from Texas	No; absence of suitable habitat within or near the study area	No impact
Mammals				
Myotis velifer (Cave myotis bat)	-	colonial and cave-dwelling; also roosts in rock crevices, old buildings, carports, under bridges, and even in abandoned Cliff Swallow (Hirundo pyrrhonota) nests; roosts in clusters of up to thousands of individuals; hibernates in limestone caves of Edwards Plateau and gypsum cave of Panhandle during winter; opportunistic insectivore	No; absence of suitable habitat within or near the study area	No impact
Spilogale putorius interrupta (Plains spotted skunk)	-	catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie	Habitat present; woodlands observed.	May impact
Mollusks				
Pleurobema riddellii (Louisiana pigtoe)	Threatened	streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins	No; suitable intermittent and/or perennial streams were not observed in the study area.	No impact
Lampsilis satura (Sandbank pocketbook)	Threatened	small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River	No; suitable intermittent and/or perennial streams were not observed in the study area.	No impact

Table 2: TPWD Species Listed for Dallas County, Texas				
Species	**TPWD Status**	**Habitat Description**	**Habitat Present**	**Findings**
Potamilus amphichaenus (Texas heelsplitter)	Threatened	quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins	No; suitable intermittent and/or perennial streams were not observed in the study area.	No impact
Fusconaia askewi (Texas pigtoe)	Threatened	rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sulphur River, Cypress Creek, Sabine through Trinity rivers as well as San Jacinto River	No; suitable intermittent and/or perennial streams were not observed in the study area.	No impact
Reptiles				
Macrochelys temminckii (Alligator snapping turtle)	Threatened	Perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October	No; absence of suitable habitat within or near the study area	No impact
Thamnophis sirtalis annectens (Texas garter snake)	-	Wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August	No; absence of suitable habitat within or near the study area	No impact
Phrynosoma cornutum (Texas horned lizard)	Threatened	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September	No; absence of suitable habitat within or near the study area	No impact
Crotalus horridus (Timber rattlesnake)	Threatened	Swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto	No; absence of suitable habitat within or near the study area	No impact
Plants				
Hexalectris nitida (Glass Mountains coral-root)	-	Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept	No; absence of suitable habitat within or near the study area	No impact
Yucca necopina (Glen Rose yucca)	-	Texas endemic; grasslands on sandy soils and limestone outcrops; flowering April-June	No; absence of suitable habitat within or near the study area	No impact

Table 2: TPWD Species Listed for Dallas County, Texas				
Species	**TPWD Status**	**Habitat Description**	**Habitat Present**	**Findings**
Dalea hallii (Hall's prairie clover)	-	In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept	No; absence of suitable habitat within or near the study area	No impact
Agalinis densiflora (Osage Plains false foxglove)	-	Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct	No; absence of suitable habitat within or near the study area	No impact
Matelea edwardsensis (Plateau milkvine)	-	Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June	Potential habitat; juniper woodlands observed in portions of the study area.	May impact
Astragalus reflexus (Texas milk vetch)	-	Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; Flowering Feb-June; Fruiting April-June	Potential habitat; clay substrates observed in portions of the study area.	May impact
Cuscuta exaltata (Tree dodder)	-	Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct	Potential habitat; woody communities dominated by Ulmus crassifolia, Ulmus americana, and Celtis laevigata observed.	May impact
Hexalectris warnockii (Warnock's coral-root)	-	in leaf litter and humus in oak-juniper woodlands on shaded slopes and intermittent, rocky creekbeds in canyons; in the Trans Pecos in oak-pinyon-juniper woodlands in higher mesic canyons (to 2000 m [6550 ft]), primarily on igneous substrates; in Terrell County under Quercus fusiformis mottes on terrraces of spring-fed perennial streams, draining an otherwise rather xeric limestone landscape; on the Callahan Divide (Taylor County), the White Rock Escarpment (Dallas County), and the Edwards Plateau in oak-juniper woodlands on limestone slopes; in Gillespie County on igneous substrates of the Llano Uplift; flowering June-September; individual plants do not usually bloom in successive years	No; absence of suitable habitat within or near the study area	No impact

Source: TPWD downloaded July 2018.
Site visit/survey of study area.

3.5 TPWD NDD Review

A review of the Texas Natural Diversity Database (NDD) within the study area was requested from TPWD. The NDD maintains information on over 700 natural resource “Elements” including threatened or endangered species, native plant communities, and/or animal aggregations (e.g. rookeries). A database record for an element is known as an Element Occurrence Record (EOR),

and the NDD contains spatial data representing the geographic locations of an element observation. The NDD is not considered comprehensive and presence or absence of EORs for a listed species should not be considered a definitive statement of presence or absence for a listed species within the study area. Terracon requested a review of the NDD for the Duncanville, Texas United States Geologic Survey (USGS) topographic quadrangle for known occurrences of listed species by TPWD. TPWD indicated "The TXNDD includes federal and state listed and tracked Threatened, Endangered, and Rare species. Please note that areas where Element Occurrence (EO) data are absent should not be interpreted as an absence of Threatened, Endangered, and Rare species. Given the small proportion of public versus private land in Texas, the TXNDD does not include a representative inventory of rare resources in the state. Data from the TXNDD do not provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features within your study area. These data cannot substitute for an on-site evaluation by qualified biologists." TXNDD search did not indicate records within the study area.

4.0 FIELD OBSERVATION FINDINGS AND CONCLUSIONS

Terracon performed a T&E species assessment which included a preliminary resource review and a site visit, conducted on July 10, 2018. Site photographs, included in *Appendix B*, provide an indication of the physical characteristics observed during the site investigation.

During the site visit, Terracon personnel did not identify aquatic features within the study area. Other streams or open water features were not observed. *Table 5* summarizes the relevant information from the Reference Photo Points (RPPs) collected during the field reconnaissance.

Table 5 – RPP Summary

RPPs	Community	Dominant Vegetation	Soil Characteristics	Hydrologic Characteristics	Classification
1 and 3	Upland Forest	*Ligustrum sinense* (UPL), *Ulmus crassifolia* (FAC), *Juniperus virginiana* (UPL)	Dark loam with roots and no redoximorphic features	Hydrology Indicators not observed	Upland
2 and 24	Drainage Swale	*Salix nigra* (FACW), *Ligustrum sinense* (UPL), *Solidago altissima* (FACU), *Iva annua* (FAC), *Carex crus-corvi* (OBL), *Helianthus annuus* (FACU)	Dark clay, no redoximorphic features	Surface soil cracks (B6)	Upland
9, 10, 13, and 14	Riparian Scrub	*Ligustrum sinense* (UPL), *Juniperus virginiana* (UPL), *Gleditisia triacanthos* (FACU), *Asclepias virdis* (UPL) *Fraxinus pennsylvanica* (FAC), *Smilax bona-nox* (FAC), *Eragrotis intermedia* (UPL)	Dark, clay loam with no redoximorphic features.	Hydrology Indicators not observed	Upland

RPPs	Community	Dominant Vegetation	Soil Characteristics	Hydrologic Characteristics	Classification
4, 5, 6, 7, 8, 11, 12, 15, 16, 18, 22, 23, and 25	Upland Scrub	*Ligustrum sinense* (UPL), *Sorgun halepense* (FACU)	Light clay ,root layer no redoximorphic features	Hydrology Indicators not observed	Upland
17, 19, 20, and 21	Grassland	*Prosopis glandulosa* (FACU), *Artemesia ludoviciana* (UPL), *Eragrostis intermedia* (UPL)	Shallow dark clay over rock layer, no redoximorphic features	Hydrology Indicators not observed	Upland

4.1 ESA Listed Species

An official species list document, dated July 6, 2018, was generated by IPaC and transmitted to Terracon on behalf of the Arlington Ecological Services Field Office. The list of T&E species compiled by the USFWS on the IPaC for Dallas County, Texas includes five species that should be considered in an effects analysis; however, The IPaC states that two of the five species (Piping Plover and Red Knot) need only be considered in an effects analysis for wind energy projects. The species listed by the USFWS and their typical/suitable habitats are listed on *Table 1* above and the *USFWS IPaC Official Species List* in *Appendix B*. The proposed development within the study area is not a wind energy project; therefore, it is Terracon's opinion that the Piping Plover and Red Knot should not be considered in the effects analysis.

Based on the IPaC report, no critical habitat is listed for the Golden-cheeked Warbler. Golden-cheeked warblers nest only in central Texas mixed Ashe-juniper and oak woodlands in ravines and canyons. They typically forage for insects and spiders found on the leaves and bark of oaks and other trees. Tall/mature junipers are obligatory in the nesting habitat of Golden-cheeked warblers, providing the only source of long, fine bark strips needed for nesting material.

During the site visit, wooded communities were observed with dominant species including cedar elm, honey mesquite, Chinese privet (*Ligustrum sinense*), and sparse eastern red cedar. The wooded habitat observed within, and within 300 feet of, the proposed construction limits does not meet the requisite habitat criteria for the Golden-cheeked Warbler. Furthermore, eBird (a dynamic internet mapping tool that allows users to share information regarding bird observation) shows the nearest Golden-cheeked Warbler observation approximately seven miles to the southwest of the study area, near Cedar Hill State Park. Based on the available data, Golden-cheeked Warbler habitat is absent in the study area and vicinity, and development activities within the study area would have no effect on the Golden-cheeked Warbler.

Based on the IPaC report, no critical habitat is listed for the Least Tern within, or in the immediate vicinity of, the proposed project limits. Least Terns nest along sand and gravel bars within braided

streams, rivers, and (less commonly) man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc.). During the field investigation, suitable nesting habitat for the Least Tern was not observed, nests were not observed, and individual Least Terns were not observed. The study area generally lacks aquatic features that would typically be associated with Least Tern nesting/foraging habitat. The lack of suitable foraging habitat makes it unlikely that the Least Tern would utilize the study area, even as a stopover during migration. Furthermore, eBird (a dynamic internet mapping tool that allows users to share information regarding bird observation) shows the nearest Least Tern observation approximately four miles to the northwest of the study area, near the Lone Star Park and the Trinity River (Where suitable nesting and foraging habitat is relatively abundant). Based on the available data, Least Tern habitat is absent in in the study area and study area vicinity, and effects to Least Tern or Least Tern habitat are not anticipated from the proposed project. It is Terracon's opinion that development within the study area would have no effect on the Least Tern.

Based on the IPaC report, whooping crane critical habitat is absent within the study area. The nearest critical whooping crane habitat is located in the Salt Plains National Wildlife Refuge approximately 275 miles to the northwest, in Alfalfa County, Oklahoma. Whooping cranes use a variety of stopover habitats during their long migrations; feeding in croplands and large wetlands. They are known to roost in large wetlands and occasionally in riverine habitat such as large submerged sandbars, in wide unobstructed channels, isolated from human disturbance. This type of habitat was not observed within the study area. Furthermore, eBird (a dynamic internet mapping tool that allows users to share information regarding bird observation) shows the nearest whooping crane observation approximately 10 miles to the northwest of the study area, near the Arlington, Texas. Based on the available data, whooping crane habitat is absent in the study area and study area vicinity, and effects to whooping cranes or whooping crane habitat are not anticipated. It is Terracon's opinion that development within the study area would have no effect on the whooping crane.

Based on the results of the resource review and the preliminary site visit, it is Terracon's opinion that the study area does not provide suitable habitat for federally-listed species and that proposed development within the study area would have **no effect** on federally-listed T&E species.

4.2 Migratory Bird Treaty Act (MBTA)

Aerial photos and site reconnaissance observations revealed wooded and shrub/sapling communities that likely provide suitable nesting and/or foraging habitat for migratory birds. Migratory birds have the potential to be present within the study area from time-to-time. USFWS recommends activities requiring vegetation removal or disturbance avoid the peak nesting period of March through August to avoid destruction of individuals, nests, or eggs. If project activities must be conducted during this time, we recommend surveying for nests prior to conducting work. If a nest is found, and if possible, the USFWS recommends a buffer of vegetation remain around the nest until the young have fledged or the nest is abandoned.

4.3 Bald and Golden Eagle Protection Act (BGEPA)

Aerial photos and site reconnaissance revealed wooded and shrub/sapling communities throughout the study area. Bald and golden eagle's typical habitat requirements include broad swaths of undeveloped land, large trees and/or cliffs for nesting habitat, and large waterbodies (navigable rivers, lakes, reservoirs, large ponds, etc.) for foraging/hunting activities. This requisite habitat is absent within the study area. While there is a potential, albeit small, for bald and/or golden eagles to migrate within the vicinity of the study area, the absence of suitable foraging, hunting, and perching habitat reduces the potential for occurrence. Therefore, it is Terracon's opinion that development within the study area would

4.4 State Listed Species

The Texas legislature enacted a state Endangered Species Act; subsequently the TPWD was authorized to generate a list of species threatened or endangered with state-wide extinction. Unlike the Federal Act, state laws make no provision for habitat protection or regulation of indirect "takes", but do outlaw killing or maiming individuals of listed species and regulates other aspects such as trade and transportation. Therefore, these species are typically only a development constraint if they are identified onsite and will be directly impacted.

The TPWD construction BMPs for the Plains Spotted Skunk are as follows: Contractors will be advised of potential occurrence in the project area, and to avoid harming the species if encountered, and to avoid unnecessary impacts to dens.

TPWD has no approved species BMPs for SGCN plant species.

5.0 GENERAL COMMENTS

The T&E Species Assessment was performed in accordance with generally accepted practices of this profession undertaken in similar studies at the same time and in the same geographical area. A T&E Species Assessment, such as the one performed at this site, is of limited scope and is noninvasive. This report has been prepared in accordance with generally accepted scientific and engineering evaluation practices. No warranties, either express or implied, are intended or made.

APPENDIX A
Exhibits

Legend

Study Area

Feet

0 1,000 2,000 4,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

Project No.:	9418P078
Date:	Jul 2018
Drawn By:	JC
Reviewed By:	JH

Terracon
8901 John W. Carpenter Freeway, Suite 100
Dallas, Texas 75247
PH. (214) 630-1010 terracon.com

Vicinity Map

Dallas-Fort Worth National Cemetery
VA DFW Phase 4 Cemetery
32.718369°, -96.927954° (GCS NAD83)
Dallas, Dallas County, Texas

Exhibit

1.0

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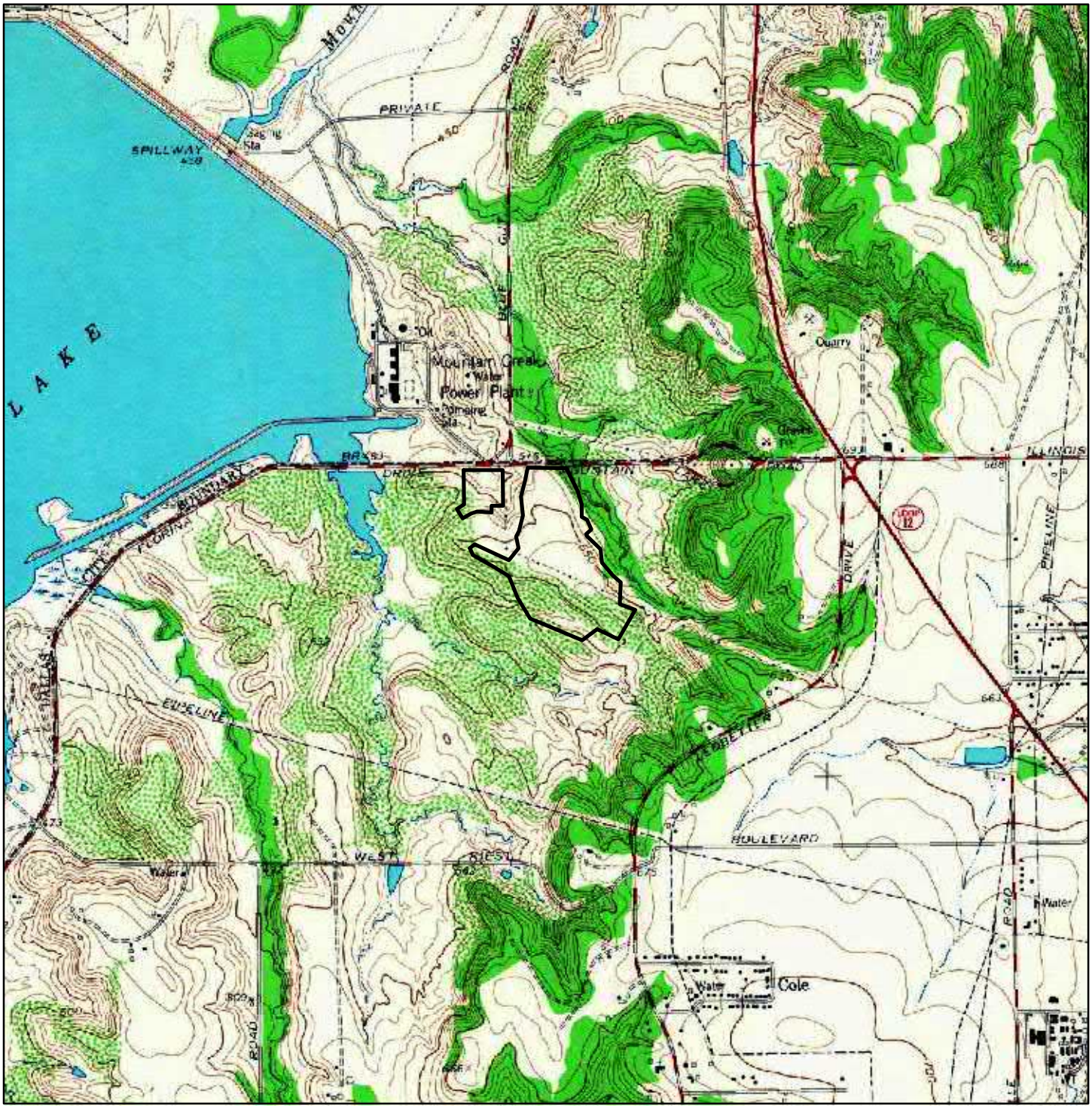

Legend

Study Area

Feet

0 1,000 2,000 4,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, Duncanville Quadrangle, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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Date:	Aug 2018
Drawn By:	JC
Reviewed By:	JH

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USGS Topographic Map: 1959

Dallas-Fort Worth National Cemetery
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Dallas, Dallas County, Texas

Exhibit

2.0

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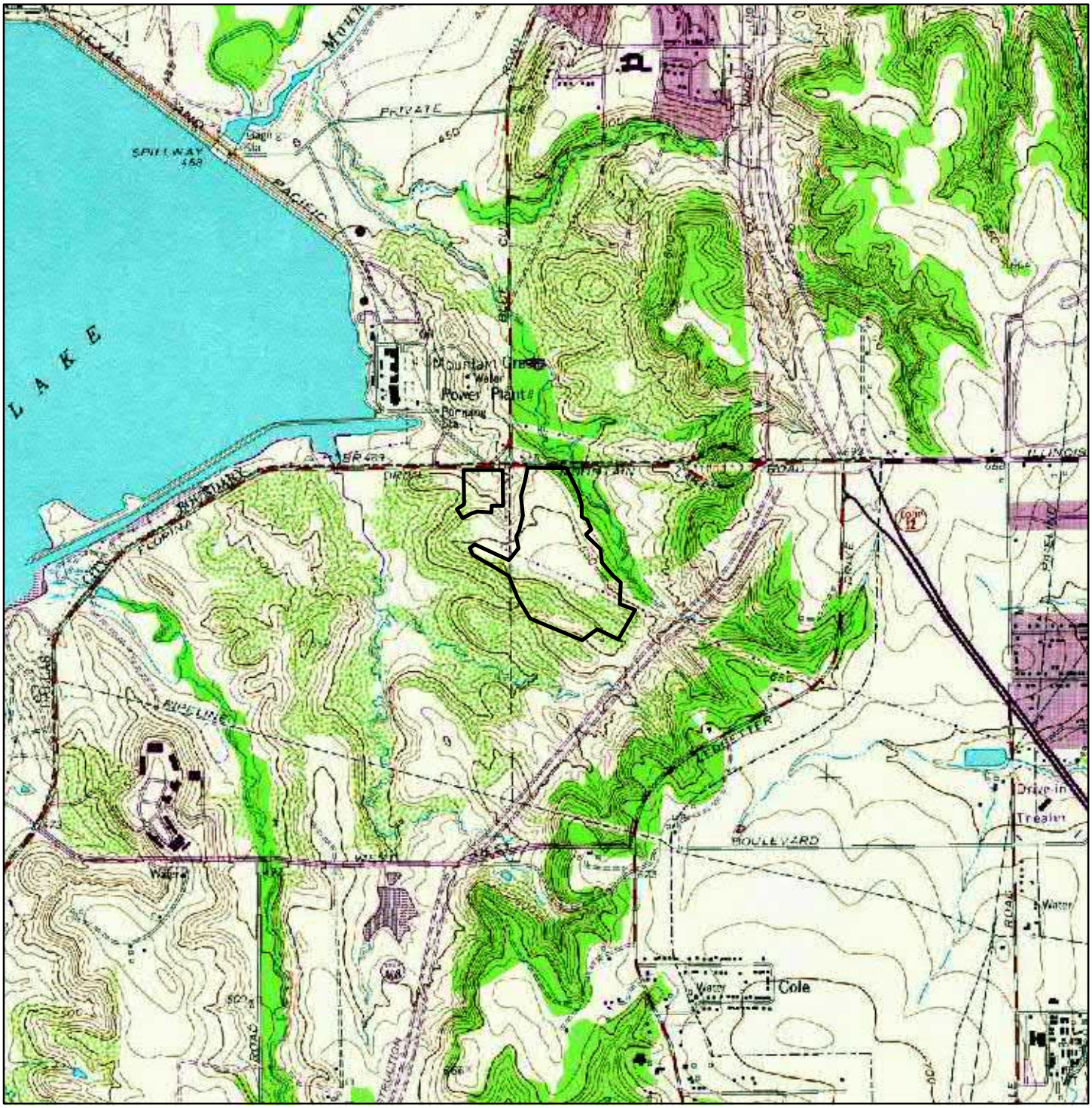

Legend

Study

Feet
0 1,000 2,000 4,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView Duncanville Quadrangle, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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Project No.:	9418P078
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Drawn By:	JC
Reviewed By:	JH

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USGS Topographic Map: 1973

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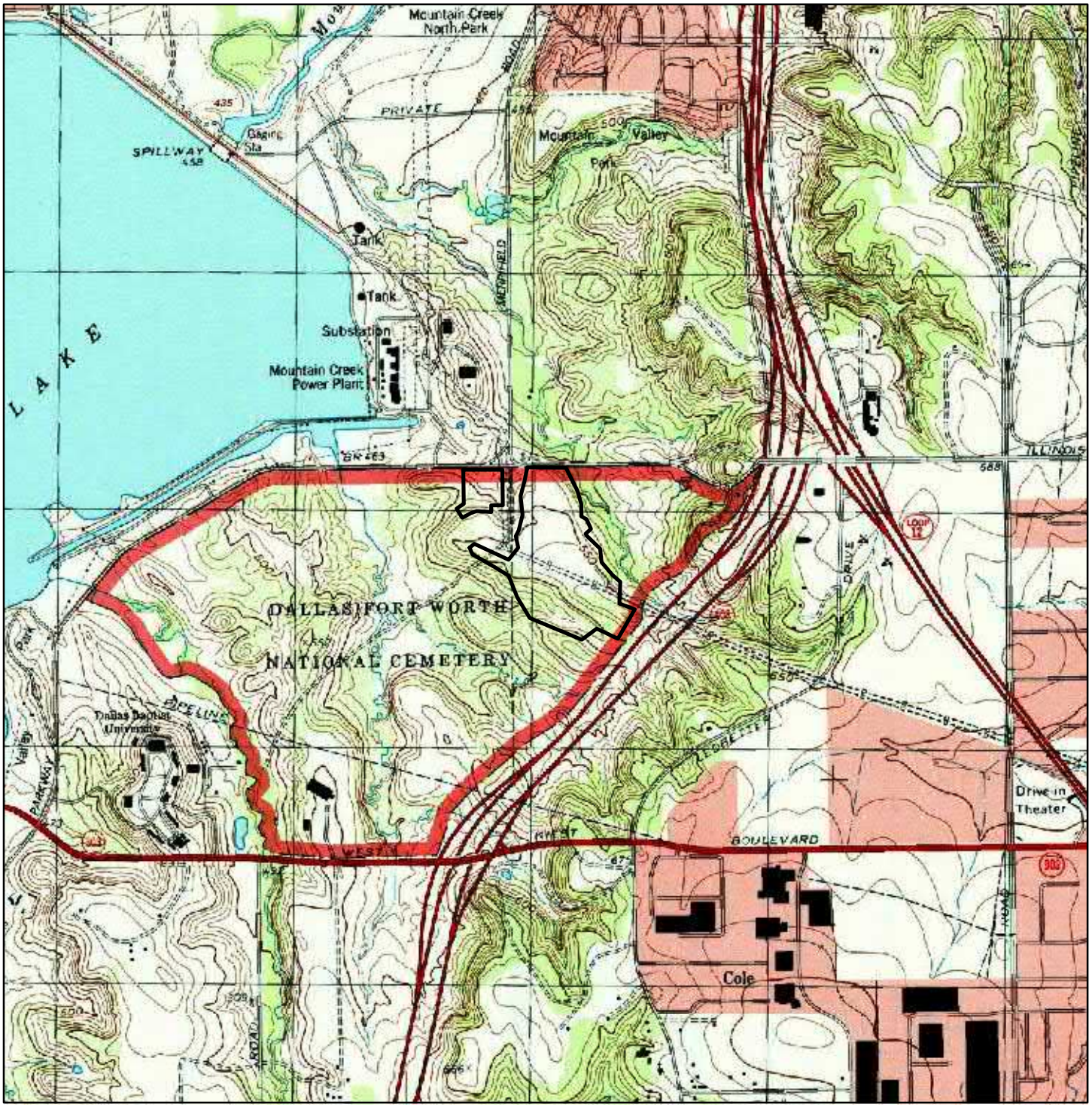
Exhibit

2.1



Legend

Study

Feet
0 1,000 2,000 4,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView Duncanville Quadrangle, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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USGS Topographic Map: 1995

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Dallas, Dallas County, Texas

Exhibit

2.2

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Legend

Study Area

N

0 500 1,000 2,000 Feet

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
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Date:	Aug 2018
Drawn By:	JC
Reviewed By:	JH

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1996 Aerial Imagery

Dallas-Fort Worth National Cemetery
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Dallas, Dallas County, Texas

Exhibit

3.0

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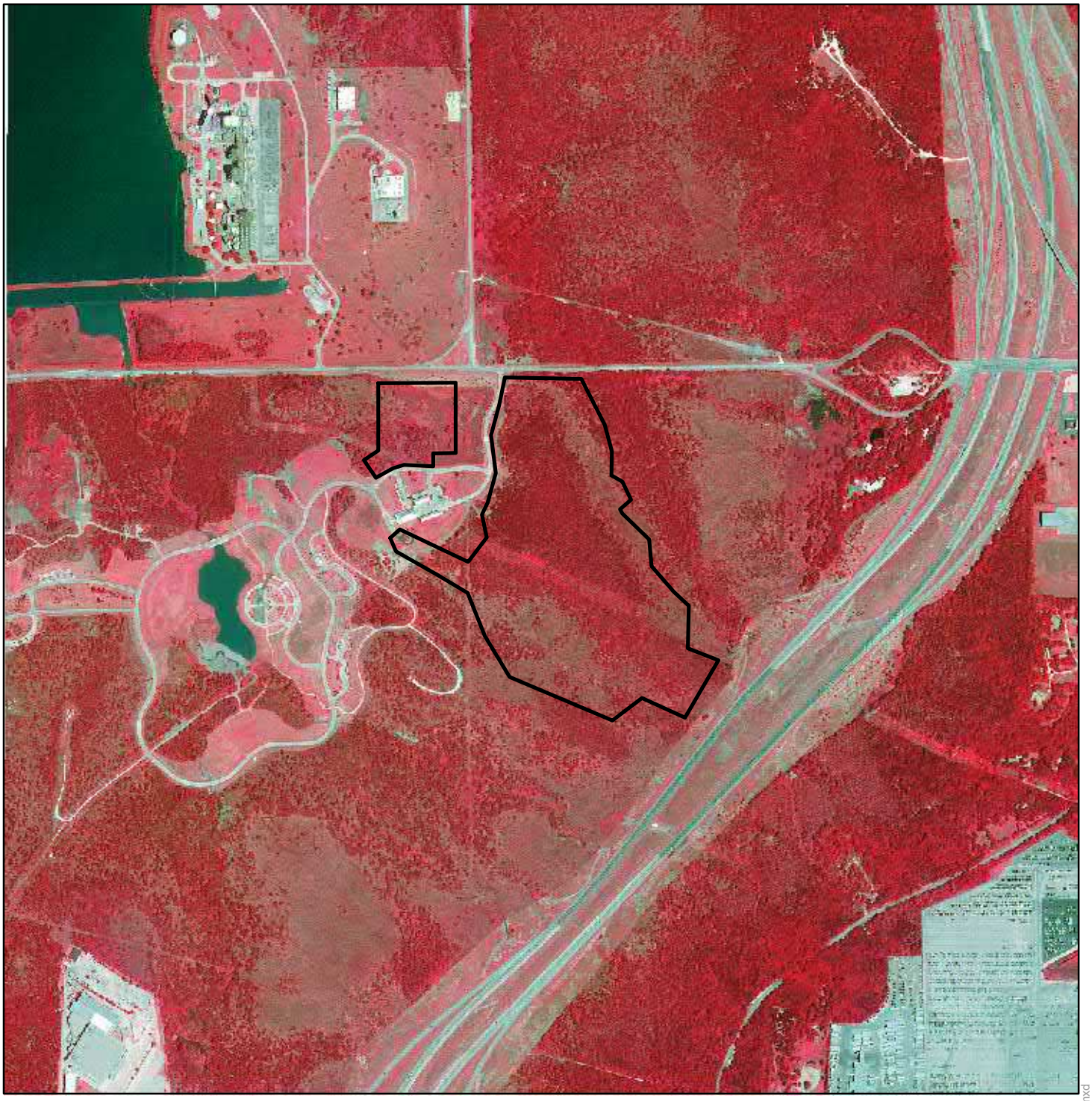

Legend

Study Area

N

0 500 1,000 2,000 Feet

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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2004 Aerial Imagery

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Exhibit

3.1

N:\GIS\2018\9418P078\Maps\T9418P078_Exhibit_3_1_2004Aerial.mxd

Legend

Study

Feet
0 500 1,000 2,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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2016 Aerial Imagery

Dallas-Fort Worth National Cemetery
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Dallas, Dallas County, Texas

Exhibit

3.2

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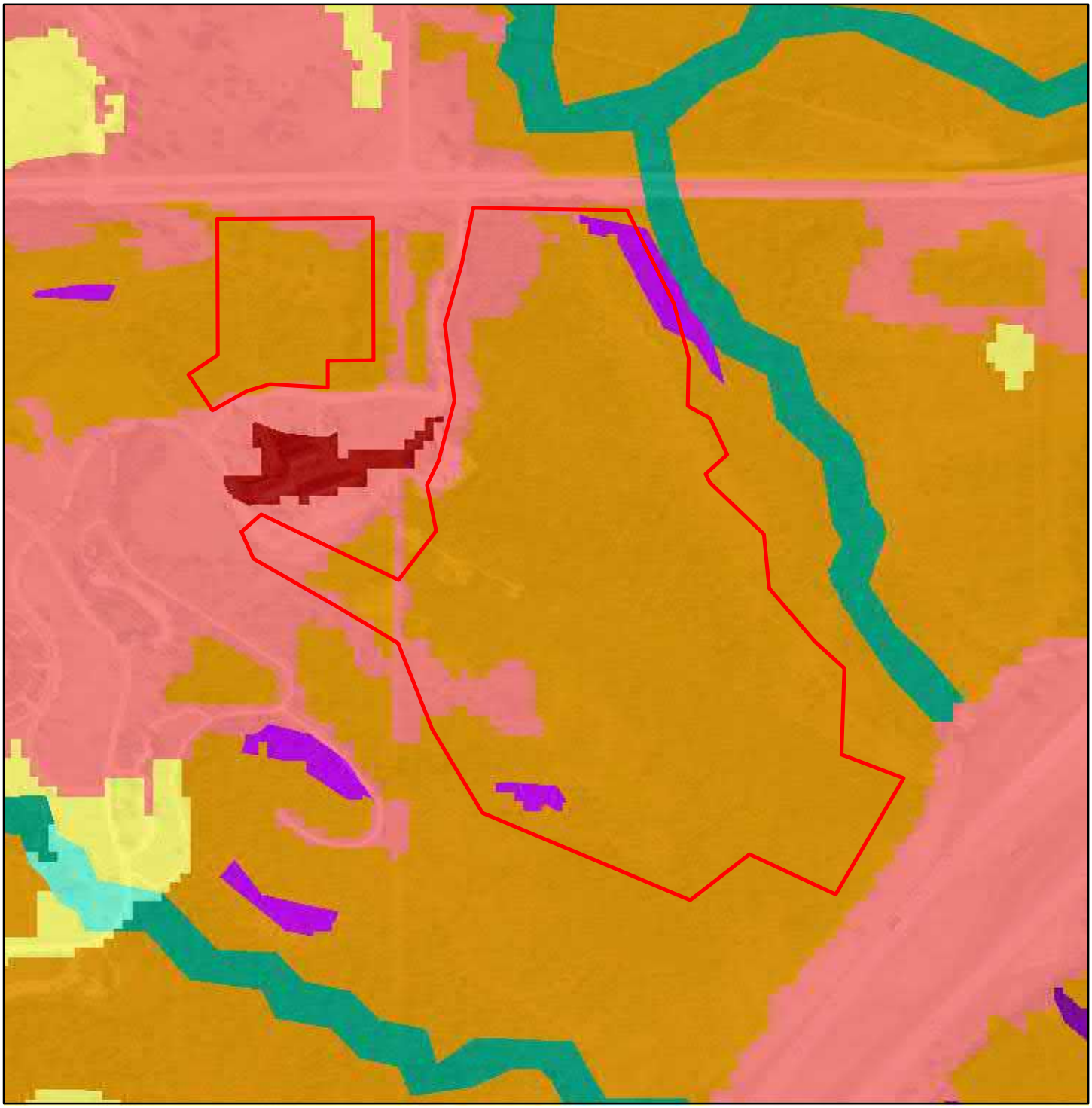

Legend

- Study Area
- **Texas Blackland Prairie Ecoregion (TBPR) EMST Map**
- Blackland Prairie: Disturbance or Tame Grassland
- Central Texas: Riparian Hardwood Forest
- Central Texas: Riparian Herbaceous Vegetation
- Edwards Plateau: Oak / Ashe Juniper Slope Forest
- Edwards Plateau: Oak / Hardwood Slope Forest
- Native Invasive: Deciduous Woodland
- Urban High Intensity
- Urban Low Intensity

N

0 250 500 1,000 Feet

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TPWD, TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

Project No.:	9418P078
Date:	Jul 2018
Drawn By:	JC
Reviewed By:	JH

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EMST Map

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Dallas, Dallas County, Texas

Exhibit

4.0

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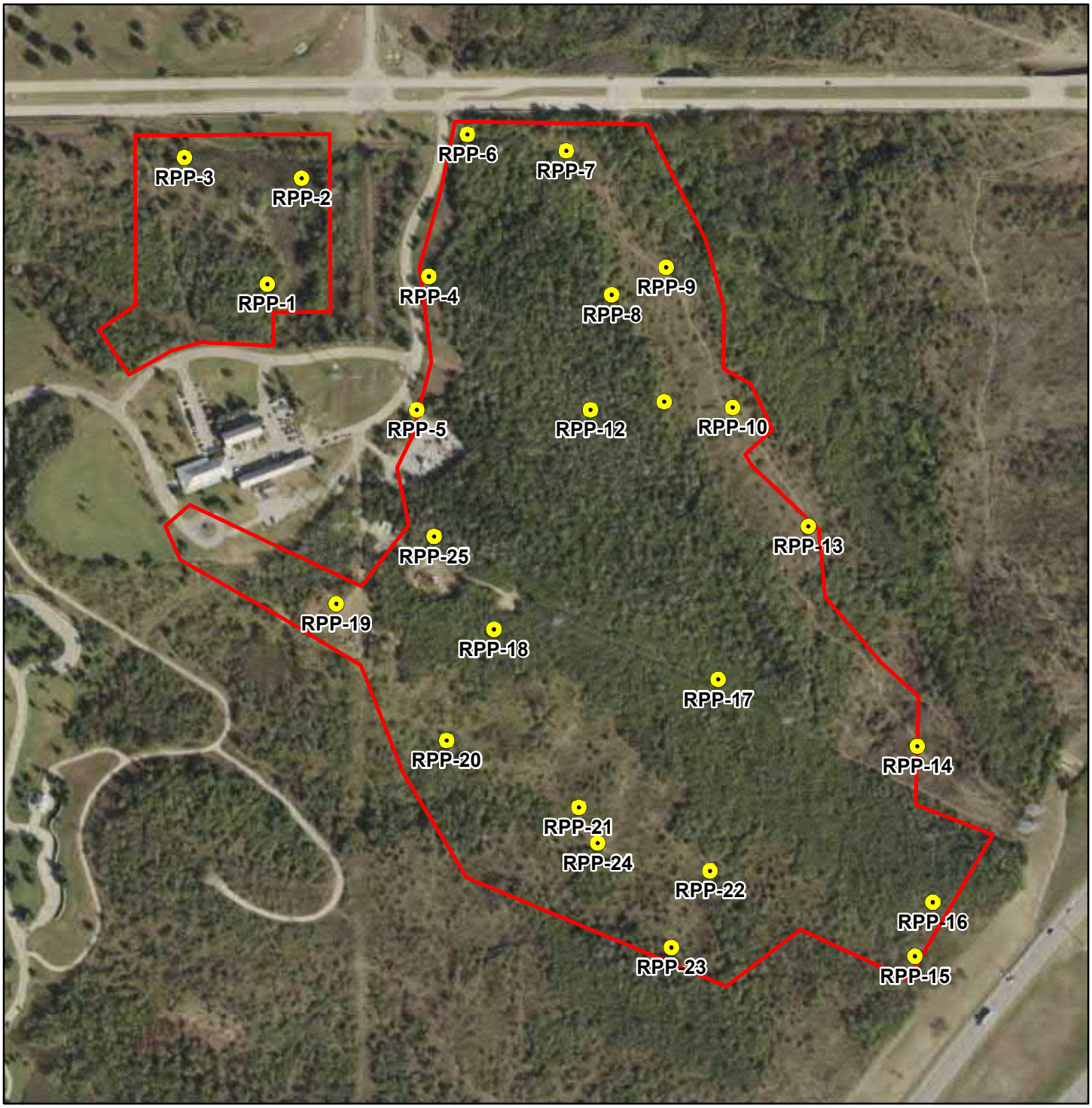

Legend

Study Area

Reference Photo Point

Feet

0 200 400 800

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community

Project No.:	9418P078
Date:	Jul 2018
Drawn By:	JC
Reviewed By:	JH

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Reference Photo Point

Dallas-Fort Worth National Cemetery
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Dallas, Dallas County, Texas

Exhibit

5.0

N:\GIS\2018\9418P078\Maps\T9418P078_Exhibit_5_0_RPP.mxd

APPENDIX B
Supporting Documentation

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Arlington Ecological Services Field Office
2005 Ne Green Oaks Blvd
Suite 140
Arlington, TX 76006-6247
Phone: (817) 277-1100 Fax: (817) 277-1129
http://www.fws.gov/southwest/es/arlingtontexas/
http://www.fws.gov/southwest/es/EndangeredSpecies/lists/

In Reply Refer To: July 06, 2018
Consultation Code: 02ETAR00-2018-SLI-1403
Event Code: 02ETAR00-2018-E-03063
Project Name: 9418P078

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

To Whom It May Concern:

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

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

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

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

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

The Service recommends that candidate species, proposed species, and proposed critical habitat be addressed should consultation be necessary. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at: http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

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

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 et seq.), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/

eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

For additional information concerning migratory birds and eagle conservation plans, please contact the Service's Migratory Bird Office at 505-248-7882.

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

Attachment(s):

- Official Species List

Official Species List

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

This species list is provided by:

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

Project Summary

Consultation Code: 02ETAR00-2018-SLI-1403

Event Code: 02ETAR00-2018-E-03063

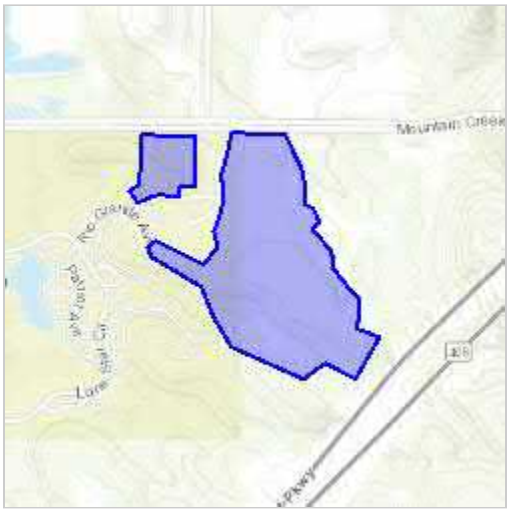
Project Name: 9418P078

Project Type: LAND - CLEARING

Project Description: DFW VA Cemetery

Project Location:

Approximate location of the project can be viewed in Google Maps: https://www.google.com/maps/place/32.717069613582694N96.92890256806277W



Counties: Dallas, TX

Endangered Species Act Species

There is a total of 5 threatened, endangered, or candidate species on this species list.

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

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

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

---

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

Birds

NAME	STATUS
Golden-cheeked Warbler (=wood) *Dendroica chrysoparia*	Endangered
No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/33	
Least Tern *Sterna antillarum*	Endangered
Population: interior pop. No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/8505	
Piping Plover *Charadrius melodus*	Threatened
Population: [Atlantic Coast and Northern Great Plains populations] - Wherever found, except those areas where listed as endangered. There is **final** critical habitat for this species. Your location is outside the critical habitat. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/6039	
Red Knot *Calidris canutus rufa*	Threatened
No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: ▪ Wind Energy Projects Species profile: https://ecos.fws.gov/ecp/species/1864	
Whooping Crane *Grus americana*	Endangered
Population: Wherever found, except where listed as an experimental population There is **final** critical habitat for this species. Your location is outside the critical habitat. Species profile: https://ecos.fws.gov/ecp/species/758	

Critical habitats

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

Last Revision: 12/30/2016 10:08:00 AM

DALLAS COUNTY

BIRDS

		Federal Status	State Status
American Peregrine Falcon	*Falco peregrinus anatum*	DL	T

year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	

migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.

Bald Eagle	*Haliaeetus leucocephalus*	DL	T

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

Black-capped Vireo	*Vireo atricapilla*	LE	E

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

Golden-cheeked Warbler	*Setophaga chrysoparia*	LE	E

juniper-oak woodlands; dependent on Ashe juniper (also known as cedar) for long fine bark strips, only available from mature trees, used in nest construction; nests are placed in various trees other than Ashe juniper; only a few mature junipers or nearby cedar brakes can provide the necessary nest material; forage for insects in broad-leaved trees and shrubs; nesting late March-early summer

Henslow's Sparrow	*Ammodramus henslowii*		

wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking

Interior Least Tern	*Sterna antillarum athalassos*	LE	E

subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony

Peregrine Falcon	*Falco peregrinus*	DL	T

both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (F. p. anatum) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, F.p. tundrius is no longer listed in Texas; but because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.

DALLAS COUNTY

BIRDS

		Federal Status	State Status
Piping Plover	*Charadrius melodus*	LT	T

wintering migrant along the Texas Gulf Coast; beaches and bayside mud or salt flats

Red Knot	*Calidris canutus rufa*	T

Red knots migrate long distances in flocks northward through the contiguous United States mainly April-June, southward July-October. 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. Its bill is dark, straight and, relative to other shorebirds, short-to-medium in length. After molting in late summer, this species is in a drab gray-and-white non-breeding plumage, typically held from September through April. In the non-breeding plumage, the knot might be confused with the omnipresent Sanderling. During this plumage, look for the knot's prominent pale eyebrow and whitish flanks with dark barring. The Red Knot prefers the shoreline of coast and bays and also uses mudflats during rare inland encounters. Primary prey items include coquina clam (Donax spp.) on beaches and dwarf surf clam (Mulinia lateralis) in bays, at least in the Laguna Madre. Wintering Range includes- Aransas, Brazoria, Calhoun, Cameron, Chambers, Galveston, Jefferson, Kennedy, Kleberg, Matagorda, Nueces, San Patricio, and Willacy. Habitat: Primarily seacoasts on tidal flats and beaches, herbaceous wetland, and Tidal flat/shore.

Sprague's Pipit	*Anthus spragueii*

only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.

Western Burrowing Owl	*Athene cunicularia hypugaea*

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

White-faced Ibis	*Plegadis chihi*	T

prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats

Whooping Crane	*Grus americana*	LE	E

potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties

Wood Stork	*Mycteria americana*	T

forages in prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds (i.e. active heronries); breeds in Mexico and birds move into Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960

INSECTS

		Federal Status	State Status
Black Lordithon rove beetle	*Lordithon niger*		

historically known from Texas

DALLAS COUNTY

MAMMALS

		Federal Status	State Status
Cave myotis bat	*Myotis velifer*		

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

Plains spotted skunk	*Spilogale putorius interrupta*		

catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie

MOLLUSKS

		Federal Status	State Status
Louisiana pigtoe	*Pleurobema riddellii*		T

streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins

Sandbank pocketbook	*Lampsilis satura*		T

small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand bottoms; east Texas, Sulfur south through San Jacinto River basins; Neches River

Texas heelsplitter	*Potamilus amphichaenus*		T

quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins

Texas pigtoe	*Fusconaia askewi*		T

rivers with mixed mud, sand, and fine gravel in protected areas associated with fallen trees or other structures; east Texas River basins, Sulphur River, Cypress Creek, Sabine through Trinity rivers as well as San Jacinto River

REPTILES

		Federal Status	State Status
Alligator snapping turtle	*Macrochelys temminckii*		T

perennial water bodies; deep water of rivers, canals, lakes, and oxbows; also swamps, bayous, and ponds near deep running water; sometimes enters brackish coastal waters; usually in water with mud bottom and abundant aquatic vegetation; may migrate several miles along rivers; active March-October; breeds April-October

Texas garter snake	*Thamnophis sirtalis annectens*		

wet or moist microhabitats are conducive to the species occurrence, but is not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August

Texas horned lizard	*Phrynosoma cornutum*		T

open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September

DALLAS COUNTY

REPTILES

		Federal Status	State Status
Timber rattlesnake	*Crotalus horridus*		T

swamps, floodplains, upland pine and deciduous woodlands, riparian zones, abandoned farmland; limestone bluffs, sandy soil or black clay; prefers dense ground cover, i.e. grapevines or palmetto

PLANTS

		Federal Status	State Status

Glass Mountains coral-root *Hexalectris nitida*

GLOBAL RANK: G3; Apparently rare in mixed woodlands in canyons in the mountains of the Brewster County, but encountered with regularity, albeit in small numbers, under Juniperus ashei in woodlands over limestone on the Edwards Plateau, Callahan Divide and Lampasas Cutplain; Perennial; Flowering June-Sept; Fruiting July-Sept

Glen Rose yucca *Yucca necopina*

Texas endemic; grasslands on sandy soils and limestone outcrops; flowering April-June

Hall's prairie clover *Dalea hallii*

GLOBAL RANK: G3; In grasslands on eroded limestone or chalk and in oak scrub on rocky hillsides; Perennial; Flowering May-Sept; Fruiting June-Sept

Osage Plains false foxglove *Agalinis densiflora*

GLOBAL RANK: G3; Most records are from grasslands on shallow, gravelly, well drained, calcareous soils; Prairies, dry limestone soils; Annual; Flowering Aug-Oct

Plateau milkvine *Matelea edwardsensis*

GLOBAL RANK: G3 ; Occurs in various types of juniper-oak and oak-juniper woodlands; Perennial; Flowering March-Oct; Fruiting May-June

Texas milk vetch *Astragalus reflexus*

GLOBAL RANK: G3; Grasslands, prairies, and roadsides on calcareous and clay substrates; Annual; Flowering Feb-June; Fruiting April-June

Tree dodder *Cuscuta exaltata*

GLOBAL RANK: G3; Parasitic on various Quercus, Juglans, Rhus, Vitis, Ulmus, and Diospyros species as well as Acacia berlandieri and other woody plants; Annual; Flowering May-Oct; Fruiting July-Oct

Warnock's coral-root *Hexalectris warnockii*

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

Photo 1 RPP1

Photo 2 RPP2

Photo 3 RPP3

Photo 4 RPP4

Photo 5 RPP5

Photo 6 RPP6

Photo 7 RPP7

Photo 8 RPP8

Photo 9 RPP9

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Photo 19 RPP19

Photo 20 RPP20

Photo 21 RPP21

Photo 22 RPP22

Photo 23 RPP23

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Photo 25 RPP25

Preliminary Waters of the U.S. Delineation

DFW National Cemetery

2000 Mountain Creek Parkway

Dallas, Dallas County, Texas

July 27, 2018
Terracon Project No. 9418P078

Prepared for:
U.S. Department of Veterans Affairs National Cemetery Administration
Dallas-Fort Worth National Cemetery
Dallas County, Texas

Prepared by:
Terracon Consultants, Inc.
Dallas, Texas

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Preliminary Waters of the U.S. Delineation
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July 27, 2018

1.0 INTRODUCTION

Terracon Consultants, Inc. (Terracon) was retained by U.S. Department of Veterans Affairs National Cemetery Administration - Dallas-Fort Worth National Cemetery (client) to perform a preliminary Waters of the U.S. (WOUS) delineation on two tracts of land (approximately 67.2 acres) located at 2000 Mountain Creek Parkway, in Dallas, Dallas County, Texas, hereafter referred to as the study area. The study area is depicted on *Exhibit 1.0* in *Appendix A*. The preliminary WOUS delineation was performed as outlined Master Subconsultant Agreement, VA CFM Nat. Cemetery IDIQ #VA101F-17-D-2827 executed on May 23, 2018.

The preliminary WOUS delineation was generally performed in accordance with the 1987 U.S. Army Corps of Engineers (USACE) Manual and 2010 Great Plains Regional Supplement. Terracon walked the study area and documented changes in vegetation, soil, and hydrologic conditions utilizing USACE data forms for the Great Plains Region. In some instances, where one or more of these characteristics remained consistent with adjacent data point locations, reference photo points were utilized to document reoccurrence. Data was collected in the field utilizing a Trimble GeoXH Global Positioning System (GPS) unit, capable of sub-meter accuracy. GPS data was post-processed utilizing the regional reference system and exported to ArcGIS shapefiles for analysis. Data point coordinates are reported in latitude and longitude, Global Coordinate System (GCS), North American Datum (NAD), 1983.

The purpose of performing the preliminary WOUS delineation was to characterize the existing site conditions and document the presence of aquatic features with the potential to be regulated as WOUS under Section 404 of the Clean Water Act (Section 404).

2.0 SCOPE OF SERVICES

Terracon performed the following scope of work:

- Reviewed U.S. Geologic Survey 7.5-minute topographic maps (USGS maps), U.S. Fish and Wildlife Service National Wetlands Inventory (NWI) data, U.S. Department of Agriculture USDA soil survey data, Federal Emergency Management Agency (FEMA) floodplain maps, aerial photographs, and local climatic data to assist in identifying potential WOUS and wetland areas in the study area.
- Mobilized to the study area to conduct the preliminary site visit.

- Prepared a map showing approximate locations of potential WOUS, including wetland areas observed during the site visit, if any.
- Prepared a Preliminary WOUS Delineation Report that included site characterization information, and a discussion of applicable data.

3.0 PRELIMINARY DATA GATHERING AND ANALYSIS

Prior to performing the site visit, several sources of mapping and other relevant background data were reviewed to assist with identifying potential aquatic features within the study area. Each source of data is described in detail below.

3.1 Topographic Map

The 1959, 1973, and 1995 U.S. Geological Survey (USGS) 7.5-Minute Topographic Maps (Duncanville, Texas Quadrangle) of the study area were reviewed to identify drainages and other potential aquatic features within the study area. The USGS topographic maps depict study area elevations between 500-550 feet above mean sea level, sloping generally southwest. The majority of the study area is depicted as unimproved land with canopy coverage in the southern half, as evidenced by green shading. A utility line easement transects the south-central portion of the study area. The perimeter of the Dallas/Fort Worth National Cemetery is depicted on the topographic map beginning in 1995. The USGS map does not depict streams, contours suggesting channelized drainage, or other potential aquatic features within the study area. The topographic maps are provided as *Exhibits 2.0 – 2.2* in *Appendix A*.

3.2 National Wetlands Inventory Map

National Wetlands Inventory (NWI) data was reviewed to identify potential aquatic features within the study area. The data was published by the U.S. Department of the Interior's Fish and Wildlife Service (USFWS) and depicts potential wetland areas and other waterbodies based on stereoscopic analysis of high altitude aerial photographs. It is Terracon's understanding that the published data is not regularly updated and has not been validated in the field. Presence of mapped NWI features is not indicative of the presence of jurisdictional waterbodies. The NWI data reviewed does not depict potential aquatic features within the study area. Digital NWI data is depicted atop 2016 aerial imagery on *Exhibit 3.0* in *Appendix A*.

3.3 Soil Survey

Data from the U.S. Department of Agriculture (USDA) Natural Resource Conservation Service (NRCS) Web Soil Survey (WSS) and the State Soil Data Access (SDA) Hydric Soils List were reviewed to characterize soils within the study area, accessed July 5, 2018. A soil survey map is included as *Exhibit 4.0* in *Appendix A*. *Table 1* contains a summary of the mapped soil units within the study area and relevant physical characteristics.

Table 1 - Study Area Mapped Soil Types

Map Unit Symbol	Map Unit Name	Landform	Natural Drainage Class	Frequency of Ponding	Frequency of Flooding	Depth to Water Table	Hydric Soil Rating
34	Ferris-Heiden complex, 5 to 12 percent slopes	Ridges	Well Drained	None	None	> 80 inches	No
42	Heiden clay, 2 to 5 percent slopes, eroded	Ridges	Well Drained	None	None	> 80 inches	No
44	Houston Black clay, 1 to 3 percent slopes	Ridges	Moderately Well Drained	None	None	> 80 inches	No
47	Lewisville silty clay, 3 to 5 percent slopes, eroded	Stream terraces	Well Drained	None	None	> 80 inches	No
77	Vertel clay, 5 to 12 percent slopes	Ridges	Well Drained	None	None	> 80 inches	No

3.4 Federal Emergency Management Agency Flood Insurance Rate Map

Terracon reviewed the Federal Emergency Management Agency (FEMA) National Flood Hazard Layer 48113C-NFHL for Dallas County, Texas, updated May 29, 2018. According to the FEMA documents, the entirety of the site is located outside the limits of the FEMA mapped 100-year floodplain and 500-year floodplains and is in Zone X, unshaded. A 100-year floodplain (Zone A) corridor is depicted offsite parallel to the east study area boundary. A FEMA Floodplain Map is included as *Exhibit 5.0* in *Appendix A*.

3.5 Aerial Photographs

Aerial photographs for the years 1996, 2004, and 2016 were reviewed to characterize land use and land cover within the study area. The study area appears to have remained relatively unchanged from 1996 to 2016, with land cover dominated by woody vegetation. The majority of the study area appears to be undeveloped with new development progressing adjacent to the western portion. The 2004 and 2016 photographs depict an apparent utility line easement transecting the south-central portion of the study area, coincident with the utility line depicted on the USGS topographic map. For reference, the aerial photographs can be seen as *Exhibits 6.0 – 6.2* in *Appendix A.*

3.6 Wetland Hydrologic Index

Terracon downloaded and reviewed local climate data to identify current site hydrologic conditions. Data from the NRCS Agriculture Applied Climate Information System (AgACIS) was downloaded and reviewed using the Direct Antecedent Rainfall Evaluation Method (DAREM),

accessed July 9, 2018. The DAREM provides an index of climatic conditions, as they pertain to wetland hydrology, for the time period in which field data was collected. Rainfall data was obtained from the Dallas Redbird AP, Texas weather station; the nearest weather station to the study area with the range of historic data available to calculate the DAREM. *Table 2* and *Table 3* summarize the DAREM index data for the study area at the time of the site visit on July 10, 2018. According to the DAREM, the study area was experiencing drier than normal hydrologic conditions at the time of the site visit.

Table 2 - Project Area Wetland Hydrologic Condition for July 2018

Prior Month	Month	WETS Percentile (in)		Measured Rainfall[1]	Condition[2]	Weight[3]	Score
		30th	70th				
1st	**June**	1.79	4.70	0.28	1	3	3
2nd	**May**	2.18	4.44	2.29	2	2	4
3rd	**April**	1.66	3.48	0.42	1	1	1
						Total:	**8**

[1]Measured rainfall recorded at Dallas Redbird AP, Texas weather station

[2]Condition: 1 = monthly rainfall totals less than the 30-year Extreme Rainfall Distribution 30th percentile, 2 = monthly rainfall totals between the 30th and 70th percentile for the 30-year Extreme Rainfall Distribution, 3 = monthly rainfalls totals greater than the 70th percentile for the 30-year Extreme Rainfall Distribution

[3]Monthly weights equal 3 for the prior month, 2 for the second prior month, and 1 for the third prior month.

Table 3 - DAREM Score Summary

DAREM Score (Observed Score)	6	7	**8**	9	10	11	12	13	14	15	16	17	18
DAREM Wetland Hydrologic Condition	**Drier than normal**				Normal					Wetter than normal			

4.0 FIELD TECHNIQUES

Terracon personnel conducted a reconnaissance of the site on July 10, 2018 to characterize the existing site conditions and identify the presence of aquatic features with the potential to be regulated as WOUS under Section 404, if any. A total of five data points were collected to characterize the vegetation, soil, and hydrology within the study area.

Aquatic features were identified based on the presence of an ordinary high water mark (OHWM) and bed/bank features, or the presence of wetland indicators where applicable. For portions of the surface tributary system (i.e. streams and impoundments of streams), the OHWM is the limit of USACE jurisdiction under Section 404. The OHWM can generally be described as the line on the shore established by the fluctuation of the surface water, and is indicated by the following characteristics:

- clear line impressed on the bank,

- shelving,
- changes in soil character,
- destruction of terrestrial vegetation,
- the presence of litter and debris,
- or other features influenced by the surrounding area.

The USACE and EPA define wetlands as "*those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstance do support, a prevalence of vegetation typically adapted for life in saturated soil condition. Wetlands generally include swamps, marshes, bogs, and similar areas*" (33 CFR 328.3b). In order to make a positive wetland determination, indicators of hydrophytic vegetation, hydric soil, and wetland hydrology need to be observed and recorded. In order to provide data with which to evaluate hydrophytic vegetation, the USACE publishes wetland indicator statuses for many plant species in the National Wetlands Plant List (NWPL). If a species is not listed on the NWPL, it is assumed to be an upland species. Generally, hydrophytic vegetation is indicated if there is a dominance or prevalence of FAC, FACW, or OBL vegetation[1]. *Table 4* describes the NWPL indicator categories.

Table 4 - Wetland Plant Indicator Status Descriptions

Indicator Status (Abbreviation)	Occurrence in Wetlands (%)
Obligate (OBL). Normally occur under natural conditions in wetlands	99%
Facultative Wetland (FACW). Usually occur in wetlands, but occasionally found in uplands.	67%-99%
Facultative (FAC). Equally to occur in wetlands and uplands.	34%-66%
Facultative Upland (FACU). Usually occur in uplands but occasionally found in wetlands.	1%-33%
Upland (UPL) may occur in wetlands in another region, but normally occur in uplands under natural conditions in the region specified.	1% or less

To evaluate hydric soil, profiles (between 4 and 20 inches) were excavated and characterized utilizing Munsell Soil Color Charts (Munsell, 2009) to record soil color. Visual and tactile observations related to composition, texture, and disturbance were also recorded. This information was compared to criteria in the *Field Indicators of Hydric Soils in the United States* manual (USDA, NRCS, 2017) to make a positive or negative determination of hydric soil. Generally, hydric soils exhibit physical characteristics (aroma, composition, color, texture) indicative of biogeochemical processes associated with anoxic conditions; including the presence

[1] If a community is dominated by FAC vegetation, hydric soil and wetland hydrology need to be present for the community to be considered hydrophytic.

of decaying organic material, hydrogen sulfide odor, and redoximorphic characteristics (i.e. iron or manganese depletions and/or concentrations).

Wetland hydrology is generally indicated by visual observations of saturated or inundated conditions. For the Great Plains Region, the USACE data form includes 18 primary indicators of wetland hydrology, and nine secondary indicators of wetland hydrology. To make a positive determination of wetland hydrology, one primary or two secondary indicators need to be present. In the absence of these indicators, a positive wetland hydrology determination can be made if hydric soil and hydrophytic vegetation are present, and morphological adaptations associated with prolonged inundation (e.g. adventitious roots, aerenchyma tissue, etc.) are present on dominant vegetation species. Additionally, stream gauge data, aerial photos, and previous wetland delineation data can be utilized in the absence of visual indicators in certain circumstances.

5.0 SUMMARY OF FIELD OBSERVATIONS AND RESULTS

On July 10, 2018, Terracon performed a field reconnaissance of the study area and did not identify aquatic features. Reference photo point, transect, and data point locations are illustrated on *Exhibit 7.0* in *Appendix A* and the *Wetland Determination Data Forms* are provided in *Appendix B*. Site photographs, included in *Appendix C* and illustrated on *Exhibit 7.0* in *Appendix A,* provide an indication of the physical characteristics observed during the site visit. Descriptions of the site conditions are provided in the following sections.

5.1 Stream, Wetland and Open Water Features

During the site visit, Terracon personnel did not identify or delineate aquatic features within the study area. Other streams or open water features were not observed. Although hydrophytic vegetation was observed and recorded throughout the study area, hydric soils and wetland hydrology were not observed and no areas meeting all three wetland criteria were identified or delineated.

Table 5 summarizes the relevant information from the five data points collected during the field reconnaissance. For further descriptions of Hydric Soil and Wetland Hydrology Indicators please refer to the *Wetland Determination Data Forms* in *Appendix B*.

Table 5 - Data Point Summary

Data Point No.	Community	Dominant Vegetation	Soil Characteristics	Hydrologic Characteristics	Classification
1	Upland Forest	*Ligustrum sinense* (UPL), *Ulmus crassifolia* (FAC), *Juniperus virginiana* (UPL)	Dark loam with roots and no redoximorphic features	Hydrology Indicators not observed	Upland

Data Point No.	Community	Dominant Vegetation	Soil Characteristics	Hydrologic Characteristics	Classification
2	Drainage Swale	*Salix nigra* (FACW), *Ligustrum sinense* (UPL), *Solidago altissima* (FACU), *Iva annua* (FAC), *Carex crus-corvi* (OBL), *Helianthus annuus* (FACU)	Dark clay, no redoximorphic features	Surface soil cracks (B6)	Upland
3	Riparian Scrub	*Ligustrum sinense* (UPL), *Juniperus virginiana* (UPL), *Gleditisia triacanthos* (FACU), *Asclepias virdis* (UPL) *Fraxinus pennsylvanica* (FAC), *Smilax bona-nox* (FAC), *Eragrotis intermedia* (UPL)	Dark, clay loam with no redoximorphic features.	Hydrology Indicators not observed	Upland
4	Upland Scrub	*Ligustrum sinense* (UPL), *Sorgun halepense* (FACU)	Light clay ,root layer no redoximorphic features	Hydrology Indicators not observed	Upland
5	Grassland	*Prosopis glandulosa* (FACU), *Artemesia ludoviciana* (UPL), *Eragrostis intermedia* (UPL)	Shallow dark clay over rock layer, no redoximorphic features	Hydrology Indicators not observed	Upland

6.0 CONCLUSIONS

According to the Federal Register [*33CFR §328.3(a)*], WOUS may include intrastate rivers and streams, including impoundments and other waters. Since the 2006 Supreme Court decision (*Rapanos v. U.S., 547 S. Ct. 715*), the USACE and EPA have continued to assert jurisdiction over traditionally navigable waters; non-navigable tributaries of traditionally navigable waters where the tributaries are relatively permanent waters (i.e. streams with perennial or intermittent flow); and wetlands directly abutting such tributaries.

Tributaries, open water, wetlands, or other aquatic features were not observed during the site reconnaissance, therefore it is not anticipated that development within the study area would result in activities subject to USACE jurisdiction under Section 404.

The USACE has the ultimate authority for wetland and WOUS determinations. The Environmental Protection Agency (EPA) has the ultimate authority for official jurisdictional determinations; however, authority has been delegated to the USACE to verify wetland delineations and give an Approved Jurisdictional Determination (AJD) on potential WOUS.

To confirm the conclusions reached in this assessment regarding impacts to jurisdictional waters and/or verification of the delineation performed by Terracon, an AJD can be requested from the USACE. Certain activities which involve the discharge of dredged or fill material into jurisdictional waters, including jurisdictional wetlands, require authorization from the USACE and it is

incumbent upon the client to consult with the USACE to determine if USACE authorization is required. AJDs are made by the USACE, in conjunction with the EPA, on a case-by-case basis in accordance with internal policies and procedures in place at the time and using information at its disposal that may not be readily available to the public.

7.0 GENERAL COMMENTS

The preliminary WOUS delineation was performed in accordance with generally accepted scientific and engineering evaluation practices of this profession undertaken in similar studies at the same time and in the same geographical area. In conducting the limited scope of services described herein, certain sources of information and public records were not reviewed. No biological assessment can remove uncertainty regarding the potential for concerns in connection with a project.

APPENDIX A
Exhibits

Legend

Study Area

Feet

0 1,000 2,000 4,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Esri, HERE, DeLorme, MapmyIndia, © OpenStreetMap contributors
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

Project No.:	9418P078
Date:	Jul 2018
Drawn By:	JC
Reviewed By:	JH

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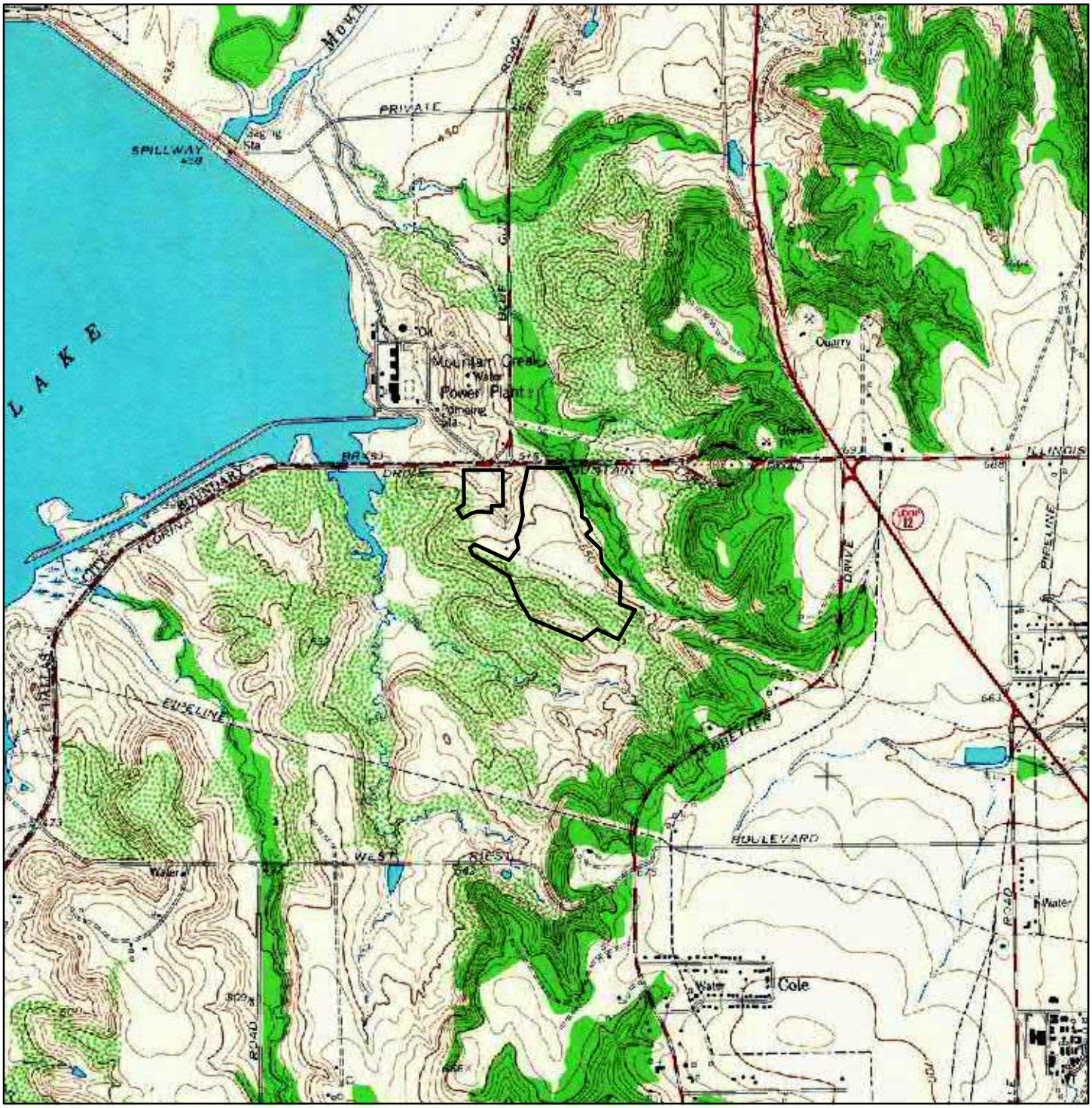
Vicinity Map

Dallas-Fort Worth National Cemetery
VA DFW Phase 4 Cemetery
32.718369°, -96.927954° (GCS NAD83)
Dallas, Dallas County, Texas

Exhibit

1.0

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_1_vicinity.mxd



Legend

Study Area

N

0 1,000 2,000 4,000 Feet

DATA SOURCES: USGS TopoView, Duncanville Quadrangle, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA

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Date:	Jul 2018
Drawn By:	JC
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USGS Topographic Map: 1959

Dallas-Fort Worth National Cemetery
VA DFW Phase 4 Cemetery
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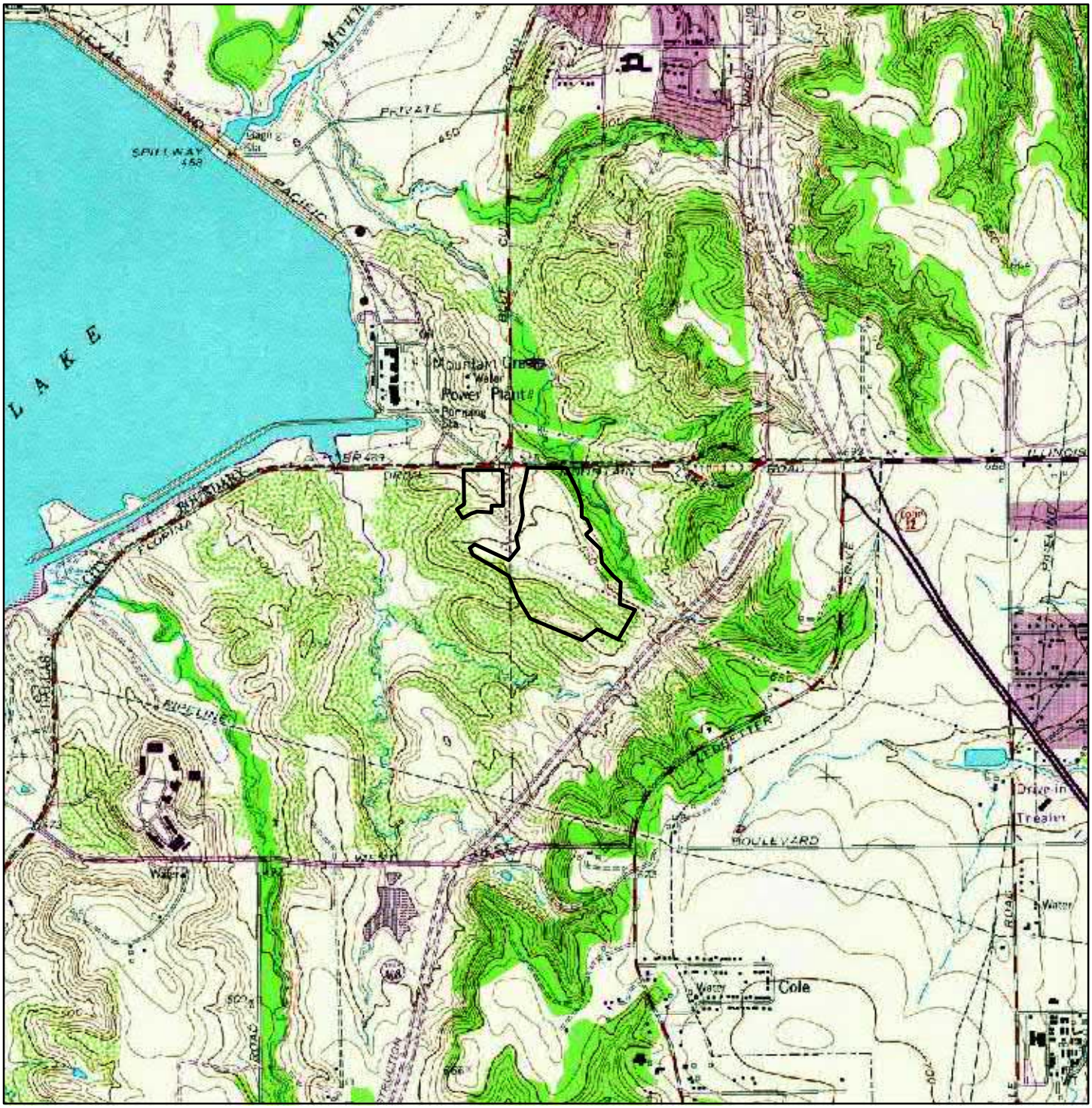
Dallas, Dallas County, Texas

Exhibit

2.0

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_2_0_topo1959.mxd



Legend

Study Area

N

0 1,000 2,000 4,000 Feet

DATA SOURCES: Kasberg, Patrick and Associates, LP, USGS TopoView Duncanville Quadrangle, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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USGS Topographic Map: 1973

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Dallas, Dallas County, Texas

Exhibit

2.1

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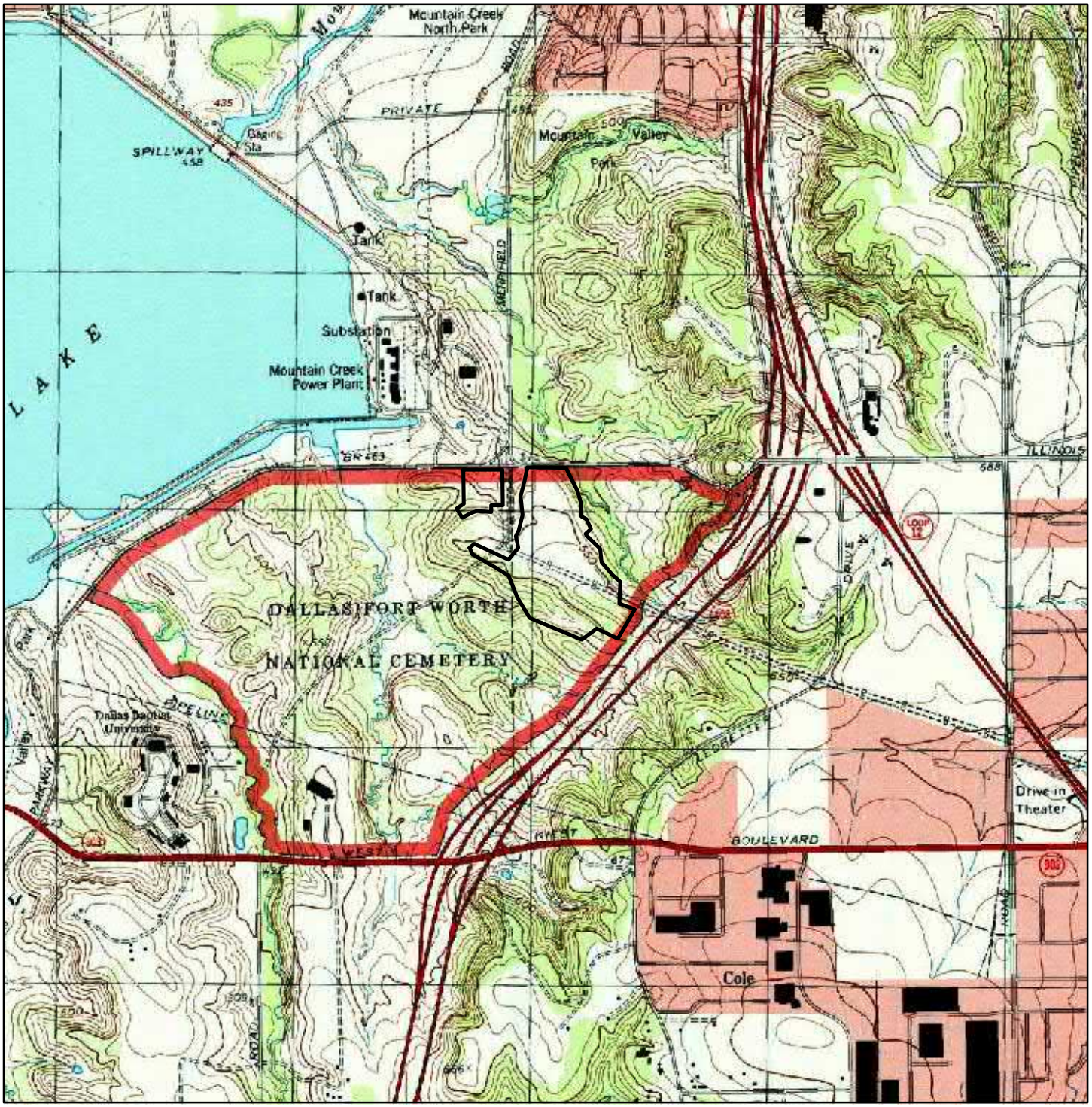

Legend

Study Area

N

0 1,000 2,000 4,000 Feet

DATA SOURCES: Kasberg, Patrick and Associates, LP, USGS TopoView Duncanville Quadrangle, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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USGS Topographic Map: 1995

Dallas-Fort Worth National Cemetery
VA DFW Phase 4 Cemetery
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Dallas, Dallas County, Texas

Exhibit

2.2

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_2_2_topo1995.mxd

Legend

- Study

NWI Feature Type

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

Feet
0 500 1,000 2,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

Project No.:	9418P078
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Drawn By:	JC
Reviewed By:	JH

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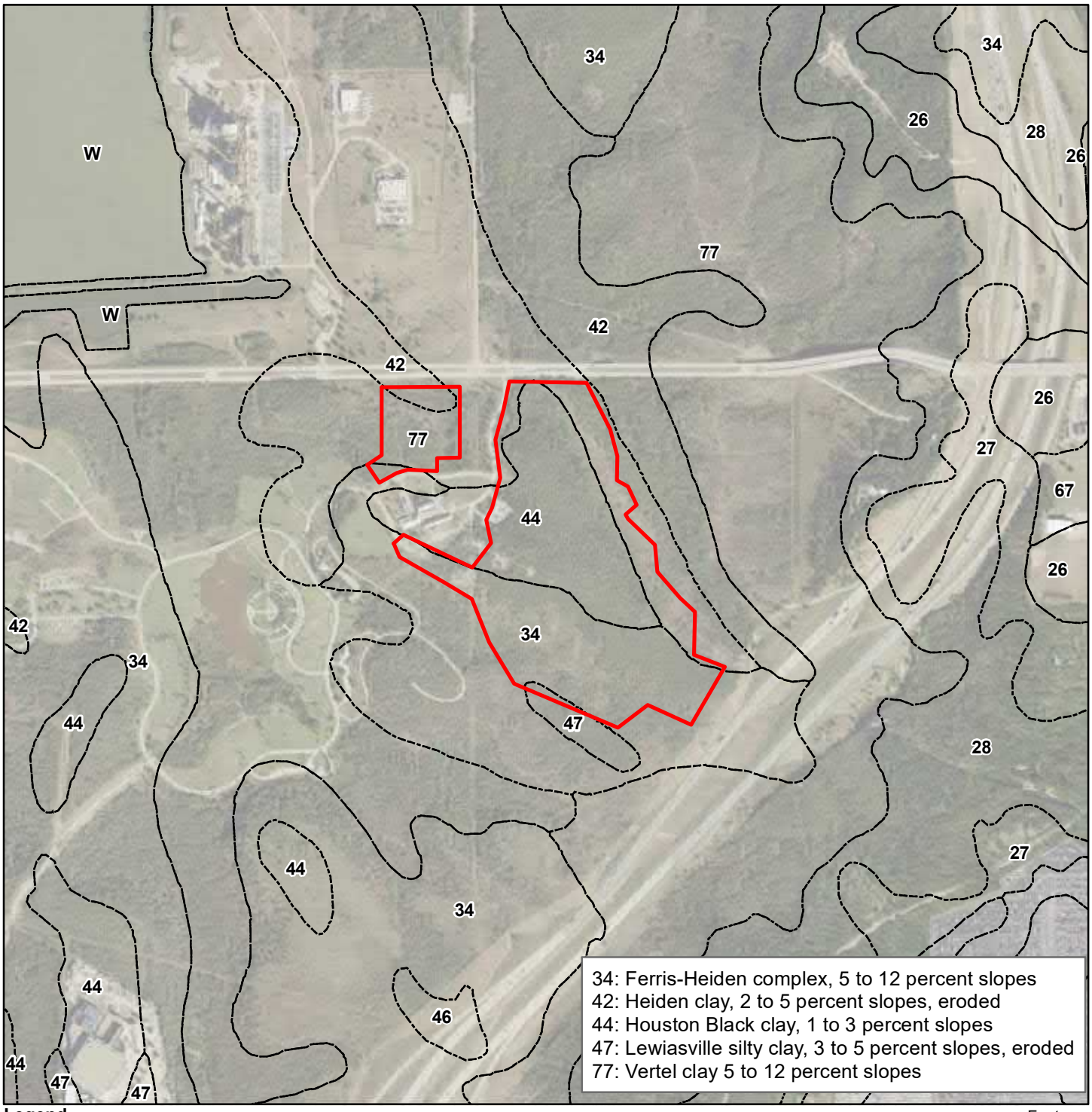
National Wetland Inventory Map

Dallas-Fort Worth National Cemetery
VA DFW Phase 4 Cemetery
32.718369°, -96.927954° (GCS NAD83)
Dallas, Dallas County, Texas

Exhibit

3.0

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_3_NWI.mxd



Legend

Study Area

USDA WSS Map Unit

Feet

0 500 1,000 2,000

N

DATA SOURCES: Calibre Engineering, Inc., LP, USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS , ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits: © OpenStreetMap (and) contributors, CC-BY-SA
Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

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USDA Web Soil Survey Map

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VA DFW Phase 4 Cemetery
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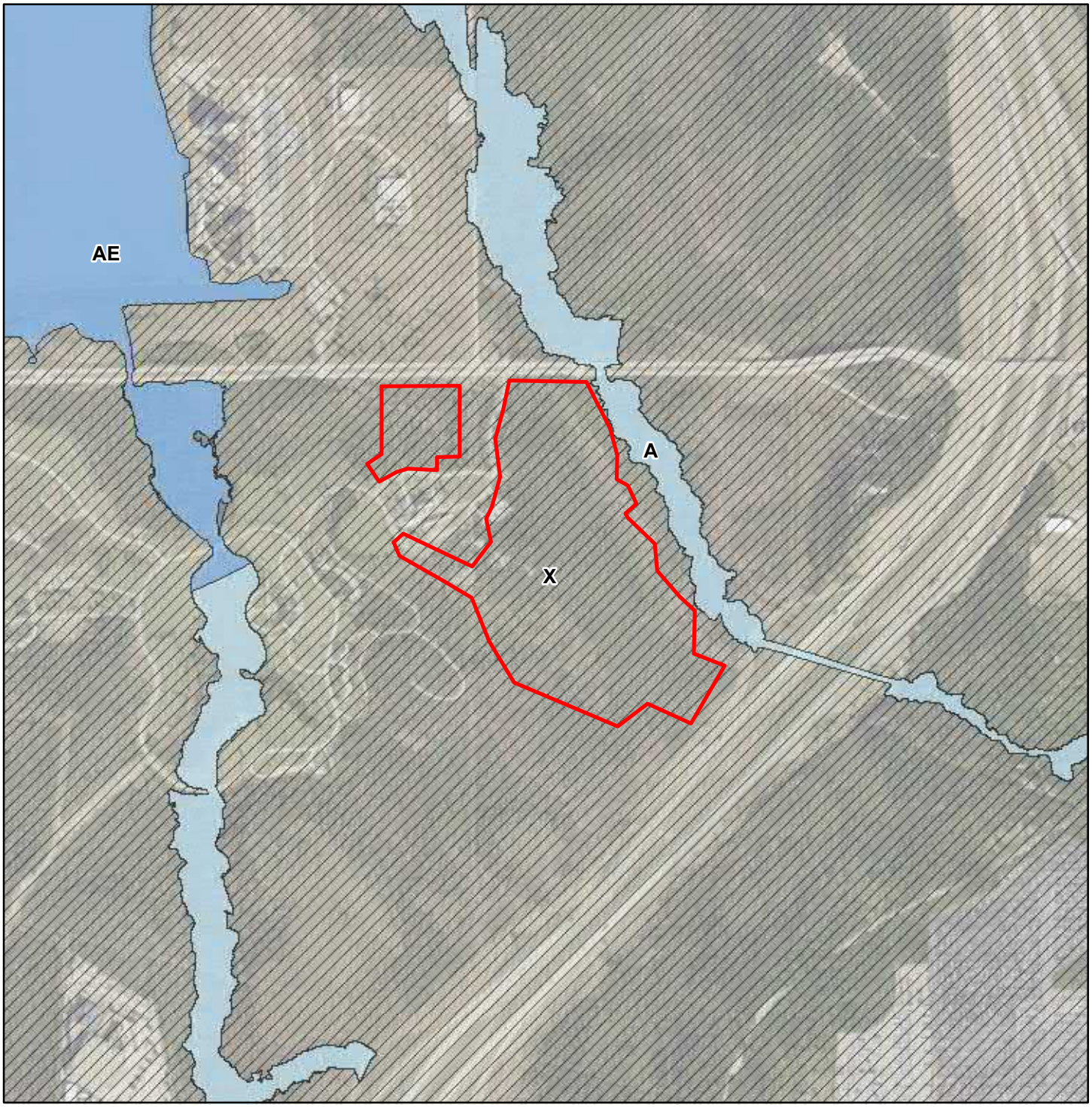
Dallas, Dallas County, Texas

Exhibit

4.0

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_4_soil.mxd



Legend

- Study Area
- **FEMA Floodplain Zone**
- Base Floodplain *AE*
- 100-Year Flood Zone *A*
- 500-Year Flood Zone
- Zone X

Feet
0 500 1,000 2,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA, USGS, AeroGRID, IGN, and the GIS User Community
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Source: Esri, DigitalGlobe, GeoEye, Earthstar Geographics, CNES/Airbus DS, USDA,

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FEMA Floodzone Map

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VA DFW Phase 4 Cemetery
32.718369°, -96.927954° (GCS NAD83)
Dallas, Dallas County, Texas

Exhibit

5.0

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_5_FEMA.mxd

Legend

Study Area

Feet
0 250 500 1,000

N

DATA SOURCES: Kasberg, Patrick and Associates, LP, USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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1996 Aerial Imagery

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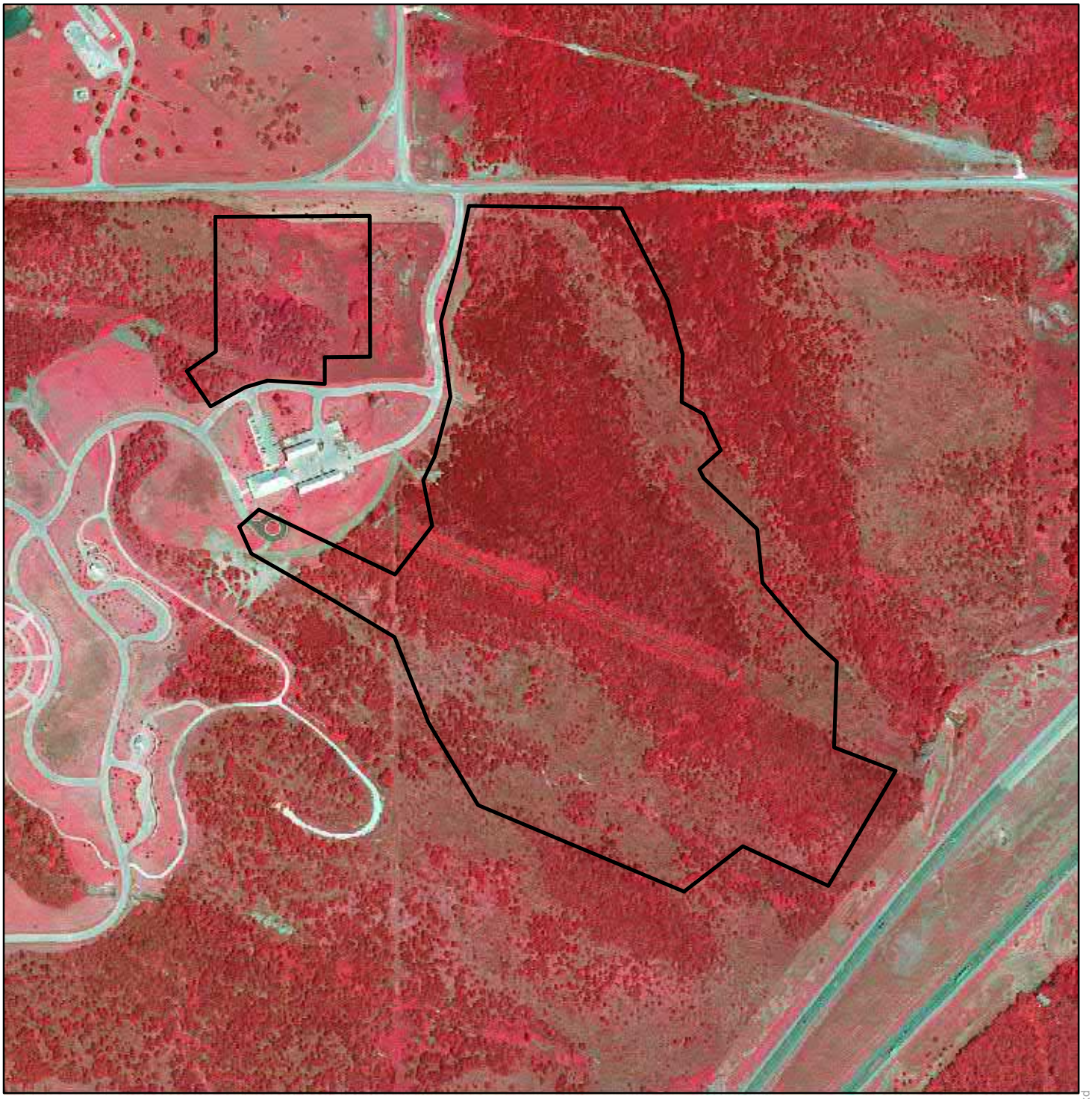
Dallas, Dallas County, Texas

Exhibit

6.0

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_6_0_1996Aerial.mxd



Legend

Study Area

Feet
0 250 500 1,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits:
Service Layer Credits:

Project No.:	9418P078
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2004 Aerial Imagery

Dallas-Fort Worth National Cemetery
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Dallas, Dallas County, Texas

Exhibit

6.1

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_6_1_2004Aerial.mxd

Legend

Study

Feet
0 250 500 1,000

N

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
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2016 Aerial Imagery

Dallas-Fort Worth National Cemetery
VA DFW Phase 4 Cemetery
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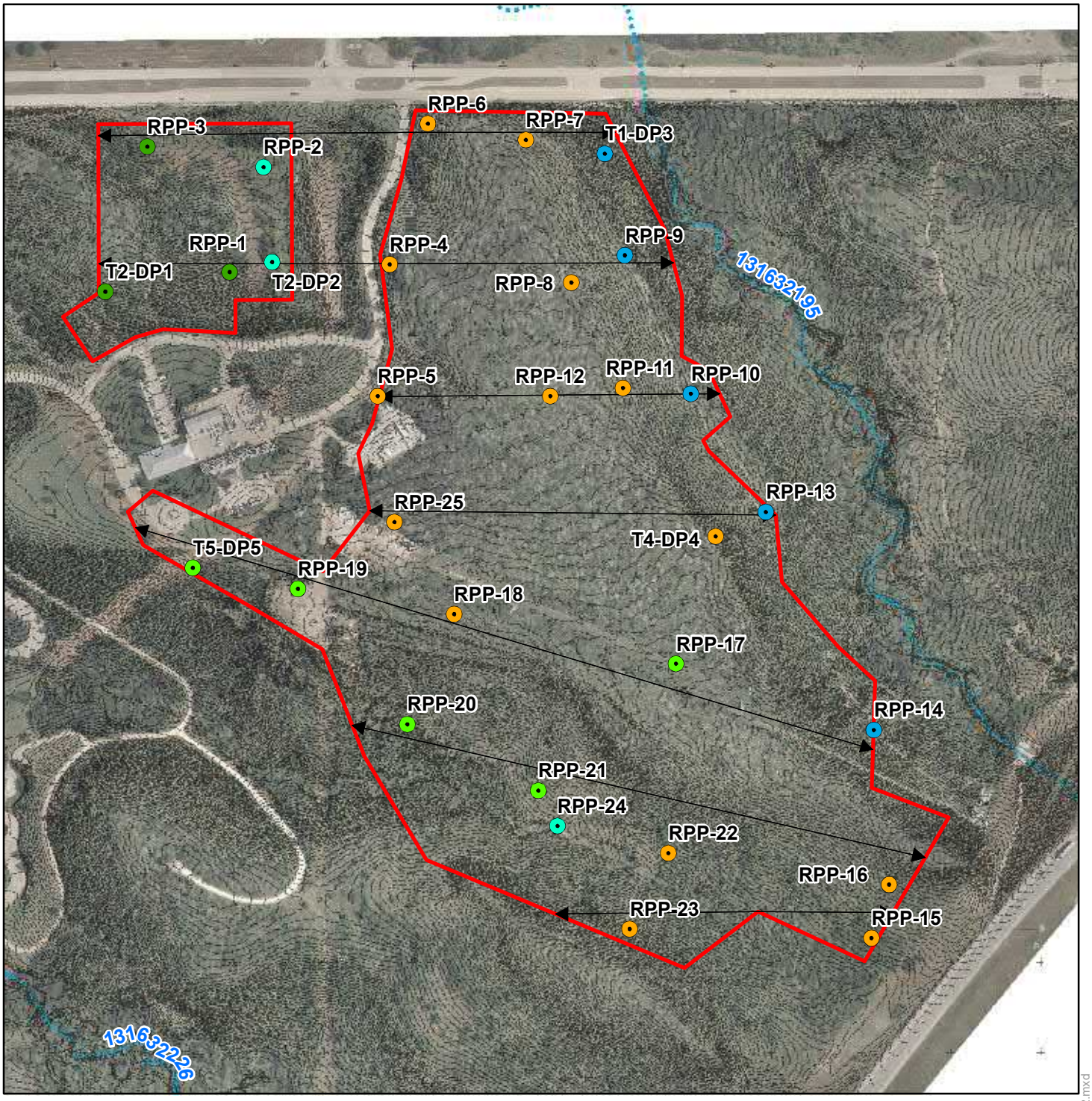
Dallas, Dallas County, Texas

Exhibit

6.2

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_6_2_2016Aerial.mxd



Legend

- Study Area
- Transect
- NHD Stream Centerline

Community

- Drainage Swale
- Grassland
- Riparian Scrub
- Upland Forest
- Upland Scrub

N

0 200 400 800 Feet

DATA SOURCES: Calibre Engineering, Inc., USGS TopoView, USFWS NWI, USGS NHD, USDA WSS, FEMA , TNRIS, ESRI WMS - World Aerial Imagery, OpenStreetMap
Service Layer Credits:
Service Layer Credits:

Project No.:	9418P078
Date:	Jul 2018
Drawn By:	JC
Reviewed By:	JH

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Delineated Features Map

Dallas-Fort Worth National Cemetery
VA DFW Phase 4 Cemetery
32.718369°, -96.927954° (GCS NAD83)
Dallas, Dallas County, Texas

Exhibit

7.0

N:\GIS\2018\9418P078\Maps\9418P078_Exhibit_7_0_DelineationV2.mxd

APPENDIX B
Wetland Determination Data Forms

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 9418P078 DFW VA Cemetery City/County: Dallas/Dallas Sampling Date: 7/10/2018

Applicant/Owner: Dallas-Fort Worth National Cemetery State: TX Sampling Point: T2-DP1

Investigator(s): Cobb, Marshall Section, Township, Range: NA

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 30

Subregion (LRR): J Lat: 32.719022 Long: -96.93301 Datum: NAD83

Soil Map Unit Name: 77: Vertel clay, 5 to 12 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

DAREM= 8; drier than normal
Community: Upland Forest

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Ulmus crassifolia*	20	Y	FAC
2. *Juniperus virginiana*	15	Y	UPL
3. *Ligustrum sinense*	35	Y	UPL
4.			
	70	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Ulmus crassifolia*	15	N	FAC
2. *Ligustrum sinense*	80	Y	UPL
3.			
4.			
5.			
	95	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Ligustrum sinense*	80	Y	UPL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	80	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	35	x 3 =	105
FACU species	0	x 4 =	0
UPL species	210	x 5 =	1050
Column Totals:	245 (A)		1155 (B)

Prevalence Index = B/A = **4.7**

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: T2-DP1

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0"-6"	10YR 3/1	100					loam	roots

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock

Depth (inches): 6"

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 1 T2-DP1 Facing North

Photo 2 T2-DP1 Facing East

Photo 3 T2-DP1 Facing South

Photo 4 T2-DP1 Facing West

Photo 5 T2-DP1 Soil Profile

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 9418P078 DFW VA Cemetery City/County: Dallas/Dallas Sampling Date: 7/10/2018

Applicant/Owner: Dallas-Fort Worth National Cemetery State: TX Sampling Point: T2-DP2

Investigator(s): Cobb, Marshall Section, Township, Range: NA

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): _____

Subregion (LRR): J Lat: 32.720023 Long: -96.928454 Datum: NAD83

Soil Map Unit Name: 77: Vertel clay, 5 to 12 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ✔	No _____	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:
DAREM= 8; drier than normal
Community: Riparian Scrub

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix nigra*	35	Y	FACW
2.			
3.			
4.			
	35 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Ligustrum sinense*	35	Y	UPL
2. *Salix nigra*	10	Y	FACW
3.			
4.			
5.			
	45 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Solidago altissima*	20	Y	FACU
2. *Iva annua*	35	Y	FAC
3. *Smilax bona-nox*	5	N	FAC
4. *Carex crus-corvi*	15	Y	OBL
5. *Helianthus annuus*	10	Y	FACU
6. *Eleocharis englemannii*	5	N	FACW
7.			
8.			
9.			
10.			
	90 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 4 (A)

Total Number of Dominant Species Across All Strata: 7 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 57% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	15	x 1 =	15
FACW species	50	x 2 =	100
FAC species	40	x 3 =	120
FACU species	30	x 4 =	120
UPL species	35	x 5 =	175
Column Totals:	170 (A)		530 (B)

Prevalence Index = B/A = **3.11**

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

✔ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes ✔ No _____

Remarks:

SOIL

Sampling Point: T2-DP2

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0"-16"	10YR 3/3	100					clay	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ✔ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 6 T2-DP2 Facing North

Photo 7 T2-DP2 Facing East

Photo 8 T2-DP2 Facing South

Photo 9 T2-DP2 Facing West

Photo 10 T2-DP2 Soil Profile

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 9418P078 DFW VA Cemetery City/County: Dallas/Dallas Sampling Date: 7/10/2018

Applicant/Owner: Dallas-Fort Worth National Cemetery State: TX Sampling Point: T1-DP3

Investigator(s): Cobb, Marshall Section, Township, Range: NA

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): none Slope (%): _____

Subregion (LRR): J Lat: 32.719213 Long: -96.931489 Datum: NAD83

Soil Map Unit Name: 77: Vertel clay, 5 to 12 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

DAREM= 8; drier than normal
Community: Drainage Swale

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0 = Total Cover		
Sapling/Shrub Stratum (Plot size: 15')			
1. *Gleditisia triacanthos*	15	Y	FACU
2. *Ligustrum sinense*	35	Y	UPL
3. *Celtis laevigata*	10	N	FAC
4. *Juniperus virginiana*	15	Y	UPL
5.			
	75 = Total Cover		
Herb Stratum (Plot size: 5')			
1. *Ligustrum sinense*	10	Y	UPL
2. *Asclepias viridis*	10	Y	NI/UPL
3. *Centaurea americana*	5	N	NI/UPL
4. *Amphiachyris dracunculoides*	5	N	NI/UPL
5. *Fraxinus pennsylvanica*	10	Y	FAC
6. *Smilax bona-nox*	15	Y	FAC
7. *Gleditisia triacanthos*	10	Y	FACU
8. *Vitis vulpina*	5	N	FAC
9. *Eragrostis intermedia*	10	Y	NI/UPL
10.			
	80 = Total Cover		
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0 = Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 1 (A)

Total Number of Dominant Species Across All Strata: 9 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 11% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	40	x 3 =	120
FACU species	25	x 4 =	100
UPL species	90	x 5 =	450
Column Totals:	155 (A)		620 (B)

Prevalence Index = B/A = **4.0**

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: T1-DP3

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0"-17"	10YR 4/3	100					clay loam	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: _____

Depth (inches): _____

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 11 T1-DP3 Facing North

Photo 12 T1-DP3 Facing East

Photo 13 T1-DP3 Facing South

Photo 14 T1-DP3 Facing West

Photo 15 T1-DP3 Soil Profile

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 9418P078 DFW VA Cemetery City/County: Dallas/Dallas Sampling Date: 7/10/2018

Applicant/Owner: Dallas-Fort Worth National Cemetery State: TX Sampling Point: T4-DP4

Investigator(s): Cobb, Marshall Section, Township, Range: NA

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 20

Subregion (LRR): J Lat: 32.717077 Long: -96.927499 Datum: NAD83

Soil Map Unit Name: 77: Vertel clay, 5 to 12 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

DAREM= 8; drier than normal
Community: Upland Scrub

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Ligustrum sinense*	90	Y	UPL
2. *Prosopis glandulosa*	5	N	FACU
3.			
4.			
5.			
	95	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Ligustrum sinense*	30	Y	UPL
2. *Sorgum halepense*	20	Y	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
	50	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	25	x 4 =	100
UPL species	120	x 5 =	600
Column Totals:	145 (A)		700 (B)

Prevalence Index = B/A = **4.8**

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

leaf litter

SOIL

Sampling Point: T4-DP4

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0"-6"	10YR 2/2	100					clay	
6"	root layer							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: root layer

Depth (inches): 6"

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 16 T4-DP4 Facing North

Photo 17 T4-DP4 Facing East

Photo 18 T4-DP4 Facing South

Photo 19 T4-DP4 Facing West

WETLAND DETERMINATION DATA FORM – Great Plains Region

Project/Site: 9418P078 DFW VA Cemetery City/County: Dallas/Dallas Sampling Date: 7/10/2018

Applicant/Owner: Dallas-Fort Worth National Cemetery State: TX Sampling Point: T5-DP5

Investigator(s): Cobb, Marshall Section, Township, Range: NA

Landform (hillslope, terrace, etc.): hillslope Local relief (concave, convex, none): concave Slope (%): 10

Subregion (LRR): J Lat: 32.716895 Long: -96.932251 Datum: NAD83

Soil Map Unit Name: 34: Ferris-Heiden complex, 5 to 12 percent slopes NWI classification: none

Are climatic / hydrologic conditions on the site typical for this time of year? Yes _____ No ✔ (If no, explain in Remarks.)

Are Vegetation _____, Soil _____, or Hydrology _____ significantly disturbed? Are "Normal Circumstances" present? Yes ✔ No _____

Are Vegetation _____, Soil _____, or Hydrology _____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes _____	No ✔	**Is the Sampled Area within a Wetland?** Yes _____ No ✔
Hydric Soil Present?	Yes _____	No ✔	
Wetland Hydrology Present?	Yes _____	No ✔	

Remarks:

DAREM= 8; drier than normal
Community: Grassland

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30')	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	0	= Total Cover	
Sapling/Shrub Stratum (Plot size: 15')			
1. *Prosopis glandulosa*	20	Y	FACU
2.			
3.			
4.			
5.			
	20	= Total Cover	
Herb Stratum (Plot size: 5')			
1. *Centaurea americana*	15	N	NI/UPL
2. *Prosopis glandulosa*	10	N	FACU
3. *Sorgum halepense*	15	N	FACU
4. *Artemisia ludoviciana*	35	Y	UPL
5. *Eragrostis intermedia*	20	Y	NI/UPL
6.			
7.			
8.			
9.			
10.			
	95	= Total Cover	
Woody Vine Stratum (Plot size: 30')			
1.			
2.			
	0	= Total Cover	

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC (excluding FAC−): 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	0	x 1 =	0
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	45	x 4 =	180
UPL species	70	x 5 =	350
Column Totals:	115 (A)		530 (B)

Prevalence Index = B/A = **4.6**

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? Yes _____ No ✔

Remarks:

SOIL

Sampling Point: T5-DP5

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0"-3"	10YR 3/4	100					Clay	
3"	rock layer							

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Stratified Layers (A5) (**LRR F**)
- ___ 1 cm Muck (A9) (**LRR F, G, H**)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) (**LRR G, H**)
- ___ 5 cm Mucky Peat or Peat (S3) (**LRR F**)
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1)
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)
- ___ High Plains Depressions (F16) (**MLRA 72 & 73 of LRR H**)

Indicators for Problematic Hydric Soils[3]:

- ___ 1 cm Muck (A9) (**LRR I, J**)
- ___ Coast Prairie Redox (A16) (**LRR F, G, H**)
- ___ Dark Surface (S7) (**LRR G**)
- ___ High Plains Depressions (F16) (**LRR H outside of MLRA 72 & 73**)
- ___ Reduced Vertic (F18)
- ___ Red Parent Material (TF2)
- ___ Very Shallow Dark Surface (TF12)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if present):

Type: rock layer

Depth (inches): 3"

Hydric Soil Present? Yes _____ No ✔

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Water-Stained Leaves (B9)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Dry-Season Water Table (C2)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where not tilled**)
- ___ Presence of Reduced Iron (C4)
- ___ Thin Muck Surface (C7)
- ___ Other (Explain in Remarks)

Secondary Indicators (minimum of two required)

- ___ Surface Soil Cracks (B6)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Drainage Patterns (B10)
- ___ Oxidized Rhizospheres on Living Roots (C3) (**where tilled**)
- ___ Crayfish Burrows (C8)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ FAC-Neutral Test (D5)
- ___ Frost-Heave Hummocks (D7) (**LRR F**)

Field Observations:

Surface Water Present? Yes _____ No ✔ Depth (inches): _____

Water Table Present? Yes _____ No ✔ Depth (inches): _____

Saturation Present? (includes capillary fringe) Yes _____ No ✔ Depth (inches): _____

Wetland Hydrology Present? Yes _____ No ✔

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

Photo 20 T5-DP5 Facing North

Photo 21 T5-DP5 Facing East

Photo 22 T5-DP5 Facing South

Photo 23 T5-DP5 Facing West

APPENDIX C
Site Photographs

Photo 1 RPP1

Photo 2 RPP2

Photo 3 RPP3

Photo 4 RPP4

Photo 5 RPP5

Photo 6 RPP6

Photo 7 RPP7

Photo 8 RPP8

Photo 9 RPP9

Photo 10 RPP10

Photo 11 RPP11

Photo 12 RPP12

Photo 13 RPP13

Photo 14 RPP14

Photo 15 RPP15

Photo 16 RPP16

Photo 17 RPP17

Photo 18 RPP18

Photo 19 RPP19

Photo 20 RPP20

Photo 21 RPP21

Photo 22 RPP22

Photo 23 RPP23

Photo 24 RPP24

Photo 25 RPP25

APPENDIX E
Common Acronyms

COMMON ACRONYMS

AJD	Approved Jurisdictional Determination
CWA	Clean Water Act
EPA	Environmental Protection Agency
FAC	Facultative
FACU	Facultative Upland
FACW	Facultative Wetland
FEMA	Federal Emergency Management Agency
FIRM	Flood Insurance Rate Map
GPS	Global Positioning Systems
NRCS	Natural Resource Conservation Service
NWI	National Wetlands Inventory
OBL	Obligate Wetland
OHWM	Ordinary High Water Mark
PJD	Preliminary Jurisdictional Determination
UPL	Obligate Upland
USACE	U.S. Army Corps of Engineers
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geologic Survey
WOUS	Waters of the U.S.

Cultural Resources Survey Report

Archaeological Survey of 79 Acres at Dallas Fort Worth National Cemetery
Dallas, Dallas County, Texas

July 15, 2020

Terracon Project No. 90187P078

David Yelacic, RPA, Principal Investigator

Prepared for:
U.S. Department of Veterans Affairs National Cemetery Administration
Dallas Fort Worth National Cemetery
Dallas, Dallas County, Texas

Prepared by:
Terracon Consultants, Inc.
San Antonio, Texas

July 15, 2020

Mark Wolfe, Executive Director
Texas Historical Commission
1511 Colorado Street
Austin, Texas 78701

RE: **Cultural Resources Survey**
Dallas Fort Worth National Cemetery Expansion
Appx. 79 Acres
2000 Mountain Creek Parkway,
Dallas, Dallas County, Texas
Terracon Project No. 90187P078

Dear Mr. Wolfe:

Terracon is pleased to submit this report of findings from a cultural resources survey for Dallas Fort Worth National Cemetery Expansion Project in Dallas, Dallas County, Texas. The archaeological investigation consisted of a systematic and intensive pedestrian survey of approximately 79-acres of currently undeveloped land adjacent to the existing cemetery. The undertaking is under purview of the Section 106 of the National Historic Preservation Act (NHPA).

Overall, pedestrian survey and 57 shovel test excavations failed to identify cultural resources within the APE for direct effects. Terracon therefore recommends that the project should proceed as planned given that no archaeological sites considered eligible for NRHP inclusion or designation of a SAL were identified present within the project area—pending review and concurrence by the appropriate regulating agencies (e.g., THC).

Sincerely,
Terracon Consultants, Inc.

Morlock, Juan D
Digitally signed by Morlock, Juan D
DN: cn=Morlock, Juan D, ou=General Users, email=Juan.Morlock@terracon.com
Date: 2020.07.15 14:48:39 -05'00'

Juan D Morlock,
Staff Archaeologist

Yelacic, David M
Digitally signed by Yelacic, David M
DN: cn=Yelacic, David M, ou=General Users, email=David.Yelacic@terracon.com
Date: 2020.07.15 15:12:26 -05'00'

David M. Yelacic, RPA
PI Archaeologist

Jennifer Peters
Environmental Planning Group Manager

Attachments

TABLE OF CONTENTS

ABSTRACT

Terracon archaeologists conducted a systematic and intensive pedestrian survey of a proposed cemetery expansion project at Dallas Fort Worth National Cemetery at 2000 Mountain Creek Parkway in Dallas, TX on behalf of the Department for Veteran Affairs. Survey took place over approximately 79 acres of land that is currently undeveloped with the exception of utility easements. The undertaking is under purview of Section 106 of the National Historic Preservation Act (NHPA).

Fieldwork was conducted from May 20-22 of 2020 by Terracon archaeologists Juan “Kiko” Morlock and Edgar Vasquez under supervision of David Yelacic, Principal Investigator. Overall, pedestrian survey and 57 shovel test excavations failed to identify cultural resources within the APE for direct effects. Terracon therefore recommends that the project should proceed as planned given that no archaeological sites considered eligible for NRHP inclusion or designation of a SAL were identified present within the project area—pending review and concurrence by the appropriate regulating agencies (e.g., THC).

Cultural Resources Survey Report:
Dallas Fort Worth National Cemetery Expansion Project
Dallas, Dallas County, Texas

Terracon Project No. 9018P078

July 15, 2020

1.0 INTRODUCTION

On behalf of the Department of Veteran Affairs (VA), Terracon Consultants Inc. performed intensive archaeological survey in support of phased expansion of Dallas Fort Worth National Cemetery (approximately 79-acres) in the City of Dallas, Dallas County, Texas. As the proposed cemetery expansion is sponsored by and includes land controlled by the VA, the proposed undertaking is subject to provisions of Section 106 of the National Historic Preservation Act (NHPA). The proposed expansion does not trigger the Antiquities Code of Texas

Fieldwork was carried out by Terracon archaeologists on May 20-22 of 2020. David Yelacic, RPA served as Principal Investigator, and archaeological fieldwork was carried out by Juan "Kiko" Morlock and Edgar Vasquez. Following reporting guidelines promulgated by the Council for Texas Archaeologists and the Texas Historical Commission (THC), the area of potential effect is defined and contextualized, methods are described, results are presented, and recommendations are provided in the concluding section.

2.0 AREA OF POTENTIAL EFFECT

The overall area of potential effects (APE) includes a 64.7-acre tract located west and south of the Cemetery Administration Building, as well as a smaller 14.3-acre tract to the north, totaling approximately 79-acres. The larger tract is bounded by the cemetery Administration and Maintenance complex to the west, Mountain Creek Parkway to the north, an unnamed drainage to the west, and Highway 408 to the south. The smaller tract is bound by the Administration and Maintenance complex to the south, Mountain Creek Parkway to the north, Rio Grande Drive to the west, and undeveloped cemetery property to the east. The vertical APE is unknown at this time.

3.0 ENVIRONMENTAL SETTING

Environments are composed of such interconnected elements as underlying bedrock geology, soil, biology (i.e., plants and animals), and climate. Environmental conditions are coupled with initial patterning and subsequent preservation of materials left behind by humans, the culmination of which is referred to as site formation processes. Understanding and evaluating potential site formation processes aids in assessing the presence and preservation of cultural resources. It is therefore important to consider environmental conditions of the past and present when assessing

cultural resources of all ages. The 7.5-minute U.S. Geological Survey Duncanville Quadrangle shows the study area as rolling to undulating low hills with elevations ranging across the area from 500 to 550 feet above sea level.

In general terms, the project area is located within the Blackland Prairie (Griffith et al. 2004). This ecoregion is distinguished by a unique combination of physical and biological properties. The Blackland Prairie is characterized topographically by nearly flat to rolling plains. The Blackland Prairie was at one point a diverse, productive grassland with wooded stream bottoms, but most of it has been converted to agricultural purposes or urban sprawl.

3.1 Geology and Soils

Bedrock geology is mapped as the Cretaceous-age Eagle Ford Group (Kef), which are selenitic shales with calcareous concretions over platy, burrowed sandstone that rests on a hard limestone base (USGS: GDT 2007). Three soils are mapped in the area: Houston Black Series, Ferris-Heiden Complex, and Vertel Clay (Web Soil Survey 2019). Houston Black Series consists of very deep and very slowly permeable clay soils that formed in clayey residuum from calcareous mudstone; the Ferris-Heiden Complex are both very deep soils, slowly permeable clay soils that formed from clayey residuum of calcareous mudstone; Vertel Clays are moderately deep, very slowly permeable soils that are gently to strongly sloping soils on uplands that form in shaly materials (NRCS Web Soil Survey 2019).

4.0 CULTURAL HISTORY

Generally, the cultural chronology of the Texas can be divided between Prehistoric and Historic time periods. The boundary between the two is marked by the introduction of Europeans into the western hemisphere. Through the last 75-plus years of archaeological research in the region, identifiable and repeated patterns in artifact assemblages have indicated major shifts in subsistence strategies and technology through time. As a result, Prehistoric Period has three subdivisions: Paleoindian, Archaic, and Late Prehistoric.

The Paleoindian period (ca. 12,500-8800 years ago) includes the earliest human occupation of North America, which extends back into the late Pleistocene. During this period of time, people hunted large game, but they generally had a broad diet and consumed much of what they could. This included small game and aquatic creatures all the way up to mega fauna that went extinct with the close of the Pleistocene (i.e., mammoth, mastodon, bison, horse, camel, etc.). Technological traditions further subdivide the Paleoindian period into Early and Late. The Archaic period (ca. 8800-1250 years ago) was the longest period in prehistory, and it is generally marked by the introduction of hot-rock cooking in addition to the proliferation of a wide variety of diagnostic projectile points. Cooking with fire-heated rocks developed with increased reliance on plant foods, which may have been a response to diminishing game resources and ultimately climatic change/variation. This is not to say that human agency, and ultimately culture, did not play an important role in the shift of economic and subsistence strategies. The Archaic period is

subdivided into Early-, Middle-, and Late-Archaic periods, each with a slight variation in response to cultural shifts and ambient conditions. The Late Prehistoric (ca. 1250-250 years ago) was a relatively brief period, but it was marked by a shift in weapon technology: the introduction of the bow-and-arrow. Like the Archaic, the Late Prehistoric people utilized hot rock cooking to process plants to edible forms. There also appeared to be increasing contact among groups, which resulted in increased trade of materials and evident competition over resources.

4.1 Historic Period

Sometimes referred to as the Protohistoric period, the Spanish Entradas, or expeditions, mark the onset of western influence in the New World. These explorations effectively scouted the new land and resulted in the settlement and establishment of missions spread throughout what has become northern Mexico and Texas. Through the Historic period, European populations and influence steadily increased as native populations were diminished.

Aerial photographs available for the years 1952-2014 were reviewed to characterize land use and land cover within the study area. The study area appears to have remained relatively unchanged from 1952 to 2001, with land cover dominated by woody vegetation. Most of the study area appears to be undeveloped; however, considering the continuous development of the cemetery complex to the west, it is possible some artificial impacts to the area have taken place. Photographs indicate the cemetery began development some time between 2000, with little development occurring in the immediate surrounding area.

5.0 PREVIOUS INVESTIGATIONS

The Texas Archaeological Sites Atlas database (Atlas) and the NRHP geographic information system informed this records review. This review indicates that the project area would be in an area that has been previously evaluated for historic and archaeological cultural resources.

The Atlas indicates that three archaeological surveys (ca. 1994, 2002, and 2015) have taken place at and around the proposed project area. Three historic-age archaeological sites were recorded within the immediate vicinity and within one kilometer of the proposed project area. Historic windmill sites, 41DL364 and 41DL365, were recorded in 1995 (Skinner et.al. 1995) and were not relocated during attempts to revisit the sites in 2015 (Lindemuth 2015: 3-1). Site 41DL421, an early to mid-twentieth century artifact scatter recorded in 2002, was revisited circa 2006 and could not be relocated. Early consultation with the Texas Historical Commission during a 2015 expansion phase of the cemetery concluded that archaeological survey should be conducted due to the time span between the previous surveys (i.e., greater than 10 years). Accordingly, pedestrian survey supplemented with shovel test pits investigated the general area north of the current project for previously recorded, as well as unrecorded, archaeological resources. The previously identified sites could not be relocated and were likely destroyed since their initial documentation (Lindemuth 2015: 3-3). None of these sites are/were documented within the present area of potential effect for the proposed expansion and improvements activities.

6.0 METHODS

6.1 Pedestrian Survey

To investigate the proposed project area, archaeologists conducted pedestrian survey in 30-meter transects following a one square acre grid overlaid onto the project area. While this project was begun prior to updated survey standards, Terracon archaeologists implemented the new standards, which included excavation of a total of 45 shovel tests at 57 potential shovel test locations (i.e., 12 shovel test locations were not excavated due to clear disturbances). Shovel tests were placed at regularly spaced intervals

Shovel tests were excavated in arbitrary 20-centimeter levels, and sediment excavated during shovel testing was passed through ¼-inch hardware mesh and/or troweled through. Shovel test results were recorded on paper field forms as well as through photographs and GPS. Additionally, areas along the line that were surveyed only by visual pedestrian survey were recorded with a GPS and photographs.

7.0 RESULTS

Despite generally abundant surface visibility, inspection of the surface along transects was difficult through the very brushy and thorny interior of the larger tract, but sinuous survey lines were walked or crawled. No cultural materials were identified at the surface across the property, and no cultural materials were identified in the 45 excavated shovel tests.

Shovel test excavations yielded observations of relatively shallow bedrock in more upland environments, as well as shallow and ferrous subsoils in low-lying portions of the APE. Shovel test excavations were typically terminated by 30 to 50 centimeters below surface. Non-cultural gravels were encountered in many shovel tests.

Both the larger and smaller tracts appear to have been subject to some degree of ground disturbance. The larger tract by the construction of a large power line right of way and the dumping and storage of various items utilized by the cemetery and its upkeep. The smaller tract had both gas and sewer utility easements running through it.

8.0 CONCLUSIONS AND RECOMMENDATIONS

On behalf of the VA, Terracon archaeologists carried out intensive archaeological survey of the proposed Dallas Fort Worth National Cemetery Expansion Project (approximately 79 acres) in the City of Dallas, Dallas County, Texas. The undertaking is under purview of Section 106 of the

National Historic Preservation Act as the proposed project is sponsored and impacts land controlled by the VA.

Overall, pedestrian survey and 57 shovel test excavations failed to identify cultural resources within the APE for direct effects. Terracon therefore recommends that the project should proceed as planned given that no archaeological sites considered eligible for NRHP inclusion or designation of a SAL were identified present within the project area—pending review and concurrence by the appropriate regulating agencies (e.g., THC).

9.0 REFERENCES CITED

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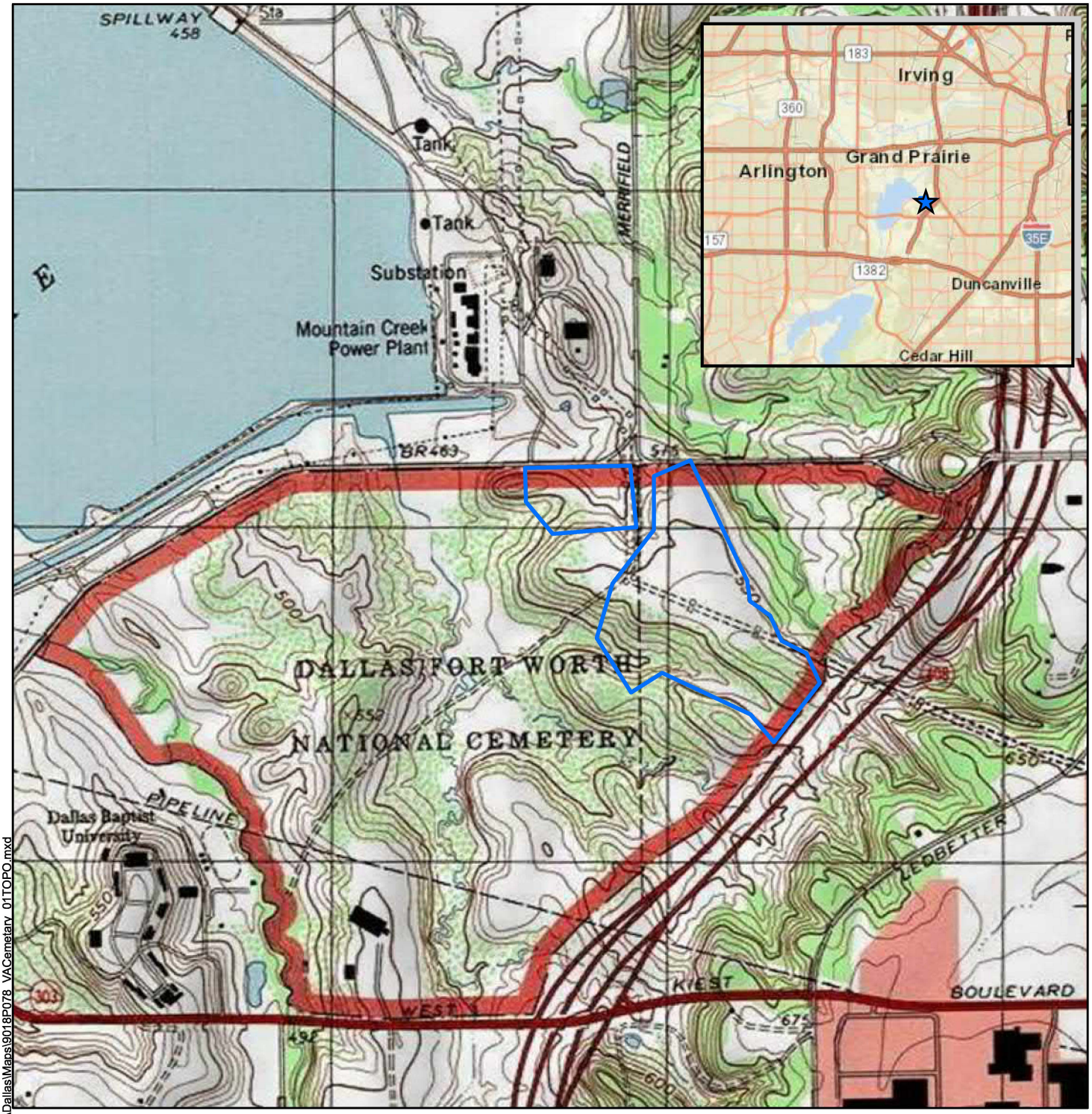
APPENDIX A
Maps



Service Layer Credits: Sources: Esri, HERE, Garmin, USGS, Intermap, INCREMENT P, NRCan, Esri Japan, METI, Esri China (Hong Kong), Esri Korea, Esri (Thailand), NGCC, (c) OpenStreetMap contributors, and the GIS User Community

Project Area

N
W E
S

0 350 700 1,400
Feet

0 150 300 600
Meters

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Drawn By:	VCP
Checked By:	DMY
Approved By:	DMY

Project No.	9018P078
Scale:	1 in = 1,400 ft
TBPE Firm No.	F-3272
Date:	June 2020

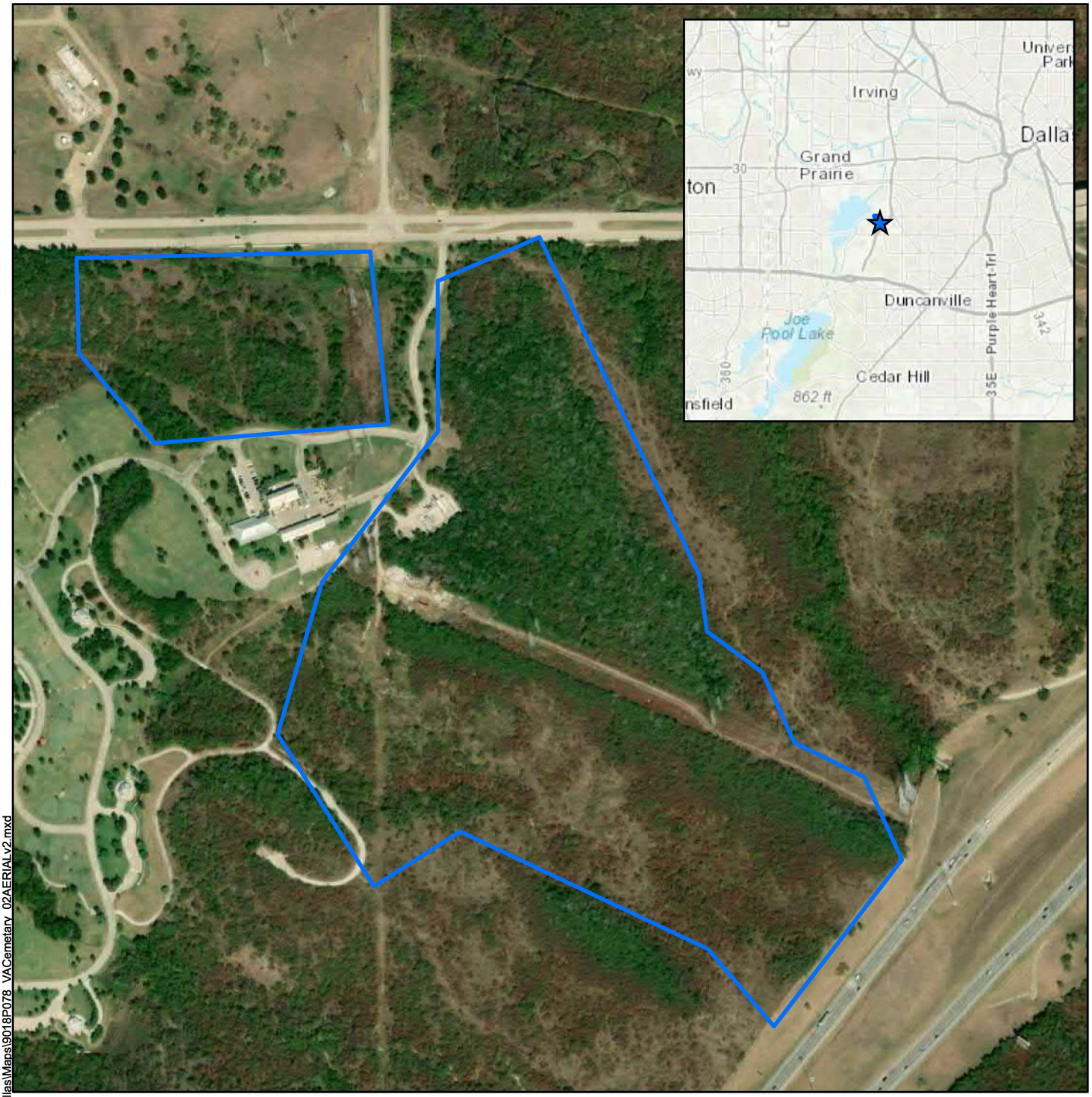
Terracon
Consulting Engineers & Scientists
6911 Blanco Road San Antonio, TX 78216
PH (210) 641-2112 Fax (210) 641-2124

Topographic Map

Dallas VA Cemetery Expansion Project
2000 Mountain Creek Parkway
Dallas County, Texas

Figure

1



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Project Area

N
W E
S

0 150 300 600
Feet

0 50 100 200
Meters

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Project Mngr:	JTP
Drawn By:	VCP
Checked By:	DMY
Approved By:	DMY

Project No.	9018P078
Scale:	1 in = 500 ft
TBPE Firm No.	F-3272
Date:	June 2020

Terracon
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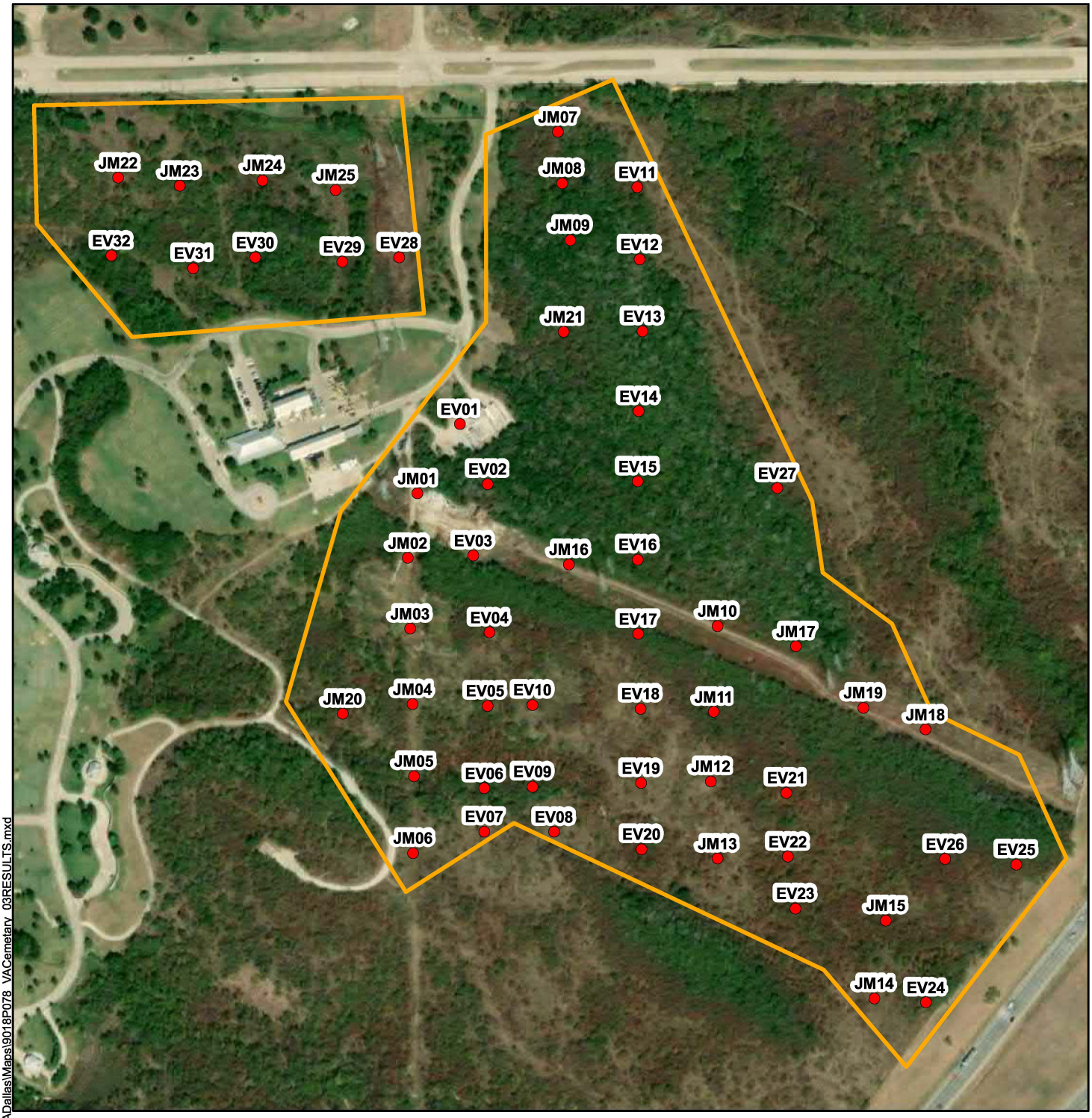
Aerial Map

Dallas VA Cemetary Expansion Project
2000 Mountain Creek Parkway
Dallas County, Texas

Figure

2



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Shovel Test
ProjectArea

N
W E
S

0 125 250 500
Feet
0 50 100 200
Meters

Project Mngr:	JTP
Drawn By:	VCP
Checked By:	DMY
Approved By:	DMY

Project No.	9018P078
Scale:	1 in = 400 ft
TBPE Firm No.	F-3272
Date:	June 2020

Terracon
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6911 Blanco Road San Antonio, TX 78216
PH (210) 641-2112 Fax (210) 641-2124

Results Overview

Dallas VA Cemetery Expansion Project
2000 Mountain Creek Parkway
Dallas County, Texas

Figure
3

APPENDIX B
Photographs

Photo 1 Powerline ROW and Cemetery Storage Area

Photo 2 View of road/disturbance to area used for dumping brush.

Photo 3 Shovel Test JM03

Photo 4 Shovel Test JM04

Photo 5 Low Drainage Area at JM05

Photo 6 Standing water on slope near garbage dumping area.

Photo 7 Metal Drainage pipe embedded in ground.

Photo 8 PVC Drainage pipe embedded in the ground.

Photo 9 Dumped concrete cemetery debris on slope near JM02 and JM03.

Photo 10 Shovel test JM07

Photo 11 Shovel Test JM09

Photo 12 Shovel Test JM12

Photo 13 Shovel Test JM14

Photo 14 Power Line ROW near east side of larger project area facing SE

Photo 15 Gas utility infrastructure that goes into the smaller project area.

Photo 16 Sewer line infrastructure in smaller project area.

Photo 17 Shovel Test JM23 in smaller project area.

Photo 18 Manhole cover in smaller project area.

Photo 19 Shovel Test JM24

Photo 20 Shovel Test JM25

Photo #1 View of EV01 ND, facing East.

Photo #2 View of EV02, facing Northeast.

Photo #3 View of EV03, facing east

Photo #4 View of EV04 shovel test, plan

Photo #5 View of EV4, facing south

Photo #6 View of EV5, facing south

Photo #7 View of EV6, facing south

Photo #8 View of EV7, facing northwest

Photo #9 View of EV7 shovel test, plan

Photo #10 View of EV8, facing west

Photo #11 View of EV9, facing west

Photo #12 View of EV10, facing east

Photo #13 View of EV11, facing northwest

Photo #14 View of EV12, facing southwest

Photo #15 View of EV13, facing west

Photo #16 View of EV15, facing northeast

Photo #17 View of EV16, facing south

Photo #18 View of EV16 shovel test, plan

Photo #19 View of EV17, facing southwest

Photo #20 View of EV18, facing SW

Photo #21 View of EV19, facing east

Photo #22 View of EV 20, facing east

Photo #23 View of EV21, facing northwest

Photo #24 View of EV22, facing southwest

Photo #25 View of EV23, facing south

Photo #26 View of EV24, facing southeast

Photo #27 View of EV25, facing south

Photo #28 View of EV26, facing southwest

Photo #29 View of EV27, facing north

Photo #30 View of EV27 Shovel test, plan

Photo #31 View of EV28 ND on ROW, facing N

Photo #32 View of EV29, facing south

Photo #33 View of EV30, facing East

Photo #34 View of Dump Pile, facing NW

Photo #35 View of Dump Pile, facing SE

Photo #36 View of EV31, facing SW

Photo #37 View of Sewer cap, plan

Photo #38 View EV32, facing NW

APPENDIX C
Shovel Test Log

ST #	Depth (cmbs)	+/-	Ground Cover (%)	Munsell Color	Texture	Gravels (%)	Comments
EV01	0	-	N/A	N/A	N/A	N/A	Disturbed; construction area with shipping containers
EV02	0-40	-	90+	2.5YR 2.5/1	Clay to Clay Loam	<2	Lots of roots; densely vegetated area. Terminated due to clay loam to clay transition. Compact. NCM.
EV03	0-30	-	90+	2.5YR 2.5/1	Clay	2-20	Edge of row and dense shrubs. Few roots. Compact, firm, NCM.
EV04	0-40	-	90+	10YR 4/2 – 0-30cmbs 10YR 6/2 – 30-40cmbs	Clay Loam to Clay	>50	Several roots; moist; slight $CaCO_3$; sudden transition @ ~30cmbs. Soil change to wet, $CaCO_3$. Hit water table. NCM, subsoil.
EV05	0-30	-	90+	2.5Y 5/3	Clay	>20	On slight mound; dense vegetation; several roots; iron oxide and $CaCO_3$ mottling. NCM. Subsoil.
EV06	0-32	-	90+	2.5Y 5/2	Clay	2-20	Moist; lots of roots; on slope; iron oxide and $CaCO_3$; NCM; Term @ Subsoil.
EV07	0-40	-	80-90	2.5Y 5/2	Clay	<2	Compact, semi-moist, firm; few roots; Iron oxide; NCM; Term @ subsoil.
EV08	0-30	-	90+	2.5Y 5/2	Clay		Moist; compact; several roots; iron oxide; NCM. Term @ Subsoil.
EV09	0	-	N/A	N/A	N/A	N/A	No dig. On bank of creek; lots of exposed sandstone @ surface.
EV10	0-37	-	90+	2.5Y 4/1	Clay	<2	Compact clay; few dense roots; slight open area. Term @ compaction.
EV11	0-40	-	90+	10YR 3/1	Clay	<2	Semi-moist; compact; sticky; several roots; densely vegetated area w/yaupon; NCM. Term @ compaction.
EV12	0-30	-	90+	10YR 3/1	Clay	<2	Semi-moist; compact; sticky; several roots; densely vegetated area w/yaupon; NCM. Term @ compaction.
EV13	0-36	-	90+	10YR 2/1	Clay	<2	Sticky; compact; plastic line soil; several roots; heavily vegetated; briar and yaupon. Term @ compaction.
EV14	0-33	-	90+	10YR 2/1	Clay	<2	Sticky; compact; plastic line soil; several roots; heavily

							vegetated; briar and yaupon. Term @ compaction.
EV15	0-30	-	90+	10YR 2/1	Clay	<2	Sticky; compact; plastic line soil; several roots; heavily vegetated; briar and yaupon. Term @ compaction.
EV16	0-40	-	90+	10YR 2/1	Clay	<2	Sticky; compact; plastic line soil; several roots; heavily vegetated; briar and yaupon. Term @ compaction.
EV17	0-30	-	90+	10YR 2/1	Clay	<2	Sticky; compact; plastic like soil; several roots; heavily vegetated; briar and yaupon. Term @ compaction. Near edge of right of way.
EV18	0-35	-	90+	10YR 5/2	Clay	2-20	On slight slope to south. Tall grasses; compact; firm; several roots; iron oxide; Term @ subsoil.
EV19	0-37	-	90+	2.5Y 5/3	Clay	2-20	On slight slope to south. Tall grasses; compact; firm; several roots; iron oxide; mesquite shrubs; Term @ subsoil.
EV20	0-30	-	90+		Clay	2-20	Bigger gravels <5cm; several roots; slight down slope to SW; densely vegetated; $CaCO_3$ and iron oxide. Term @ subsoil.
EV21	0-57	-	90+	2.5YR 4/1 – 0-44cmbs 2.5Y 2.5/1 – 44-57cmbs	Clay	2-20	Lots of roots; compact/firm; several gravels <5cm. Sudden soil change @ appx 44cmbs. After 44cmbs few rootlets; blocky; compact/firm; plastic like. Term @ compaction.
EV22	0-47	-	90+	10YR 4/1	Clay	2-20	Several rootlets; dry; firm; compact; blocky; plastic like. Term @ compaction.
EV23	0-38	-	90+	10YR 4/1	Clay	<2	Moist; very sticky; several roots; cobbles <3cm; compact; hard to screen. Dense Veg. Term @ compaction.
EV24	0-49	-	90+	10YR 4/1	Clay	<2	Few roots; blocky; compact/firm; plastic like; near highway. Term @ compaction.
EV25	0-48	-	90+	2.5Y 6/2	Clay	2-20	Dense veg area north of highway. Moist; firm; compact soil. Iron oxide and $CaCO_3$. Term @ compaction.

EV26	0-30	-	90+	2.5Y 6/2	Clay	<2	Very dense veg. Yaupon. Moist; firm; compact; plastic like soils. Several roots. Term @ compaction.
EV27	0-46	-	90+	2.5Y 6/2	Clay	<2	Open area near edge of dense vegetation. Tall grasses. Dry, plastic like; compact/firm; slight iron oxide. Term @ compaction.
EV28	0	-	N/A	N/A	N/A	N/A	In wide disturbed Right of Way.
EV29	0-43	-	80-90	2.5Y 4/1 – 0-39cmbs 2.5Y 6/4 – 39-43cmbs	Clay	>20	On slope going N. Possible bank of ROW. Large cobbles <5cm. Firm/compact. Sudden soil change to lighter color; frim; sticky; dry; compact. Light iron oxide. Term @ compaction.
EV30	0-27	-	60-80	2.5Y 4/1	Clay	>50	Lots of cobbles and sandstone @ surface. Clay, firm/compact; lots of roots. Gravels <5cm. Impassible. Term @ gravels.
EV31	0-59	-	80-90	2.5Y 5/2	Clay	2-20	About 20m NE of dump area. Dense veg. Yaupon and Mesquite. Dry, compact/firm. Several roots. Term @ compaction.
EV32	0-46	-	80-90	2.5Y 4/2 w/mottles of 2.5Y 6/4	Clay	2-20	On edge of semi-cleared path. Tall grasses. Dry; firm; compact; plastic like clay. Several roots. Slight iron oxide. Term @ compaction.
JM01	0	-	5-20	N/A	N/A	N/A	No Dig; Area disturbed by transmission line, as well as service road and construction staging area.
JM02	0	-	5-20	N/A	N/A	N/A	No Dig; Area disturbed by construction of gravel service road and brush push piles.
JM03	0-40	-	40-60	10YR 3/4 w/mottles of 10YR 5/1 & 10YR 6/3	Clay Loam	>20	Highly turbated soil, very mixed/mottled, gravels and $CaCO_3$ nodules throughout. Roots near surface. Term @ $CaCO_3$.
JM04	0-40	-	80-90	10YR 4/2 – 0-5cmbs 2.5Y 5/3 – 5-30cmbs 2.5Y 4/2 – 30-40cmbs	Clay	>50	Clay loam in top ~5cm. Followed by layer of very dense clay & tabular rock pieces. After the rock, very dense, moist darker color clay. $CaCO_3$ throughout. Term @ $CaCO_3$.

JM05	0	-	60-80	N/A	N/A	N/A	No Dig; streambed w/slopes on either side. Tabular rock seen in last st visible scattered in the stream and nearby ground surface.
JM06	0-45	-	80-90	2.5Y 4/1	Clay	2-20	Uniform gray clay w/$CaCO_3$ and tabular rock frags below ~35cmbs. Infrequent gravels and roots @ surface. Term @ rock.
JM07	0-50	-	20-40	2.5Y 3/2	Clay Loam	2-20	Uniform clay loam w/abundant roots and rootlets throughout. Infrequent gravels. $CaCO_3$ starting @ 45cmbs. Increases in frequency with depth. Term @ $CaCO_3$.
JM08	0-45	-	20-40	2.5Y 3/1 – 0-35cmbs 2.5Y 4/2 – 35-45cmbs	Clay Loam	<2	Abundant roots/rootlets. Infrequent tabular rocks and gravels. $CaCO_3$ in last 10cm. Term @ $CaCO_3$.
JM09	0-40	-	20-40	10YR 2/1	Clay Loam	<2	Abundant roots/rootlets. Infrequent tabular rocks and gravels. $CaCO_3$ in last 10cm. Term @ $CaCO_3$.
JM10	0	-	60-80	N/A	N/A	N/A	No Dig; disturbed, in powerline Right of Way w/cleared brush etc.
JM11	0	-	60-80	N/A	N/A	N/A	No dig; steep slope.
JM12	0-55	-	90+	2.5Y 5/2 w/mottles of 10YR 6/6	Clay	>50	Abundant poorly sorted gravels and small flat rock fragments. Mottled dense clay. On terrace between slopes. $CaCO_3$ in approx. the last 10cm.
JM13	0-50	-	90+	10YR 3/2 – 0-5cmbs 2.5Y 4/2 – 5-50cmbs	Clay	2-20	Clay less dense than last ST. Roots abundant. $CaCO_3$ from appx 40cmbs down. Term @ $CaCO_3$.
JM14	0-45	-	90+	2.5Y 4/2	Clay	2-20	Dense clay, roots frequent at/near surface. Infrequent poorly sorted gravels. $CaCO_3$ in last 10cm. Term @ $CaCO_3$.
JM15	0-40	-	5-20	10YR 4/1 – 0-5cmbs 2.5Y 5/2 – 5-40cmbs	Clay	2-20	Dense clay, roots frequent at/near surface. Infrequent poorly sorted gravels. $CaCO_3$ in last 10cm. Term @ $CaCO_3$.
JM16	0	-	N/A	N/A	N/A	N/A	No Dig; Disturbed ROW

JM17	0	-	N/A	N/A	N/A	N/A	No Dig; Disturbed ROW
JM18	0	-	N/A	N/A	N/A	N/A	No Dig; Disturbed ROW and steep slope.
JM19	0	-	N/A	N/A	N/A	N/A	No Dig; Disturbed ROW
JM20	0-45	-	40-80	2.5Y 3/2 – 0-5cmbs 2.5Y 5/2 – 5-45cmbs	Clay	>20	On small terrace between heavy brush and drainage. Moist clay w/roots near surface. Poorly sorted tabular rock frags and gravels decreasing slightly w/depth.
JM21	0-45	-	<5	2.5Y 4/1 – 0-40cmbs 2.5Y 4/2 – 40-45cmbs	Clay Loam	2-20	In tiny clearing. Moist clay loam. Roots and poorly sorted gravels throughout. $CaCO_3$ in last ~5cm. Term @ $CaCO_3$.
JM22	0-45	-	80-90	10YR 5/1 w/mottles of 10YR 6/8	Clay	>50	Dense mottled clay. Poorly sorted gravels to cobbles. Generally subrounded. $CaCO_3$ in last 10cm. Term @ $CaCO_3$.
JM23	0-45	-	<5	10YR 3/2 – 0-15cmbs 10YR 5/2 – 15-45cmbs	Clay Loam	2-20	Dense loamy clay. Roots and gravels abundant in top 20cm. Term @ $CaCO_3$.
JM24	0-25	-	40-60	2.5Y 4/1	Clay Loam	>20	Loamy clay, roots and gravels abundant, insect bioturbation, iron nodules. Term @ bedrock.
JM25	0-45	-	90+	10YR 3/1 – 0-30cmbs 2.5Y 5/2 – 30-45cmbs	Clay Loam	2-20	Loamy clay; roots, gravels, tabular rocks. Color change @ 30cmbs. $CaCO_3$ from 30 down. Term @ $CaCO_3$.