TexAmericas CENTER

# RESOLUTION NO. 20240827-06

## A RESOLUTION APPROVING A QUALIFIED SITES PROGRAM FOR WACO SITE UPON TEXAMERICAS CENTER WEST CAMPUS

**WHEREAS**, TexAmericas Center is a political subdivision of the State of Texas with the powers and authorities specified in Chapter 3503 of the Special District Local Laws Code of the State of Texas; and

**WHEREAS,** on August 25, 2020 the Board of Directors approved a Qualified Sites Program by Resolution 20200825-02 for the purpose of recognizing the commercial and industrial sites with characteristics and infrastructure in place that make the sites Shovel-Ready for development; and

**WHEREAS,** the goal of the Qualified Sites Program is to help developers, real estate professionals, both public and private utility companies and state partners understand and utilize the criteria outlined in this program, to recognize TAC as a nationally recognized industrial park with an inventory of attractive, pre-qualified, speculative sites ready for immediate development by end-users and for these groups to refer prospects to TAC for their business endeavors to take advantage of the location attributes; and

**WHEREAS**, staff has completed the Qualified Sites Program analysis of the Waco Site, the site meets the program criteria and the data in this report is current as of today and will be updated as information changes, such as increased utility capacity, roadway changes, changes in community information, etc.; and

**WHEREAS**, this will serve as a template for future TAC Qualified Sites.

**NOW, THEREFORE, BE IT RESOLVED** by the Board of Directors of TexAmericas Center the attached hereto as Exhibit "A" is approved and shall be implemented as of this date.

**PASSED and APPROVED this 27th day of August, 2024.**

**Jim Roberts, Chairman of the Board**

**ATTEST:**

**Justin Powell, Secretary**

Attached: Exhibit "A" – Qualified Sites Program WACO SITE

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# QUALIFIED SITES PROGRAM
# GAP ANALYSIS REPORT
# WACO SITE

## TexAmericas Center – Texarkana MSA - New Boston, Texas

**Qualified Site**:

A Certified Site is a commercial or industrial site where the majority of the information (infrastructure, encumbrances, attributes, availabilities, etc.) needed for a development to go to construction has been obtained, organized, prepared and endorsed by an objective third-party assuring a higher level of accuracy of site conditions therefore reducing the unknowns and increasing the speed to development.

A **Qualified Site,** endorsed by TexAmericas Center, is a commercial or industrial tract of land that has undergone the same level of scrutiny as a site certified by an objective third party but has been prepared in-house by a qualified professional.

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**Date: 8/22/24**

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# 1 ABOUT TEXAMERICAS CENTER

TexAmericas Center is one of the largest mixed-use industrial parks in the Americas and has recently been recognized as the 3rd ranked industrial park in the nation by *Business Facilities*. TexAmericas Center is a State of Texas-sanctioned Local Redevelopment Authority. This unique organizational structure allows TexAmericas Center to act like a hybrid of an economic development organization and an industrial real estate development & management company. These characteristics allow it to offer tenants custom real estate solutions and unparalleled speed-to-market.

With the operating capabilities of a municipality and control of its own land use (zoning) regulations and permitting, TexAmericas Center eliminates much of the red tape inherent in traditional real estate processes. Depending on the size and complexity of a development, the plan review and approval may be completed in less than five (5) business days giving businesses a shorter timeline to become operational than may exist in other complexes or municipalities. In addition to permitting expediency and custom real estate solutions, TexAmericas Center offers unique value-added services including: third party logistics, transload activities, on-site rail service, incentive management and build-to-suit and/or build-out-to-suit services.

## 1.1 MISSION

TexAmericas Center's mission is to bring quality jobs to the greater Texarkana area and diversify the tax base through property redevelopment. The TexAmericas Center Board of Directors has mandated that staff **create 12,000 jobs on the property**. To fulfill this mission, TexAmericas Center redevelops and manages **12,000 acres and approximately 3.5 million square feet** of former military property in centrally located Northeast Texas. TexAmericas Center is currently home to **43 manufacturing and commercial businesses**. TexAmericas Center and its Partners in Development have invested over **$70 million** in on-site infrastructure upgrades & environmental remediation and are committed to continue investing in our tenants, future tenants, and community.

## 1.2 LAND USE

TexAmericas Center is located outside of any city municipal boundaries and therefore controls its own land use (zoning) regulations and has designated the majority of its property for **light and heavy industrial uses.** All land and buildings are governed by TexAmericas Center planning, permitting, and approval processes, which are administered by an on-staff Professional Engineer. Guidelines covering development of the property, including but not limited to, Drainage Guidelines, Land Use Guidelines and Covenants, Codes & Restrictions are available from TexAmericas Center, most being easily accessible on our website, www.TexAmericasCenter.com and more specifically at https://texamericascenter.com/public-information/development-use-guidelines/.

## 1.3 CAMPUSES

TexAmericas Center (TAC) is broken up into three separate but easily accessible campuses, TAC West, TAC Central, and TAC West. TAC West is approximately 2,900 acres and is accessed by Walnut Road off U.S. Highway 82. TAC Central is approximately 765 acres and is accessed by four different approaches from U.S. Highway 82 with the predominant point of access being James Carlow Drive off U.S. Highway 82. TAC East is approximately 8,900 acres and is accessed four different intersections with U.S. Highway 82 and Bowie Parkway with the predominant point of access being the Cass Street intersection with U.S. Highway 82.

## 1.4 CONTACT INFORMATION

Additional information about TexAmericas Center and the contents of this report may be obtained through the following:

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## 1.5 QUALIFIED SITES PROGRAM PURPOSE

The purpose of the TexAmericas Center (TAC) **Qualified Sites Program (QSP)** is to recognize the commercial and industrial sites with known development characteristics and available infrastructure in place that allow for the designation of the property as a **Qualified Site** meaning that the site is **Shovel-Ready** for vertical development.

When a site is designated as a **Qualified Site**, it has undergone a rigorous level of scrutiny to confirm that the site is **adjacent to the utilities** typically needed for commercial and/or industrial operations, that site characteristics are **conducive to business activities**, that any **encumbrances** that might impact the property are

known and that **key approvals**, documentation, regulations and assessments required for commercial or industrial uses are known and in place.

By having shovel-ready sites available, TAC can better accommodate the needs and desires of prospective businesses. Companies that have immediate space and/or time requirements will have access to a greater amount of information, potentially decreasing the chances of risks or constraints that could delay or derail a project.

The goal of the QSP is to help developers, real estate professionals, both public and private utility companies and state partners understand and utilize the criteria outlined in this program, to acknowledge TAC as a nationally recognized industrial park with an inventory of attractive, pre-qualified, speculative sites ready for immediate development by end-users and for these groups to refer prospects to TAC for their business endeavors to take advantage of the location attributes.

Positioning a business prospect on a Qualified Site offers the company the ability to perform at a high standard. The coordination of these efforts may result in the ability of portions of TAC to be branded for a specific application or **Targeted Industry**.

Program objectives include:

- Winning more projects;
- Filling identified market gaps;
- Establishing an expectation of high standards for development;
- Creating a high-quality product, a Qualified Site, that does not currently exist in the market;
- Creating an inventory of qualified speculative sites ready for immediate development prior to a prospect's inquiry

It is important to recognize that a secondary purpose of the QSP is to identify market gaps in TAC's portfolio of sites and develop gap closure recommendations that will increase the inventory of Qualified Sites. This **Gap Analysis Report** will Identify the deficiencies in information or the lack of availability of infrastructure. Knowing these deficiencies will allow TAC to prioritize efforts to obtain currently unavailable information and to extend infrastructure to underserved properties. In addition, the QSP will also help elevate recognition of existing sites that may not be perceived as having qualifying attributes will be recognized as a Qualified Site and marketed as such.

Creating an inventory of Qualified, Shovel-Ready Sites, defined as being ready for vertical development before a prospect conducts a site visit will help TAC convert more leads to announcements thus creating jobs, causing more investment and creating more quality commercial and industrial jobs in the region.

TAC reserves the right to amend or terminate the requirements of the QSP at any time.

# 2 GOVERNMENTAL JURISDICTION

## 2.1 BOWIE COUNTY, TEXAS

TAC resides inside unincorporated Bowie County, Texas which is governed by a five-member commissioners' court. Four commissioners are voted on by the residents of their respective precincts in the county and presided over by a county judge elected by the residents of Bowie County.

## 2.2 TEXAMERICAS CENTER (TAC)

TAC is governed by a fifteen-member Board of Directors comprised of individuals appointed by the mayors of the municipalities throughout Bowie County, Texas. The Board of Directors sets policy and delegates the daily operations of TAC property to staff. The Board of Directors is the final decision maker on all matters related to TAC business, with exception of taxation as TexAmericas Center does not have the right to

### *2.2.a Zoning*

The Waco Site **is located in the Technology District 2 (T2)**. This is based on the Land Use Map adopted by the TexAmericas Center Board of Directors on September 25, 2018. A copy of the Land Use Map (Figure A-10) is included in Appendix A.

All TAC property is deed restricted to commercial and industrial activity. TAC controls all land uses (zoning) on the property and has designated the property primarily for Light and heavy industrial uses.

### *2.2.b Encumbrances*

Other than the restrictions to the property from the deed and title transfer, there are no additional easements, liens or other rights on the property. Information about restrictions on the property may be obtained as described in Section 3.1.a of this document.

### *2.2.c Land Use Guidelines and Ordinances*

TAC has developed ordinances that affect site development of TAC property. These ordinances are intended to promote the health, safety, moral and general welfare of TAC. A list of these ordinances include:

- Codes, Covenants & Restrictions (CCR's);
- Drainage Guidelines;
- Land Use & Site Design Guidelines;
- Paving Guidelines;
- Road Signage, Striping & Lighting Guidelines;
- Sign Guidelines.

A copy of these are easily accessible on our website, www.TexAmericasCenter.com and more specifically at https://texamericascenter.com/public-information/development-use-guidelines/.

## 2.3 Fire Protection

Fire Protection for the property will come from the New Boston Volunteer Fire Department. **The ISO rating for the New Boston Volunteer Fire Department, at the Waco Site, is a 6.** A Mutual Aid, Interlocal Agreement exists between the cities of Hooks & New Boston, Texas and Red River Army Depot (RRAD) to provide emergency response services. The **ISO rating for RRAD's Fire and Emergency Services is a 2**.

## 2.4 Police Protection

Police Protection will be provided by the Bowie County Sheriff's Department. Similar Mutual Aid agreements exist within the adjacent cities for these services also.

# 3 THE WACO SITE

## 3.1 PROPERTY ATTRIBUTES

The 552-acre Waco Site is a greenfield development site situated on the TexAmericas Center West Campus (TAC West). This site is at the northwest corner of the 3,839 acre TAC West Campus and is generally situated between Walnut Street and Texas Highway No. 8 (HWY 8) and is positioned to be the prominent development site near the north entries into TAC West. This property is a wooded buffer area separating a former ammunition storage bunkers from adjacent roadways and other land uses.

Vicinity Maps (Figures A-1 to A-5) of TexAmericas Center as well as a Boundary Exhibit (A-6) of the Waco Site may be found in Appendix A.

### *3.1.a Deeds and Records*

The property that makes up the TexAmericas Center West Campus transferred from the United States of America to Red River Redevelopment Authority (later renamed TexAmericas Center) by Deed Without Warranty on September 30, 2011, and recorded in Volume 6114, Page 1 of the Real Property Records of Bowie County, Texas. A copy of this document is available from TexAmericas Center, being most easily accessible on our website, www.TexAmericasCenter.com.

### *3.1.b Property Access*

The site is accessible by vehicle to its boundary on the east and west property lines. Additional information regarding the adjacent roads may be found in Section 5.1.1 of this document.

## 3.2 PROPERTY TERRAIN

The Waco Site terrain slopes from the east and west boundaries toward its center, generally at a 1% slope, where an unnamed tributary flows from north to south through the site at a slope of approximately 0.5%. A Topographical Exhibit (Figure A-7) of the property can be found in Appendix A.

The site is wooded with a mixture of a variety of species of Pine trees and Oak trees.

## 3.3 FLOOD PLAIN

Based on the National Flood Insurance Program Flood Insurance Rate Map for Bowie County Community Panel No. 48037C0285D and No. 48037C0295D with an effective date of October 19, 2010, the site is situated in Zone X with the Unnamed Tributary being classified as Zone A. These areas are defined as:

**Zone X - Areas determined to be outside of the 0.2% annual chance (500-year) floodplain'.**

**Zone A – Special Flood Hazard Area subject to inundation by the 1% annual chance flood (100-year) – No Base Flood Elevation determined.**

A copy of the firmettes (Figure A-8 and A-9) of the site is included in Appendix A.

## 3.4 GEOLOGICAL INFORMATION

Historical information in the form of a Soil Survey of Bowie County, Texas and on-the-ground investigation of the property are available to give an insight into the soil conditions on the Waco Site.

### *3.4.a Soil Survey of Bowie County, Texas*

Based on the Web *Soil Survey of Bowie County, Texas* prepared by the United States Department of Agriculture in cooperation with the National Resources Conservation Service, approximately 50% of the soils located across the property are classified as being a loam and/or silt loam (characterized by a layer of loam for approximately six-inches (6") to eleven-inches (11") and varied colored clay loams below) and approximately 25% of the soils located across the property are classified as being a silt loam (characterized by a layer of loam for approximately six-inches (6") and varied colored clay loam and clay below). Excerpts from the Soil Survey are included in Appendix B.

### *3.4.b Preliminary Geotechnical Investigation*

There have not been any geotechnical investigations prepared on the Waco Site or on any portion of the TAC West Campus.

A geotechnical investigation has been prepared for a portion of the TAC Central Campus situated approximately three miles from the Waco Site. Soil types and conditions can vary greatly over that distance. The Web Soil Survey for this site have some of the same soil types that appear on the Waco Site. Excerpts from geotechnical investigations are included in Exhibit C of this report for reference only.

# 4 ENVIRONMENTAL & CULTURAL IMPACTS

Located amid the Piney Woods, the Texarkana region offers a rare and wonderful bounty of lakes, green space and forestry where hardwoods grow nearly as quickly as softwoods. The region offers picturesque, relaxing and meaningful settings in which to retreat, relax and recharge. An impressive collection of federal, state and local recreational assets are waiting to be explored within a 90-minute drive.

## 4.1 ENVIRONMENTAL ASSESSMENT

A **Final Phase I and Limited Phase II Environmental Site Assessment** for TexAmericas East Tract (Former Lone Star Army Ammunition Plant) in Texarkana, Texas was prepared by Science Applications International Corporation (SAIC) in May 2013. The findings of the report are that...*'based on the results of the report, a more extensive Phase II Environmental Site Assessment is not recommended at this time'*. A copy of the report may be obtained at the office of TexAmericas Center.

## 4.2 WETLANDS

A wetland delineation for a portion of TAC West, including the limits of the Waco Site, has been prepared. The findings of the investigation reveal that portions of the delineated area contain jurisdictional wetlands. A copy of the Letter of Concurrence and Concurrence Map are found in Appendix D.

## 4.3 ENDANGERED/THREATENED SPECIES

Texas Parks & Wildlife Department Annotated County Lists of Rare Species, updated March 5, 2021, is included in Appendix E. This is a county-wide list of the species.

In 2000, a planning level survey (PLS) was conducted for vegetative communities and fauna, including an assessment of the potential presence of quality habitat for threatened and endangered species (TES) (Tetra Tech 2002b). The alligator snapping turtle (*Macroclemys temminckii*), a state-listed threatened species, was the only Threatened and Endangered Species (TES) observed at the installations during the Planning Level Survey (PLS). There we no federal-listed threatened or endangered species on the property.

## 4.4 ARCHAEOLOGICAL/HISTORICAL DESIGNATIONS

Based on the Phase II Archaeological Investigations at Red River Army Depot and Lone Start Army Ammunition Plant, Bowie County, Texas Final Report dated February 2012 prepared for the US Army Corps of Engineers (Mobile District) by Earth Science, Inc., there are no locations on the Waco Site that are determined to be of Archaeological or Historical Significance. A map of locations from the report showing the Waco Site and the locations of areas of Historical Significance is included in Appendix F.

## 4.5 Air Attainment Status

Based on information provided by the Texas Commission on Environmental Quality and the United States Environmental Protection Agency, Bowie County, Texas appears within acceptable air quality levels according to the National Ambient Air Quality Standards.

# 5 TRANSPORTATION ASSETS

TAC is positioned to give you access to the greatest domestic market share while still operating in the top-ranked State of Texas. This is because TAC is situated in the Texarkana MSA, **one of the lowest aggregate mile locations in Texas to the geographic and population centers of the US**. This gives tenants at TAC a **500-mile reach of 53.8 million consumers**, which is **10 million more than the Dallas 500-mile reach**. This access comes at a fraction of the transportation costs due to our strategic, central location and robust infrastructure.

## 5.1 ROAD INFRASTRUCTURE

TAC has excellent interstate access with plans for additional improvements to ease speed of delivery for businesses. **Interstate Highway 30** (I-30) is the closest interstate to the WACO Site at a distance of **less than 1 mile**. I-30 has **six interchanges** and multiple entry points to TAC on the 15-mile stretch that runs parallel to and less that 1-mile from its north property boundary. TexAmericas Center is **two hours east of Dallas** and **two hours southwest of Little Rock**. Construction is currently underway in Texarkana to widen I-30 to six lanes.

### *5.1.a Key Connections*

Key connections of TAC road transportation system:

- **Interstate Highway 30** connects to I-20, I-35 & I-45 and more U.S. & State Highways to the west to the DFW Metroplex, and east to Little Rock, connecting with I-40 to Oklahoma City, Memphis, Nashville and the eastern seaboard of the United States.
- **Interstate Highway 69/369** (I-69/I-369) connects Canada and the Northeast United States to Houston and the Texas/Mexico border with multiple connections to additional interstate, U.S. & State Highways along the route. I-69 is currently under construction in various stages along its route.
- **U.S. Highway 59** (HWY 59) connects Texarkana to Houston and all Texas ports along the Gulf of Mexico with connections to I-20, Interstate Highway 10 (I-10) and numerous U.S. & State Highways along the route. The existing roadbed of HWY 59 is the proposed route for I-69/I-369 corridor.
- **Interstate Highway 49** (I-49) connects Texarkana to New Orleans with connections to I-10 and I-20 along this route to the south, and Fort Smith and Kansas City to the north with connections to I-40 & I-44 with multiple connections to additional U.S. & State Highways along the entire route. Plans are in progress to complete the construction of the portion of I-49 between Texarkana and Fort Smith.
- **U.S. Highway 71** (HWY 71) connects Texarkana to Fort Smith, Arkansas and I-40.
- **U.S. Highway 67** (HWY 67) connects Dallas to St. Louis through Texarkana with multiple connections to additional interstate, U.S. & State Highways along the route.

- **U.S. Highway 82** (HWY 82) runs immediately adjacent to the north property line of all TexAmericas Center property and connects North and West Texas, to the Atlantic Ocean, and to Los Angeles via I-10 with multiple connections to additional interstate, U.S. & State Highways along the route.

### *5.1.b Waco Site Road Adjacency*

As stated previously, the site is situated at the northwest corner of TAC West. Below are several of the access points to the property.

- Walnut Steet, a road maintained by Bowie County, is the main entry into TAC West. The north boundary of TAC West is approximately .75 miles south of HWY 82 on Walnut Street. Leaving the TAC West campus on Walnut Street and returning to HWY 82, Texas Highway 8 (TX 8) is approximately .5 miles to the west. See below for information about TX 8. Spur 86 is approximately .5 miles to the west and provides access to the north I-30 approximately 2 miles from the Site and access to HWY67 approximately 8.5 miles to the south.
- TX 8 runes adjacent to a portion of the west boundary of TAC West. TX 8 is a two lane road that provides access back to HWY 82 approximately 0.75 miles to the north, access to I-30 approximately 2 miles from the Site and access to HWY 67 approximately 8.5 miles to the south.

Additional roads can be extended from both TX 8 and Walnut Street for access to the interior portions of the Waco Site.

Exhibits in Appendix A show the roads adjacent to TexAmericas Center and to the Waco Site

## 5.2 RAIL AND INTERMODAL INFRASTRUCTURE

### *5.2.a Area Rail Operators*

Texarkana is a major east/west and north/south rail center, with over 125 trains passing through the community per day. The Union Pacific (UP – a Class I Operator), Kansas City Southern (KCS – a Class I Operator), Texas Northeastern (TNER – a Short Line Operator), and Lone Star Rail Car Service (LSRCS – a privately owned Operator on the TAC East Campus) serve TexAmericas Center and the Texarkana market.

### *5.2.b Area Intermodal Facilities*

The Texarkana/TexAmericas Center market is well-served by inland ports or intermodal facilities. The nearest intermodal operations can be found in:

- **Dallas/Fort Worth, TX** (BNSF, KCS-NS, and UP)
- **Houston, TX** (BNSF and UP)
- **Kansas City, MO-KS** (BNSF, CP, NS, and UP)
- **Memphis, AR-TN** (BNSF, CN, CSX, NS and UP)
- **New Orleans, LA** (CN, NS and UP)
- **St. Louis MO-IL** (BNSF, CN, CSX, NS and UP)

- **San Antonio, TX** (UP)
- **Shreveport/Minden, LA** (KCS-NS)

### *5.2.c WACO Site Rail Adjacency*

The TAC West Campus is currently not served by rail.

### *5.2.d TAC Rail System*

TAC owns approximately 36-miles of rail on TAC East. The rail on the TAC East campus is predominantly 85# rail. TAC has received grant funds, and as of the preparation of this report, is working on improvements to several existing crossing and turnout with the intentions of upgrading the rail through these facilities to 115# rail and performing other maintenance upgrades to better accommodate 286,000# loads.

### *5.2.e TAC Transload Facility*

A designated transload location is currently operating at TAC East. A twelve-car spot is designated, and the TAC Logistics division can be contacted for loading and unloading activities. A variety of commodities can be handled in this facility.

## 5.3 AIR INFRASTRUCTURE

TexAmericas Center is a 25-minute drive from **Texarkana Regional Airport (TXK)**, with three daily round trip flights to **Dallas/Fort Worth International Airport (DFW)**. DFW is America Airlines' largest hub and is the third busiest airport in the world, with **over 900 flights daily** from over 23 airlines with service to **218 non-stop destinations**, both international and domestic. DFW is a 30-minute flight from Texarkana.

In July 2024, Texarkana Regional Airport opened a brand new 40,000 sq. ft. Passenger Terminal.

Other airports within an approximate two-hour drive from TAC East include:

- **Shreveport Regional Airport (SHV)** – approximately 75 minutes, 5 non-stop, direct flights
  - Commercial air operations are provided by Allegiant, American, Delta, GLO, and United.
  - Major Destinations include: Dallas/Fort Worth, Las Vegas, Atlanta, Chicago, Denver, Charlotte, and Houston
- **Little Rock Municipal Airport (Clinton National Airport)(LIT)** – approximately 2 hours, 13 non-stop, direct flights
  - Commercial air operations are provided by Allegiant, American, Delta, Southwest, GLO, and United.
  - Major Destinations include: Las Vegas, New Orleans, Phoenix, Dallas, Houston, Atlanta, Orlando, Charlotte, Detroit, St. Louis, Denver, and Chicago.
- **Dallas Love Field (DAL)** – approximately 2 hours, 58 non-stop, direct flights
  - Southwest HQ hub

- Major Destinations include: Chicago, Washington DC, Los Angeles, New York, Atlanta, and Las Vegas

## 5.4 WATERWAYS AND PORT FACILITIES

TexAmericas Center is **within a five-hour drive of 10 of the 20 busiest ports in the USA**. The **Port of Caddo-Bossier** is approximately 100 miles away in Northwest Louisiana, the closest port to Texarkana and commercially navigable via the Red River. The Red River connects to the Mississippi River, the coastal waterway system, and the central US waterway system. The **Port of Little Rock** is approximately 160 miles northeast of TexAmericas Center on the Arkansas River, while the **Port of Houston** lies 295 miles south on the Gulf of Mexico.

# 6 UTILITIES

As a whole, TexAmericas Center is well-served by industrial-grade utilities with excess capacity. The TAC West Campus is in need of utility extension for service and development. Being the northernmost site on TAC West, the Waco site is the tract that will be most easily served by the extension of the utilities. Below is a brief summary of all utilities adjacent to or to be extended serve the Waco Site. More information can be provided upon request.

## 6.1 WATER INFORMATION

### *6.1.a Water Source Information*

TexAmericas Center's water provider is **Riverbend Water Resource District (RWRD)**, which currently contracts with **Texarkana Water Utilities (TWU)** for provision of water to TexAmericas Center property. The water sources are two large reservoirs, Millwood Lake in Arkansas, and Lake Wright Patman in Texas.

TWU's current water plant has a design **capacity of 36 MGD.** The average daily use is 16 MGD, leaving an **excess capacity of 20 MGD**. A **30" transmission line** connects Texarkana to New Boston, Texas. This line can deliver over **4 MGD** to Riverbend's water system on TexAmericas Center's property. RWRD pumps currently pull **1.7 MGD** of water from the line, leaving **2.3 MGD of excess capacity** in the transmission line.

### *6.1.b Water (potable) Main Adjacency*

Currently there are no water mains situated on the Waco Site.

#### *6.1.b.1 Future Water (potable) Main Service Options – Connection to TWU Main*

A 24-inch TWU main is situated on the south side of HWY 82 approximately 0.75 miles north of the Waco Site. For immediate water service to the Waco site, a main can be extended along walnut street to the northeast corner of the site. Because RWRD is wet utility provider on TAC West, this connection to the TWU main will require the installation of a meter for the purposes of metering water transferred from TWU to RWRD.

#### *6.1.b.2 Future water (potable) Main Service Options – RWRD Extension*

An 8-inch RWRD main currently serves the Army Reserve Training Center situated along HWY 83 approximately 1.5 miles east of Walnut Street. RWRD has agreed to allow the extension of this main in a southwesterly direction through portions of RRAD to the northwest corner of TAC West and continue the main west to the Waco Site.

Any future water main that is extended to the Waco Site, regardless of the above scenario utilized, will continue along the east boundary of the Waco Site to serve additional acreage south of the Waco Site on the TAC West Campus. Additional mains can be extended along and through the Waco Site, from this main, as needed to serve development.

A Water Availability Map (Figure G-1) is located in Appendix G.

### *6.1.c Water (non-potable) Main Adjacency*

Non-potable service to TAC West will not be available for the foreseeable future.

### *6.1.d Water Systems Expansion*

RWRD recently announced a $200 million investment in a new, 30 MGD regional water system that will be located on TexAmericas Center property. This state-of-the-art water system will eliminate reliance on TWUm while allowing businesses locating to the TexAmericas Center to expand without concerns surrounding water treatment needs and availability. Raw water will also be available on both the Central and East campuses. Long-term growth planning calls for full plant expansion up to 90 MGD.

### *6.1.e Contact Information*

Riverbend Water Resources District (RWRD)
Kyle Dooley, P.E.
Executive Director/Chief Executive Officer
228 Texas Avenue, Suite A
New Boston, Texas 75570
903.831.0091
riverbend@rwrd.org
www.rwrd.org

## 6.2 SANITARY SEWER

### *6.2.a Sanitary Sewer Source Information*

Riverbend Water Resources District is also the provider of sanitary sewer collection and treatment on TAC East.

### *6.2.b Sanitary Sewer Main Adjacency*

To date, RWRD does not have sanitary sewer services available on TAC West.

#### *6.2.b.1 Future Sanitary Sewer Service – Option 1*

A temporary package treatment plant could be constructed southeast of the Waco Site and utilized until RWRD has a sanitary sewer collection system infrastructure extended to TAC West. The plan would discharge effluent into Big Creek.

After RWRD has extended their sanitary sewer infrastructure to TAC West, the temporary plant could be converted to a lift station to pump the effluent towards TAC Central. It would then travel to TAC East to be treated at the Collins Wastewater Treatment Plant.

#### *6.2.b.2 Future Sanitary Sewer Service – Option 2*

A second treatment option for consideration would be to construct a lift station near the south boundary of TAC West and pump the effluent to the City of New Boston wastewater treatment plant situated along the east boundary line of the TAC West

Campus. This only becomes an option if RWRD declines to provide a wastewater service area as TAC West is part of the RWRD CCN Service Area.

A Sanitary Sewer Availability Map (Figure G-2) is located in Appendix G.

### *6.2.c Treatment Facility Information*

The Collions Wastewater Treatment Plant Servicing the TAC footprint has an average daily discharge limitation of 1.5 MGD with a daily maximum discharge limitation of 3.0 MGD. Based on the TCEQ permit for the facility, utilizing the daily maximum discharge limitations (3.0 MGD), the daily maximum biological oxygen demand is 250 lbs/day and the daily maximum total suspended solids is 500 lbs/day. The pH has an operating requirement range from greater than 6.0 to less than 9.0 with minimum monitoring requirements of one sample per day.

RWRD is in negations with RRAD to establish a public pretreatment facility for non-food industrial uses which will be at a yet determined site located on TAC East.

### *6.2.d Treatment Facility Expandability*

The existing wastewater plant serving the TAC footprint is built in a modular fashion with two (2) modules having a 750,000 GPD capacity. The facility is currently constructed with the necessary piping in place to accommodate an additional 750,000 GPD module increasing the treatment capacity to approximately 2.25 MGD.

### *6.2.e Contact Information*

Riverbend Water Resources District (RWRD)
Kyle Dooley, P.E.
Executive Director/Chief Executive Officer
228 Texas Avenue, Suite A
New Boston, Texas 75570
903.831.0091
riverbend@rwrd.org
www.rwrd.org

## 6.3 ELECTRICITY

### *6.3.a Source Information*

TexAmericas Center is served electricity by **AEP/SWEPCO**, one of the lowest cost electricity providers in the USA, with **rates typically 80% of the US average**. Currently **3-Phase, 12kv distribution lines** and **four substations** serve TexAmericas Center property. Each substation is connected to a **69kv transmission line** and has varying capacities available. There are currently three (3) 138kv lines near TAC West providing the potential for up to 150 MW possible.

### *6.3.b Electrical Service Adjacency*

A 3-phase, 12-kv distribution line leaves the substation north of HWY82 and heads in a southerly direction, crosses HWY 82 and continues south on the west side of Walnut Street and terminates at a point approximately one mile to the north line of TAC West.

This line has a current capacity of 12MW and can be extended south to the northeast corner of the Waco Site.

TAC West is also served by a 12kv distribution line that runs from the substation on the TAC Central campus. This line runs from the northeast corner of the TAC West, approximately a mile and a half, turns south through TAC West and then leaves the campus and continues into the Red River Army Depot line of Oak Street.

An Electricity Availability Map (Figure G-3) is located in Appendix G.

#### *6.3.c Substation Locations*

Four substations are on or adjacent to TexAmericas center and provide service to the property. TAC West is served by a substation on East Hoskins Street approximately one quarter mile north of HWY 82 and by a substation on TAC Central.

#### *6.3.d Contact Information*

AEP/SWEPCO (AEP)
Jason Waldon
Engineer
3708 W. 7th Street
Texarkana, TX 75501
903.277.7148
jmwaldon@aep.com
www.aep.com

## 6.4 NATURAL GAS

#### *6.4.a Source Information*

**Navitas Utility Corporation** is the gas supplier to TAC East, which will contract through **Enable**. The Enable Interstate transmission pipeline that connects Texas to Arkansas runs adjacent to TexAmericas Center, north of the HWY 82 right-of-way. This Interstate pipeline is an **8-inch** high pressure natural gas line.

#### *6.4.b Natural Gas Main Adjacency*

Currently there is no gas on TAC West

##### *6.4.b.1 Future Natural Gas Service Option*

The natural gas line proposed to Serve TAC West consists of dual 4-inch gas lines that deliver 130 MCF per hour and is expandable to at least 170 MCF per hour. These lines will be extended along HWY 8 for a distance of approximately three quarters of a mile to the northwest corner of TAC West. From there, it can be routed to and through Tac West to service property as needed.

A Gas Availability Map (Figure G-4) is located in Appendix G.

### *6.4.c System Expandability*

The Enable Interstate transmission pipeline can be upgraded substantially to at least **10,000 MCF per hour**. An upgrade like this would include a dedicated pipeline, likely a 12-inch high pressure (input 900 psi) steel line. Cost for this upgrade is $300,000 per mile (2020 estimate), plus $1,000,000 for interstate pipeline system improvements, and $1,000,000 of contingency. This cost includes:

- Development
- Engineering
- Securing ROW
- Procurement
- Installation
- Commission
- Restoration
- Clean up

### *6.4.d Contact Information*

Navitas Utility Corporation
Thomas Hartline
Executive Director/Chief Executive Officer
3186 D Airway Avenue
Costa Mesa, CA 92626
714.424.4094
thartline@navitasutility.com
www.navitasutility.com

## 6.5 HIGH SPEED FIBER

### *6.5.a Source Information*

**Conterra Networks (Conterra)** provides data center-quality internet service to TexAmericas Center and has extended a **144-strand fiber line** onto or adjacent to all TexAmericas Center campuses. Conterra offers high bandwidth at competitive rates with **100+ gigabyte upload and download speeds** available.

### *6.5.b High Speed Fiber Adjacency*

Conterra installed a 144-strand fiber line along the entire west boundary of the Waco Tract.

A Fiber Availability Map (Figure G-5) is located in Appendix G.

### *6.5.c Fiber Assessment Study – TAC Property*

**CBRE – Network Advisory Services** recently performed a Level 2 IT Assessment on TexAmericas Center property. On a scale of 1-5, with 5 being very feasible and 1 being infeasible, **TexAmericas Center ranked a 4** to support hyperscale, corporate, and similar data center applications. The next phase of the study will provide recommendations for upgrades to a 5 rating. The results of both of these assessments can be made available if requested/as completed.

### *6.5.d Contact Information*

Conterra Networks
Stephanie Green
Area Sales Manager
903.908.3052
sgreen@conterra.com
www.Conterra.com

# 7 INCENTIVES

Governments consider using public funds on a case-by-case basis to help incentivize proposed private economic development projects to strengthen a community's economic viability. Incentives can take a variety of forms such as tax breaks, construction of supporting infrastructure, workforce development programming and other forms of assistance. Jurisdictions may use these incentives to pursue economic goals such as tax base diversification, job creation, or business retention and expansion.

Incentive and business assistance offerings are typically based on the expected, realistic capital investment and job creation projections. A sample of available incentives are below; all can be used as an inducement to secure investment in our region's economy.

## 7.1 SPECIAL ZONES

Locating to one of TAC's three campuses offers several incentive options on the federal, state and local levels. All incentives are competitive and based on established criteria. Available incentives include property purchase price abatement, property tax abatement, favorable lease/purchase arrangements, employee recruitment & training assistance, infrastructure grants and favorable financing. Area partners have a successful history of obtaining financial assistance for qualified projects from both state and federal sources; however, delivery of proposed grants is not guaranteed. Independent applications must be filed, and an established review and award process is followed. Seven of TAC's distinct incentives include:

### *7.1.a Defense Economic Readjustment Zone*

As TAC is comprised solely of land formerly operated as a military installation, companies which locate to the TAC footprint become eligible for the Defense Economic Readjustment Zone Program. This program is a tool for business recruitment and job creation in adversely impacted military communities, such as TexAmericas Center. It is designed to aid Texas communities, businesses, and workers impacted by the closure or realignment of military installations and provides local and state regulatory and tax incentives to encourage businesses to locate or expand in these areas.

### 7.1.b U.S. Foreign Trade Zone #258

TexAmericas Center manages Foreign Trade Zone #258, a geographic area where goods may be landed, stored, handled, manufactured or reconfigured then re-exported under specific customs regulations, generally not subject to customs duties. Areas designated as Foreign Trade Zones (FTZ) are generally organized around major transportation hubs and areas with many advantages for trade. An FTZ is a defined, physical area within the United States that, for customs entry purposes is treated as if it is outside U.S. borders. Companies may use FTZs for both storage/distribution activities or, after specific authorization by the U.S. FTZ Board, for production.

TAC will engage our consultant, Point Trade Services Inc., to estimate cost savings of operating in FTZ #258 upon request.

Foreign Trade Zones give companies multiple benefits that ultimately streamline operations and impact the bottom line. Some of these benefits include:

- CBP duty and federal excise tax, if applicable, are paid when the merchandise is transferred from the zone for consumption.
- While in the zone, merchandise is not subject to U.S. duty or excise tax. Certain tangible personal property is generally exempt from state and local ad valorem taxes.
- Goods may be exported from the zone free of duty and excise tax.
- CBP security requirements provide protection against theft.
- Merchandise may remain in a zone indefinitely, whether or not subject to duty.
- The rate of duty and tax on the merchandise admitted to a zone may change as a result of operations conducted within the zone. Therefore, the zone user who plans to enter the merchandise for consumption to CBP territory may normally elect to pay either the duty rate applicable on the foreign material placed in the zone or the duty rate applicable on the finished article transferred from the zone whichever is most advantageous.
- Merchandise imported under bond may be admitted to an FTZ for the purpose of satisfying a legal requirement of exporting the merchandise. For instance, merchandise may be admitted into a zone to satisfy any exportation requirement of the Tariff Act of 1930, or any other exportation requirement.

### 7.1.c HUBZone

TexAmericas Center is located within a federal HUBZone which offers advantages for federal contracts. A US HUBZone helps small businesses gain preferential consideration with government contracts by limiting some contracts just to HUBZones and giving HUBZone businesses a 10% price evaluation preference in full and open contract negotiations. By law, three percent of all dollars awarded for federal prime contracts are required to go to HUBZone-certified small business concerns. The local Small Business Development Center will assist in preparing company applications for being recognized as HUBZone eligible.

The SBA provides a higher surety bond for HUBZone companies. There is typically a subcontractor participation goal for many large business contracts. HUBZone requirements generally apply to U.S. Government purchases in excess of $3,000.

The Small Business Association regulates and implements the HUBZone Program by doing the following:

- Determining which businesses are eligible to receive HUBZone contracts
- Maintaining a list of qualified HUBZone small businesses that federal agencies can use to locate vendors
- Adjudicates protests of eligibility to receive HUBZone contracts

- Reports to Congress on the program's impact on employment and investment in HUBZone areas.

To qualify for the program, a business must meet the following criteria:

- It must be a small business by SBA standards (https://www.sba.gov/federal-contracting/contracting-guide/size-standards)
- Its principal office must be located in a HUBZone, which includes military facilities closed by the Base Realignment and Closure Act, such as TAC
- At least 35% of its employees must reside in a HUBZone

### *7.1.d New Market Tax Credits*

TexAmericas Center is designated as an economically distressed community making businesses located on our footprint eligible for New Market Tax Credits (NMTC). The NMTC program attracts capital to eligible communities by providing private investors with a federal tax credit for investments made in businesses or economic development projects located in distressed communities, such as TAC.

Investors in NMTC receive a tax credit equal to 39 percent of the total Qualified Equity Investment made in a Community Development Entity. The credit is realized over a seven-year period: five percent annually for the first three years and six percent in years four through seven.

### *7.1.e U.S. Opportunity Zone*

A US Opportunity Zone is an economically distressed community where new investments, under certain conditions, may be eligible for preferential tax treatment to spur economic development in those areas. Qualified Opportunity Zones retain their designation for 10 years.

First, investors can defer tax on any prior gains until December 31, 2026 or such date in which an investment is sold or exchanged, whichever comes first, as long as the gain is reinvested in a Qualified Opportunity Fund.

Second, if the investor holds the investment in the Opportunity Fund for at least ten years, the investor would be eligible for an increase in basis equal to the fair market value of the investment on the date that the investment is sold or exchanged. Investors can defer certain taxes if they invest in an Opportunity Zone within six months of realizing the gain.

Investments in Opportunity Zones realize the following benefits for investment periods of at least:

- Five years with a 10% increase in tax basis
- Seven years with a 15% increase in tax basis

Ten years with an exemption from additional gains beyond what was previously deferred

### *7.1.f Texas Enterprise Zone*

The Texas Enterprise Zone Program is a state sales and use tax refund program designed to encourage private investment and job creation in economically distressed areas of the state of Texas.

Depending upon capital investment, Texas will refund up to $7,500 for each allocated permanent or retained job.

- For projects with a capital investment below $150 million, qualified businesses may receive up to $1.25 million in state sales and use tax refunds ($2,500 per job with a maximum of 500 jobs created).
- For projects with a capital investment between $150 million and $250 million, qualified businesses may receive up to $2.5 million in state sales and use tax refunds ($5,000 per job with a maximum of 500 jobs created).
- For projects with a capital investment of $250 million or more, qualified businesses may receive up to $3.75 million in state sales and use tax refunds ($7,500 per job for no less than 500 jobs created).

### *7.1.g Texas Reinvestment Zone*

Designating a specific geographic area as a Texas Enterprise Zone also makes it a Texas Reinvestment Zone, and potentially eligible for tax increment financing, tax abatement and limitations on appraised value. A local property tax exemption may be granted for real and tangible personal property located in the reinvestment zone that was acquired from the federal government by lease or deed. In addition, property in a reinvestment zone is eligible for:

- A tax refund based on the capital investment in the project
- An exemption from state regulation and suspension from local regulation
- Preference for loans from the state
- Refunds and credits on state excise, use, sales and franchise taxes
- Refunds on local sales and use taxes
- The reduction or elimination of local fees.
- Incentives tied to increasing jobs, wages or investment

### *7.1.h Pace Program*

The Texas Property Assessed Clean Energy (PACE) program provides low-cost, long-term financing for water and energy efficiency upgrades to commercial and industrial properties. PACE improvements add value to the property and reduce utility bills with the upgrades typically paying for themselves with positive cash flow over time. In 2013, the Legislature passed Senate Bill 385 (83R) allowing municipalities and counties to work with commercial lenders and property owners to pursue improvements using property

assessments as a secure repayment mechanism. Eligible upgrades are financed over time through a voluntary property tax assessment attached to the property.
Under a PACE arrangement, private property owners evaluate measures that achieve energy savings and obtain financing, repaid as an assessment on the building. The assessment mechanism allows access to low-cost, long-term capital to finance improvements to the property. By eliminating upfront costs, extending financing and simplifying the transfer of repayment obligations to new owners upon sale, PACE overcomes challenges that have hindered building energy efficiency and related projects.

## 7.2 RECRUITMENT AND TRAINING

### *7.2.a Skills Development Fund*

The Texas state-funded Skills Development Fund is an innovative program providing local customized training opportunities for Texas businesses and workers to increase skill levels and wages of the Texas workforce. Training providers can use grant funds for curriculum development, training materials, instructor certifications and training equipment additions or upgrades. The employer and local community colleges will partner to develop a training plan for the Skills Development project and submit the application jointly.
The Texas Workforce Commission and local Workforce Board will assist to ensure the application requirements are completed. Grants are provided to help companies and labor unions form partnerships with local community colleges and technical schools to provide custom job training. However, the benefit may vary depending on the proposal.
If the grant is awarded, the Texas Workforce Commission funding will be provided to the community college to administer the training program for the employer. Total grant amounts vary depending on the number of employees participating in the program. No money is spent or received by the company.
The Skills Development Fund is only available to Texas employers and will pay up to $1,800 for each new employee and $900 for each incumbent employee participating in the training. Grants are generally capped at $500,000 but exceptions can be approved, and additional funds requested.

### *7.2.b On-the-Job Training (OJT) Contracts*

On-the-Job Training (OJT) Contracts are available to an employer who hires an eligible Texas resident. OJT Contracts pay up to 50% of an eligible employee's wages during their training period. OJT Contracts are subject to availability and approval of Texas Workforce Solutions.

### *7.2.c Come Home to Texarkana Program*

The Texarkana region would be delighted to help you and your employees call Texarkana home. Institutions like the Texarkana Chamber of Commerce, the Greater Texarkana Young Professionals (GTYP), Leadership Texarkana, MainStreet Texarkana, Texarkana College, local school districts and others will help key employees discover Texarkana and acclimate to their new surroundings. We will use all our relocation tools to help you and your employees succeed at your new home in Texarkana.

## 7.3 TAX ABATEMENT PROGRAMS

### *7.3.a Goods in Transit Tax Abatement*

This law exempts goods, principally inventory, that are stored under a contract of bailment by a public warehouse operator at a public warehouse facility, and that is in no way owned or controlled by the owner of the goods. This is provided such property is moved to another location inside or outside Texas within 175 days after the goods were acquired in Texas or imported into Texas. The movement requirement could be satisfied by simply moving the goods to another warehouse across the street.

Certain specific types of goods are presently excluded from this exemption: oil, natural gas, petroleum products, aircraft, dealer's motor vehicle inventory, dealer's vessel and outboard motor inventory, dealer's heavy equipment inventory, or retail manufactured housing inventory. Some owners of goods that presently store them in owned facilities may move their goods into a public warehouse in order to obtain the tax exemption. Having inventory located in Texas on the lien date (January 1) that is not being manufactured, modified, assembled, or processed and is pre-committed to an out-of-state customer, most likely qualifies a business for a 100% property tax exemption. In some cases, it is possible to qualify part of your inventory for an interstate/foreign commerce exemption and a Freeport Exemption on the remainder, depending on the flow of goods and qualifying thresholds. Furthermore, as this is a statutory exemption, it applies to all taxing jurisdictions, including county, city, school, and special districts.

### *7.3.b Freeport Tax Exemption*

The Freeport Exemption is a constitutional amendment that exempts certain goods, which the government has dubbed Freeport goods, from property taxes. If a business has inventory in the state of Texas for a short period of time (175 days or less) before transporting it out of state, it may be eligible to claim a business personal property tax exemption on that inventory. Savings will be based on the percentage of tangible property goods that your business moved out of Texas within the 175-day window during the previous year.

The following conditions must also be met:

- Freeport property includes goods, merchandise, ores, and certain aircraft and aircraft parts.

- The inventory must fall under the categories of finished goods, supplies, raw materials or work in process of being assembled, repaired, maintained, stored, processed or fabricated. The exemption does not apply to oil, natural gas, or liquid or gaseous materials that are immediate derivatives of the oil refining or natural gas.
- The Freeport goods that are eligible for this exemption must be transported out of Texas within 175 days of the date that they are acquired, manufactured or brought into the state.
- Goods, known as goods-in-transit that meet the Freeport property requirements may be sold in-state instead of being shipped out of state. However, the property still must meet all the Freeport property requirements, and be transported out of Texas within 175 days after it was first acquired in or imported into the state.

### *7.3.c 312 Tax Abatement*

Chapter 312 of the Texas Tax Code permits local taxing units to enter into agreements with property owners providing for the abatement of ad valorem property taxes, provided that the property owner makes specified improvements or repairs to the property. The code, also known as the Property Redevelopment and Tax Abatement Act, allows the governing bodies of cities, counties and special districts to exempt all or part of the taxable value of new investments for a period not to exceed 10 years.
To be eligible for an abatement, a project must be a new facility or an expansion or modernization of an existing one. Abatement agreements are required to include certain provisions. They must specify the improvements to be made to the property and provide access for city or county employees to verify that the agreements are followed. The agreements must require payment of taxes if a property owner fails to comply with the abatement terms. In addition, annual certificates of compliance must be filed with the applicable taxing units to ensure accountability and visibility for the public.

### *7.3.d 313 Tax Abatement*

An appraised value limitation is an agreement between a taxpayer and a Texas school district in which the taxpayer proposes to build or install property and create jobs meeting certain requirements in exchange for a ten-year limitation on the taxpayer's property value for school district maintenance and operations tax (M&O) purposes. For ten years, school M&O property taxes are not levied on the value in excess of the limitation amount. Limitation amounts are established by statute and vary by school district. Unlike abatements based on a percentage of the property value, the structure of the program benefits primarily large projects, such as petrochemical, energy, or manufacturing sectors. .
Companies seeking a limitation submit an abatement application to the school district in which the project may be located. The school district forwards the application to the Texas Comptroller for evaluation. The school district may not grant final approval of the

abatement without Comptroller analysis and approval. For the 10 years of the tax benefit period, reduced local school district revenues are substantially replaced with state funds through the state public school finance system.

### *7.3.e Local Jobs, Energy, Technology and Innovation (JETI) Program*

JETI, aka 403, Program enables a company, school district and Governor's office to enter into an agreement for a 10-year school district maintenance and operations (M&O) tax appraised value limitation pursuant to statutorily mandated job creation and investment minimums.

A value limitation of 50% is standard based on qualifying job and capital investment minimums. Projects located at TexAmericas Center are also located in a US Opportunity Zone and therefore, are eligible for an additional 25% limitation on taxable value, or a total of 75%.

Companies planning a new project within the following categories are eligible to apply for the program: manufacturing facilities; dispatchable electric generation facilities; natural resource development facilities; research, development or manufacturing facilities for high-tech infrastructure equipment or technology; and the construction or expansion of critical infrastructure. Renewable energy projects or energy storage facilities are not eligible.

Because Bowie County, Texas is less than 100,000 in population, the minimum level of jobs required to be created is 10 and the capital investment to qualify for the program is $20,000,000.

For more information, visit: https://gov.texas.gov/business/page/texas-jobs-energy-technology-and-innovation-jeti

### *7.3.f 381 Tax Abatement*

Chapter 381 of the Local Government Code allows counties to provide incentives encouraging developers to build in their jurisdictions. A county may administer and develop a program to make loans and grants of public money to promote state or local economic development and to stimulate, encourage and develop business location and commercial activity in the county. Specifically, it provides for offering loans and grants of city funds or services at little or no cost to promote all types of business development including industrial, commercial and retail projects. Each agreement can be uniquely tailored to address the specific needs of both the local government entity and the business prospect.

### *7.3.g Texas Research and Development Tax Credit*

Taxpayers in Texas can claim the R&D Tax Credit to offset a portion of their franchise tax or use it towards a sales and use tax exemption on the purchase or lease of depreciable tangible personal property used in qualified research in Texas. Some highlights of the Texas R&D Tax Credit include:

- Qualified Research Expenses (QREs) must be for research conducted within Texas.
- The credit amount is 5% of the excess amount of qualified research expenses in the current period over the base amount (50% of the average of the previous three years).
- The allowable Franchise Tax Credit in any one period, including carryforward amounts, cannot exceed 50% of the franchise tax due for the period.
- Unused credits can be carried forward for up to 20 years.

### *7.3.h Pollution Control Equipment Incentive*

Property used wholly or partly to prevent, monitor, control or reduce pollution is considered "pollution control property" and is at least partly exempt from ad valorem (property) tax for the life of the asset. To obtain the exemption, the property owner must apply to the Texas Commission on Environmental Quality. The applicant can submit in three different tiers, or levels, of applications for a use and benefit determination.

### *7.3.i Franchise Tax Exemption and Deduction for Business HQ Relocation*

Companies may deduct from apportioned margin relocation costs incurred in relocating their main office or other principal place of business to Texas from another state provided the company (1) did not do business in Texas before the relocation and (2) is not a member of an affiliated group engaged in a unitary business, another member of which is already doing business in Texas.

Deductible relocation costs include (1) costs of relocating computers and peripherals, other business supplies, furniture and inventory; and (2) any other costs related to the relocation that are allowable deductions for federal income tax purposes. The deduction must be taken on the company's initial franchise tax filing.

# 8 GAP ANALYSIS REPORT

As mentioned in Section 1.5, the purpose of the TexAmericas Center (TAC) **Qualified Sites Program (QSP)** is to recognize the commercial and industrial sites with known development characteristics and available infrastructure in place that allow for the designation of the property as a **Qualified Site** meaning that the site is **Shovel-Ready** for vertical development.

A secondary purpose of the QSP is to identify market gaps in TAC's portfolio of sites and develop gap closure recommendations that will increase the inventory of Qualified Sites. This **Gap Analysis Report** will Identify the deficiencies in information or the lack of availability of infrastructure. Knowing these deficiencies will allow TAC to prioritize efforts to obtain currently unavailable information and to extend infrastructure to underserved properties. In addition, the QSP will also help elevate recognition of existing sites that may not be perceived as having qualifying attributes will be recognized as a Qualified Site and marketed as such.

## 8.1 LAND USE DESIGNATION

The Waco Site is situated in the Technology District 1 (T1) and the Technology District 2 (T2). These land use designations were initially developed to promote and utilize this portion of TAC West as agricultural and educational uses. As TexAmericas Center has investigated utility availability and capacities of the franchise and public infrastructure companies, the proposed use of the are has transformed more into technology, internet of things, data storage and other high technology uses. While TexAmericas Center has the abilities to grant variances to allow for uses that may not be included in the policy, updating this policy to allow these types of uses by right will enhance perception of the property. Updates to the TexAmericas Land Use and Site Design Policy will be forthcoming.

## 8.2 PHYSICAL PROPERTY CONDITION

Currently, the Waco Site is wooded and the previous land was to act as a buffer between the activities of Red River Army Depot (RRAD) and the neighboring city of New Boston, Texas. With recent reduction of certain activities at RRAD, this buffer was not required and allow the transfer of owner to TexAmericas Center. The site has remained wooded and undeveloped since transfer with the exception of timber harvesting activities. To better facilitate the promotion of the property for development, the clearing and grubbing of the property should be considered to better promote the site as Shovel Ready.

## 8.3 ACCESS

Currently, the property is accessible through a route that is unpaved and somewhat remote. To provide more ease of access to the site, the following actions are being considered and advanced:

### *8.3.a State Highway 8*

Coordination and Planning activities with the Texas Department of Transportation (TxDOT) to provide access to the Waco Site from State Highway 8 should be pursued to provide direct access.

### *8.3.b Walnut Street*

Currently, Walnut Street, a Bowie County maintained road provides access to Area A, the tract immediately east of the Waco Site, and continues south along the common boundary between Area A and the Waco Site. TexAmericas Center will be making revisions to fencing around the perimeter to Area A to allow access to the Waco Site from this road. Additionally, TexAmericas Center will be making improvements to the alignment and geometry of this road to better facilitate business traffic, size and frequency of vehicles.

### *8.3.c New TAC West Entry*

TexAmericas Center has secured easements and will be working on plans for a new entry road into TAC West from State Highway 8. This new point of access will be in close proximity to the southwest corner of the Waco Site.

## 8.4 UTILITY CONSIDERATIONS

Section 6 of this report and the exhibits included in Appendix G highlight the utilities in the vicinity of the Waco Site and extensions that are required for serving the site.

### *8.4.a Water*

For immediate water service to the Waco site, a main can be extended along Walnut Street to the northeast corner of the Waco Site. Because Riverbend Water Resources District (RWRD) is wet utility provider on TAC West, this connection to the TWU main will require the installation of a meter for the purposes of metering water transferred from TWU to RWRD.

An 8-inch RWRD main currently serves the Army Reserve Training Center situated along HWY 83 approximately 1.5 miles east of Walnut Street. RWRD has agreed to allow the extension of this main in a southwesterly direction through portions of RRAD to the northwest corner of TAC West and continue the main west to the Waco Site.

### *8.4.b Sanitary Sewer*

A temporary package treatment plant could be constructed southeast of the Waco Site and utilized until RWRD has a sanitary sewer collection system infrastructure extended to TAC West. The plan would discharge effluent into Big Creek. After RWRD has extended their sanitary sewer infrastructure to TAC West, the temporary plant could be converted to a lift station to pump the effluent towards TAC Central. It would then travel to TAC East to be treated at the Collins Wastewater Treatment Plant.

A second treatment option for consideration would be to construct a lift station near the south boundary of TAC West and pump the effluent to the City of New Boston wastewater treatment plant situated along the east boundary line of the TAC West

Campus. This only becomes an option if RWRD declines to provide a wastewater service area as TAC West is part of the RWRD CCN Service Area.

### *8.4.c Power*

A 3-phase, 12-kv distribution line leaves the substation north of HWY82 and heads in a southerly direction, crosses HWY 82 and continues south on the west side of Walnut Street and terminates at a point approximately one mile to the north line of TAC West. This line has a current capacity of 12MW and can be extended south to the northeast corner of the Waco Site.

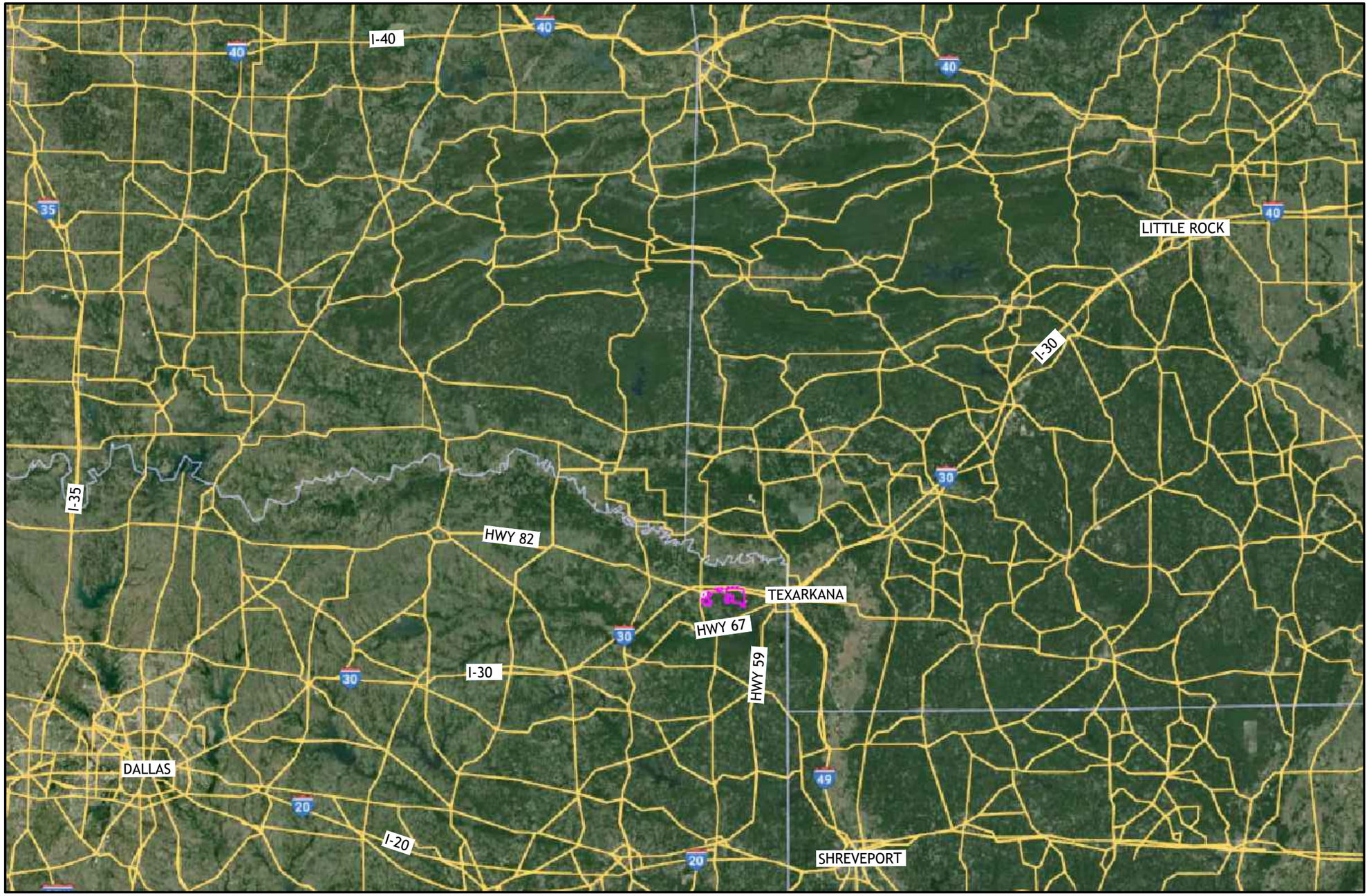
TAC West is also served by a 12kv distribution line that runs from the substation on the TAC Central campus. This line runs from the northeast corner of the TAC West, approximately a mile and a half, turns south through TAC West and then leaves the campus and continues into the Red River Army Depot line of Oak Street.

### *8.4.d Natural Gas*

The natural gas line proposed to Serve TAC West consists of dual 4-inch gas lines that deliver 130 MCF per hour and is expandable to at least 170 MCF per hour. These lines will be extended along HWY 8 for a distance of approximately three quarters of a mile to the northwest corner of TAC West. From there, it can be routed to and through Tac West to service property as needed.

# APPENDIX A

# FIGURE A-1



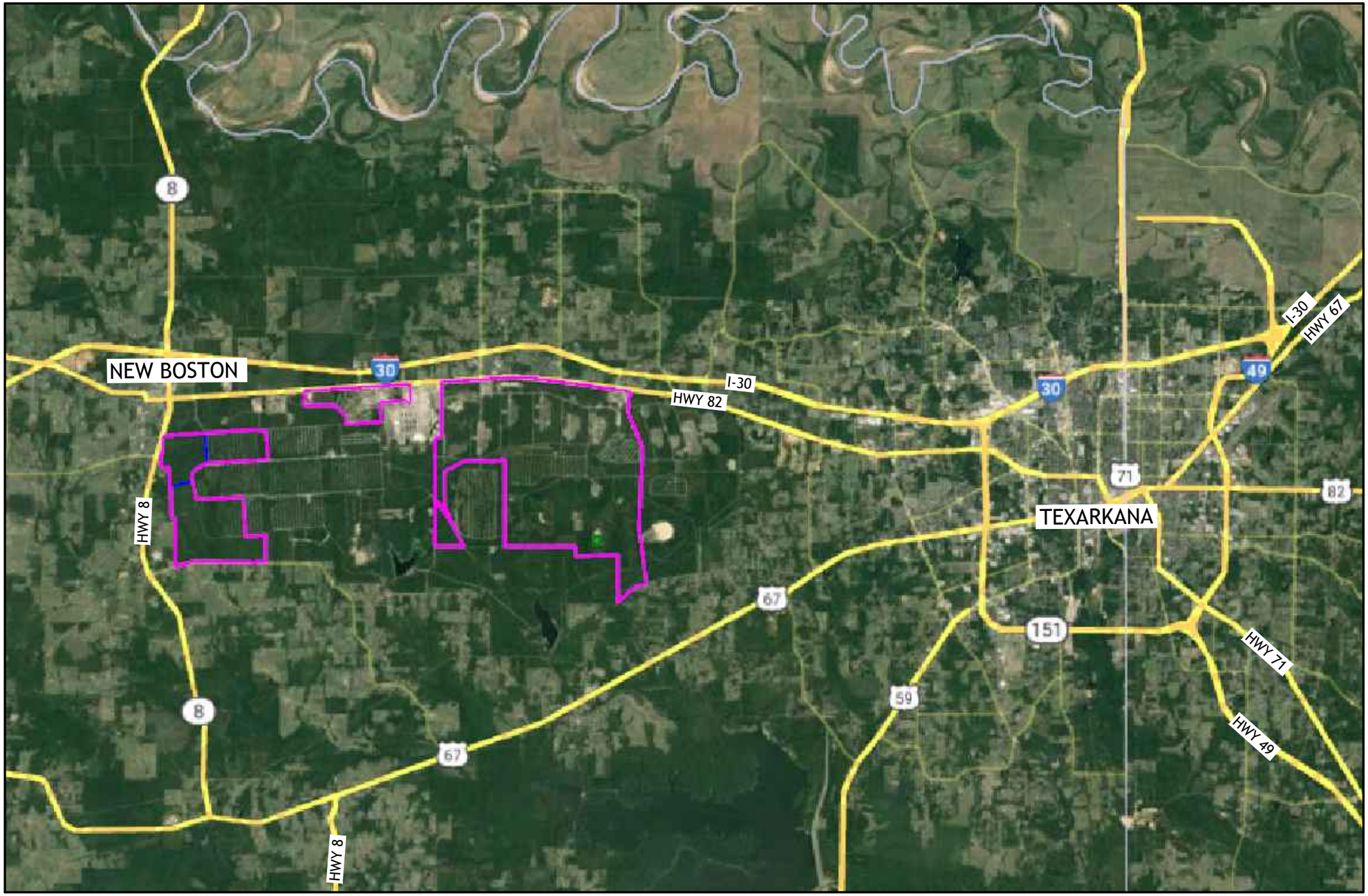

107 CHAPEL LANE
NEW BOSTON, TEXAS 75570
903.223.9841
www.TexAmericasCenter.com

TexAmericas CENTER
Texarkana USA

REGIONAL LOCATION MAP

TEXAMERICAS CENTER

# FIGURE A-2

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TexAmericas CENTER
Texarkana USA

AREA LOCATION MAP

TEXAMERICAS CENTER

# FIGURE A-3


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TexAmericas CENTER
Texarkana USA

TEXAMERICAS CENTER - CAMPUS MAP

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# FIGURE A-4


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WACO TRACT - WEST CAMPUS

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# FIGURE A-5


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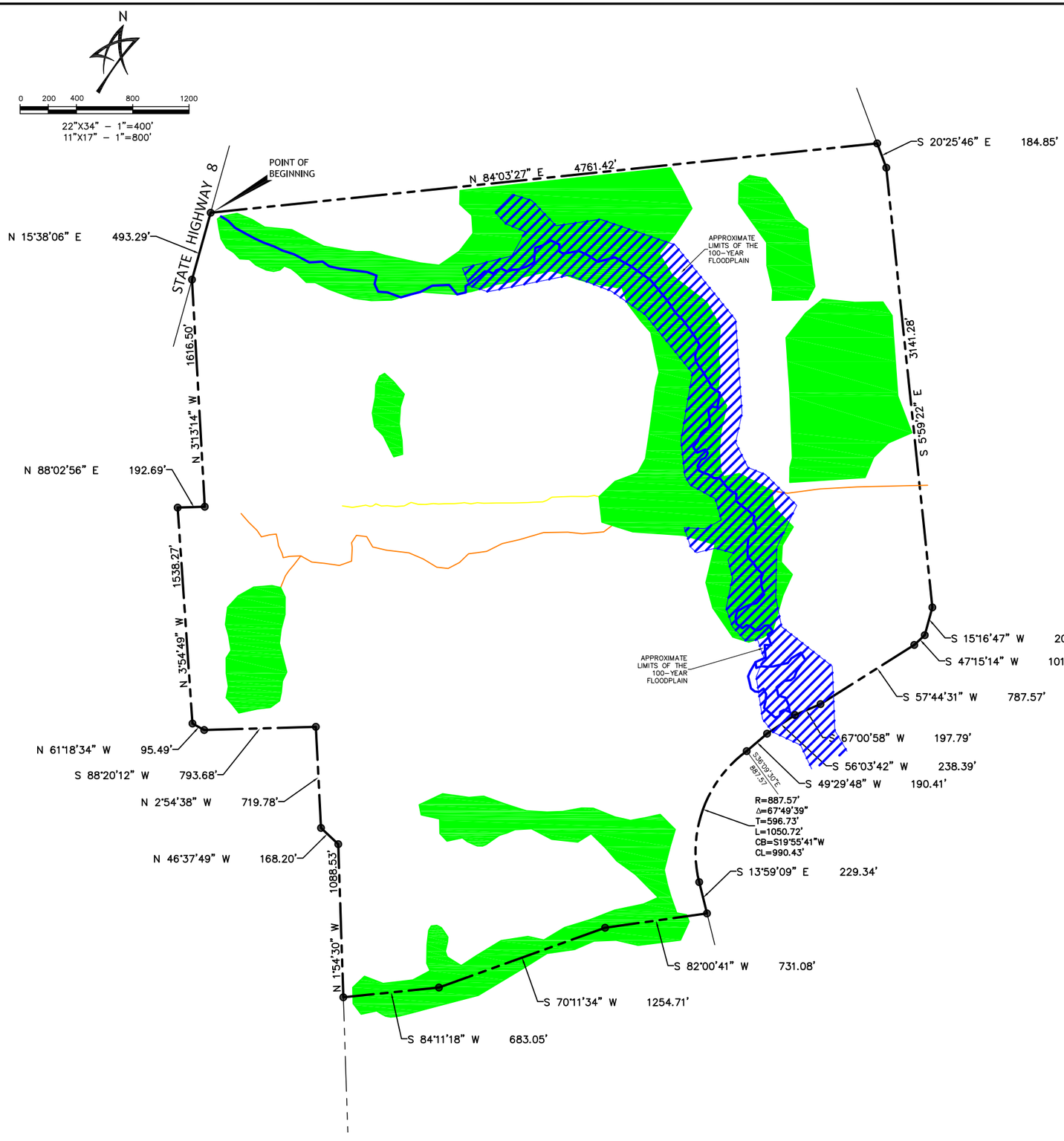
WACO TRACT

TEXAMERICAS CENTER




# FIGURE A-6

DESCRIPTION OF PROPERTY
DESCRIPTION, of a 552.393 acre tract of land situated in the W.F. Thompson Headright Survey, Abstract No. 565 and the John Ball Headright Survey, Abstract No. 25, Bowie County Texas; Said tract being a portion of a 3,839.33 acre tract of land conveyed from the United States of Americas to Red River Redevelopment Authority in a Deed Without Warranty Recorded in Volume 6114, Page 1 of the Real Property Records of Bowie County, Texas; Said 552.393 acre tract being more completely described as follows:

BEGINNING, at the northwest corner of said 552.393 acre tract (hereinafter called Waco Tract); Said point also being the northwest corner of remainder tract of said 3,839.33 acre tract (hereinafter called TAC West) conveyed to Red River Redevelopment Authority; Said point also being in the east right-of-way line of State Highway 8 (hereinafter called SH8);

THENCE, North 84 degrees, 03 minutes, 27 seconds East, departing the said east line of SH8 and along the north line of said TAC West, a distance of 4,761.42 feet to the northeast corner of said Waco Tract;

THENCE, South 20 degrees, 25 minutes, 46 seconds East, departing the north line of said TAC West along the east line of said Waco Tract, a distance of 184.85 feet to an angle point;

THENCE, South 5 degrees, 59 minutes, 22 seconds East, continuing along the east line of said Waco Tract, a distance of 3,141.28 feet to an angle point;

THENCE, South 15 degrees, 16 minutes, 47 seconds West, continuing along the east line of said Waco Tract, a distance of 205.03 feet to an angle point; said point being in the east line of TAC West;

THENCE, South 47 degrees, 15 minutes, 14 seconds West, continuing along the east line of said Waco Tract and the east line of said TAC West, a distance of 101.91 feet to an angle point;

THENCE, South 57 degrees, 44 minutes, 31 seconds West, continuing along the east line of said Waco Tract and the east line of said TAC West, a distance of 787.57 feet to an angle point;

THENCE, South 67 degrees, 00 minutes, 58 seconds West, continuing along the east line of said Waco Tract and the east line of said TAC West, a distance of 197.79 feet to an angle point;

THENCE, South, 56 degrees, 03 minutes, 42 seconds West, continuing along the east line of said Waco Tract and the east line of said TAC West, a distance of 238.39 feet to an angle point;

THENCE, South 49 degrees, 29 minutes, 48 seconds West, continuing along the east line of said Waco Tract and the east line of said TAC West, a distance of 190.41 feet to the beginning of a curve to the left whose center bears South 36 degrees, 09 minutes, 30 seconds East, a distance of 857.57 feet from said point;

THENCE, in a southerly direction, continuing along the east line of said Waco Tract and the east line of said TAC West and along said curve to the left, through a central angle of 67 degrees, 49 minutes, 39 seconds, an arc distance of 1050.72 feet (Chord bearing of South 19 degrees, 55 minutes, 41 seconds West and Chord distance of 990.43 feet) to the end of said curve;

THENCE, South 13 degrees, 59 minutes, 09 seconds East, continuing along the said east line of said Waco Tract and the east line of said TAC West, a distance of 229.34 feet to the southeast corner of said Waco Tract;

THENCE, South 82 degrees, 00 minutes, 41 seconds West, departing the east line of said TAC West and along the south line of said Waco Tract, a distance of 731.08 feet to an angle point;

THENCE, South 70 degrees, 11 minutes, 34 seconds West, continuing along the south line of said Waco Tract, a distance of 1,254.34 feet to an angle point;

THENCE, South 84 degrees, 11 minutes, 18 seconds West, continuing along the south line of said Waco Tract, a distance of 683.05 feet to a point in the west line of said TAC West; said point also being the southeast corner of said Waco Tract;

THENCE, North 1 degree, 54 minutes, 30 seconds West, along the west line of said TAC West Tract and the west line of said Waco Tract, a distance of 1,088.53 feet to an angle point;

THENCE, North 46 degrees, 37 minutes, 49 seconds West, continuing along the west line of said TAC West Tract and the west line of said Waco Tract, a distance of 168.20 feet to an angle point;

THENCE, North 2 degrees, 54 minutes, 38 seconds West, continuing along the west line of said TAC West Tract and the west line of said Waco Tract, a distance of 719.78 feet to an angle point;

THENCE, South 88 degrees, 20 minutes, 12 seconds West, continuing along the west line of said TAC West Tract and the west line of said Waco Tract, a distance of 793.68 feet to an angle point;

THENCE, North 61 degrees, 18 minutes, 34 seconds West, continuing along the west line of said TAC West Tract and the west line of said Waco Tract, a distance of 95.49 feet to an angle point;

THENCE, North 3 degrees, 54 minutes, 49 seconds West, continuing along the west line of said TAC West Tract and the west line of said Waco Tract, a distance of 1,538.27 feet to an angle point;

THENCE, North 88 degrees, 2 minutes, 56 seconds East, continuing along the west line of said TAC West Tract and the west line of said Waco Tract, a distance of 192.69 feet to an angle point;

THENCE, North 3 degrees, 13 minutes, 14 seconds West, continuing along the west line of said Waco Tract, a distance of 1,616.50 feet to an angle point; Said point also being in the east line of SH8;

THENCE, North 15 degrees, 38 minutes, 06 seconds East, continuing along the west line of said TAC West Tract and the west line of said Waco Tract and along the east line of SH8, a distance of 493.29 feet to the POINT Of BEGINNING;

CONTAINING 24,062,278.05 square feet or 552.393 acres of land, more or less.

According to the National Flood Insurance Program Flood Insurance Rate Map, Community Panel No. 48037C0285D & 48037C0295D, effective date October 19, 2010, portions of the herein described tract of land appears to be situated in 'Zone X - Unshaded' and 'Zone A - Shaded'. These area are defined as follows:

Zone X - Unshaded - Areas determined to be outside the 0.2% annual chance floodplain (500-year flood).

Zone A - Shaded - Special Flood Hazard Areas (SFHA) subject to inundation by the 1% annual chance flood (100-year flood, aka base flood) - No Base Flood Elevation Determined

## BOUNDARY EXHIBIT
## WACO TRACT
## TEXAMERICAS CENTER WEST CAMPUS
## W.F. THOMPSON HEADRIGHT SURVEY, ABSTRACT No. 119 & JOHN BALL HEADRIGHT SURVEY, ABSTRACT No. 25
## BOWIE COUNTY, TEXAS

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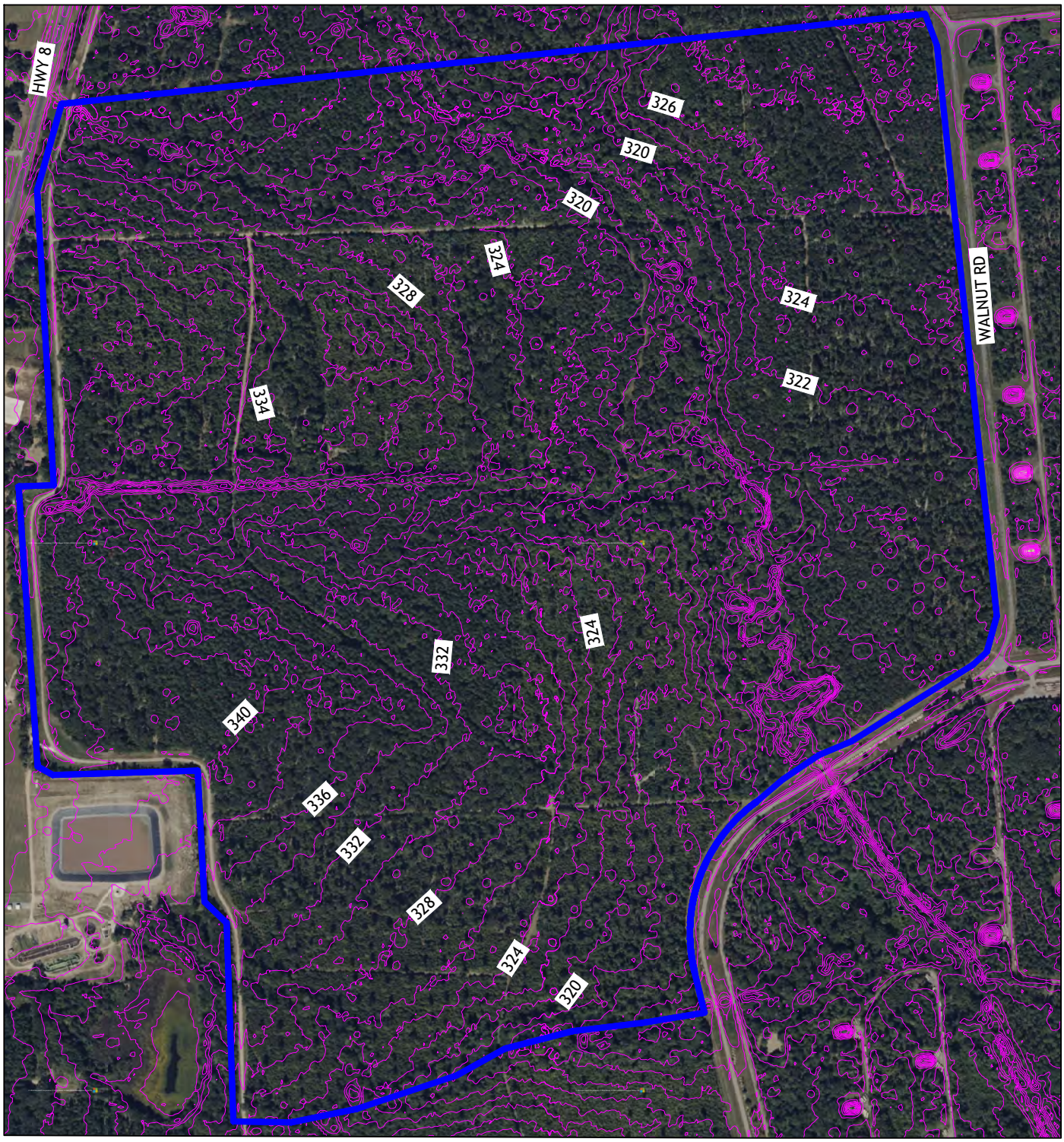
| DRAWN: *** | DESIGN: *** | DATE: 08/22/2024 | SCALE: *** | JOB #: |
|---|---|---|---|---|

# FIGURE A-7

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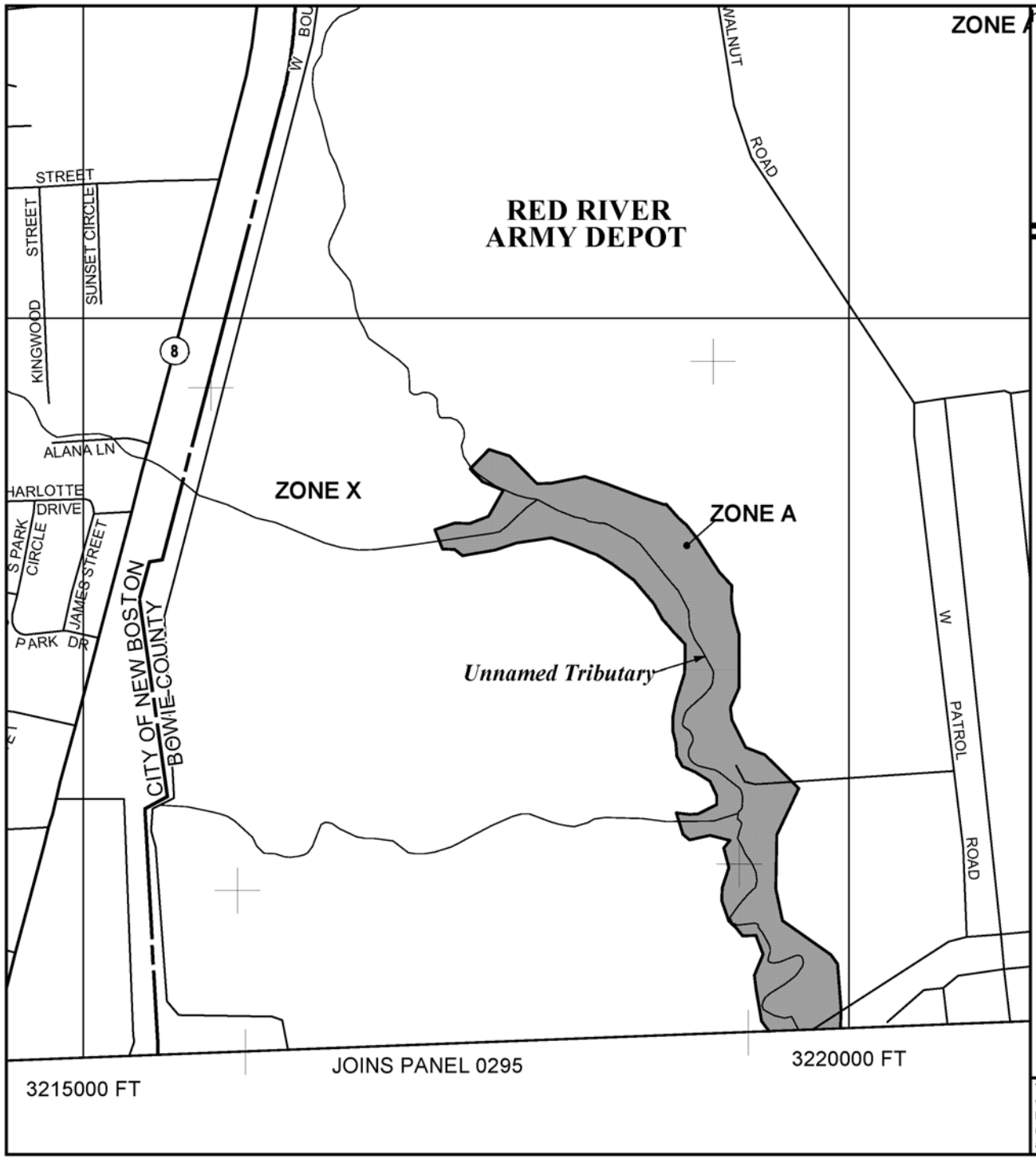
# TOPOGRAPHICAL EXHIBIT
## WACO SITE
## TEXAMERICAS CENTER
## WEST CAMPUS
HOOKS, TEXAS

| DRAWN: | DESIGN: JDW | DATE: | SCALE: | WCE #: |
|---|---|---|---|---|




he National Flood Insurance Program at 1- 800- 638- 6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0285D

# FIRM

## FLOOD INSURANCE RATE MAP

## BOWIE COUNTY, TEXAS

### AND INCORPORATED AREAS

**PANEL 285 OF 600**

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

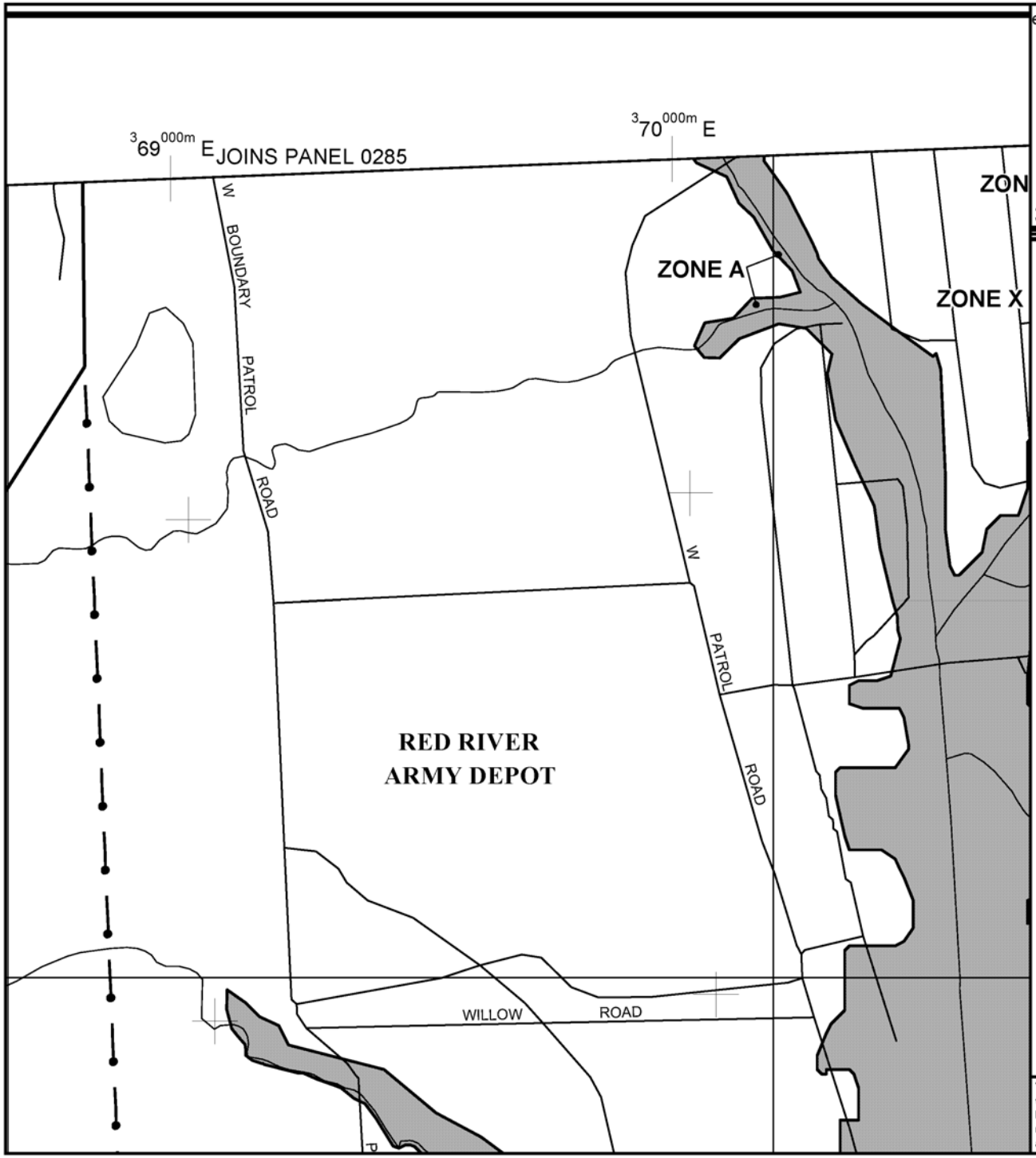
| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| BOWIE COUNTY | 481194 | 0285 | D |
| NEW BOSTON, CITY OF | 480059 | 0285 | D |

Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**
**48037C0285D**

**EFFECTIVE DATE**
**OCTOBER 19, 2010**

Federal Emergency Management Agency




e National Flood Insurance Program at 1- 800- 638- 6620.

MAP SCALE 1" = 1000'

500 0 1000 2000 FEET

300 0 300 600 M

NFIP

NATIONAL FLOOD INSURANCE PROGRAM

PANEL 0295D

# FIRM

## FLOOD INSURANCE RATE MAP

## BOWIE COUNTY, TEXAS AND INCORPORATED AREAS

**PANEL 295 OF 600**

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS:

| COMMUNITY | NUMBER | PANEL | SUFFIX |
|---|---|---|---|
| BOWIE COUNTY | 481194 | 0295 | D |
| NEW BOSTON, CITY OF | 480059 | 0295 | D |

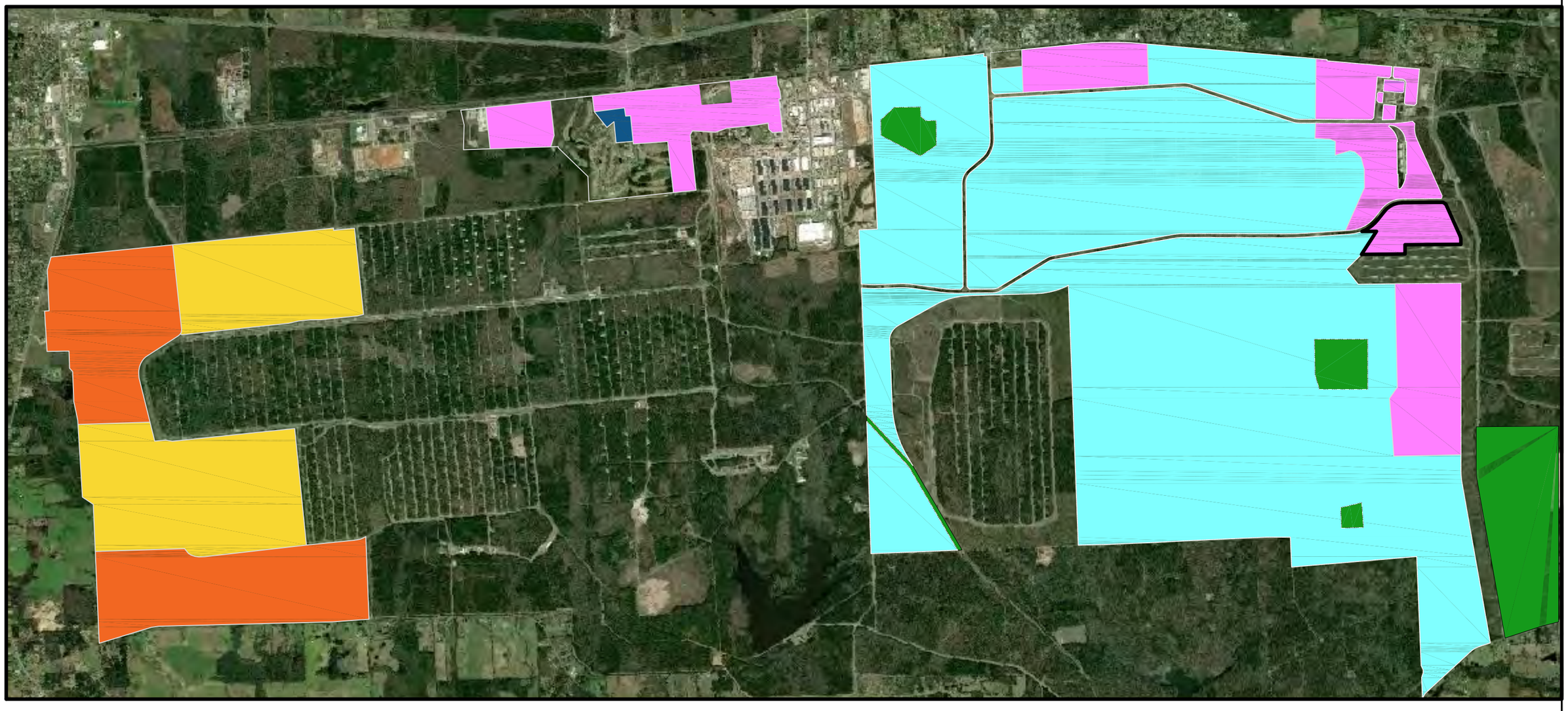
Notice to User: The **Map Number** shown below should be used when placing map orders; the **Community Number** shown above should be used on insurance applications for the subject community.

**MAP NUMBER**
**48037C0295D**

**EFFECTIVE DATE**
**OCTOBER 19, 2010**

Federal Emergency Management Agency

N



- TECHNOLOGY DISTRICT 1 (T1)
- TECHNOLOGY DISTRICT 2 (T2)
- RESIDENTIAL DISTRICT (R)
- LIGHT INDUSTRIAL DISTRICT (LI)
- HEAVY INDUSTRIAL DISTRICT (HI)
- U.S. ARMY PROPERTY

ADOPTED 09.25.2018

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LAND USE MAP

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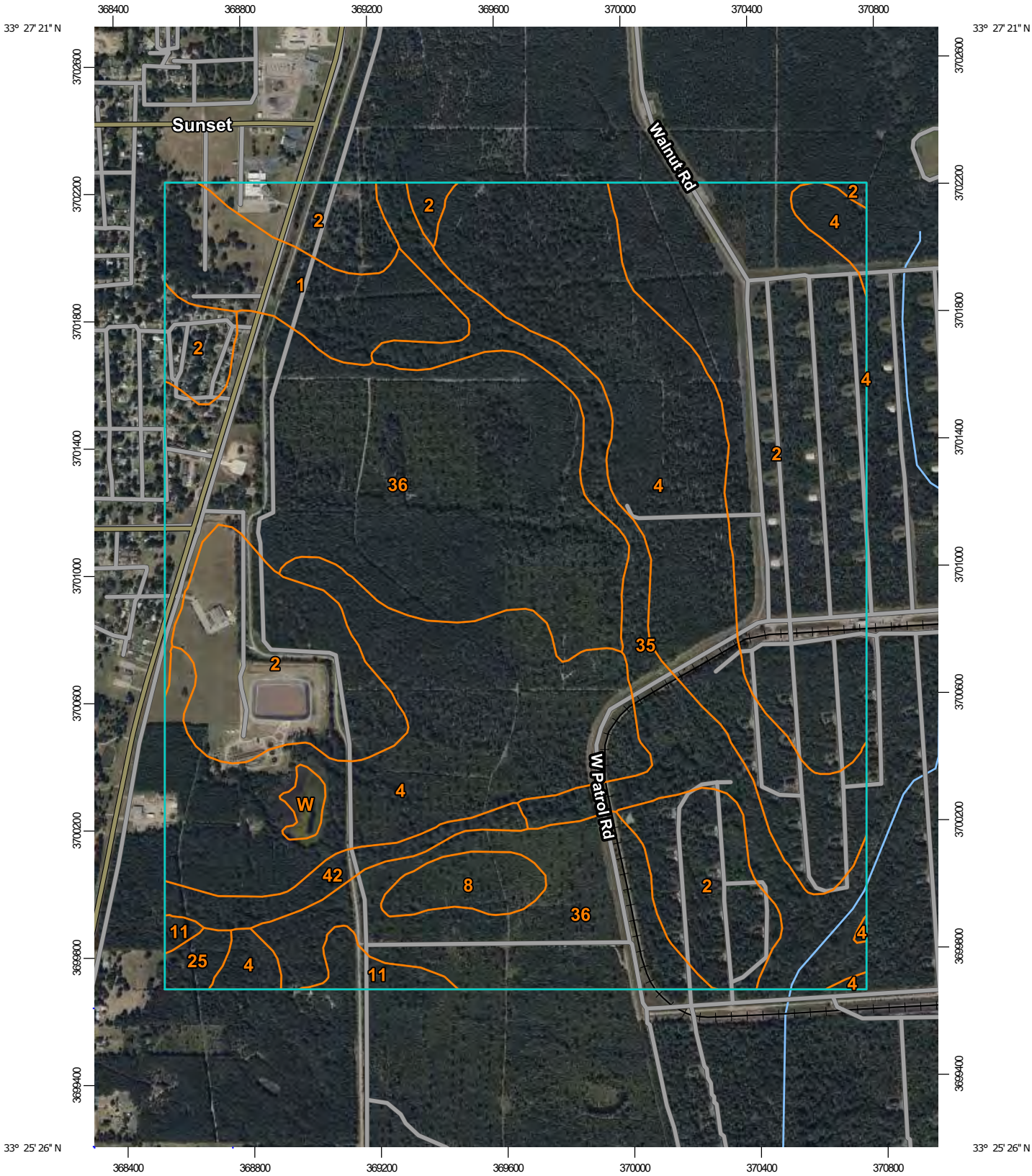
SHEET NO: LUM

# APPENDIX B

Soil Map—Bowie County, Texas
(Waco Site)




Map Scale: 1:17,200 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 250 500 1000 1500

Feet
0 500 1000 2000 3000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 15N WGS84

## MAP LEGEND

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

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

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

**Water Features**
- Streams and Canals

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

**Background**
- Aerial Photography

## MAP INFORMATION

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

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

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

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

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

Soil Survey Area: Bowie County, Texas
Survey Area Data: Version 21, Aug 31, 2023

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

Date(s) aerial images were photographed: Data not available.

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

# Map Unit Legend

| Map Unit Symbol | Map Unit Name | Acres in AOI | Percent of AOI |
|---|---|---|---|
| 1 | Adaton-Muskogee complex | 64.0 | 4.6% |
| 2 | Alusa loam | 399.4 | 28.7% |
| 4 | Annona loam, 1 to 3 percent slopes | 394.7 | 28.3% |
| 8 | Blevins silt loam, 1 to 3 percent slopes | 19.4 | 1.4% |
| 11 | Darden loamy fine sand, 1 to 8 percent slopes | 12.7 | 0.9% |
| 25 | Rosalie loamy fine sand, 2 to 5 percent slopes | 7.4 | 0.5% |
| 35 | Sardis silt loam, 0 to 1 percent slopes, frequently flooded | 110.0 | 7.9% |
| 36 | Sawyer silt loam, 0 to 3 percent slopes | 357.7 | 25.7% |
| 42 | Thenas fine sandy loam, frequently flooded | 22.8 | 1.6% |
| W | Water | 5.3 | 0.4% |
| **Totals for Area of Interest** | | **1,393.3** | **100.0%** |

# Map Unit Description

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

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

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

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

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

# Bowie County, Texas

## 1—Adaton-Muskogee complex

### Map Unit Setting

*National map unit symbol:* m9lk
*Elevation:* 150 to 800 feet
*Mean annual precipitation:* 42 to 52 inches
*Mean annual air temperature:* 61 to 64 degrees F
*Frost-free period:* 190 to 220 days

*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Adaton and similar soils:* 70 percent
*Muskogee and similar soils:* 20 percent
*Minor components:* 10 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Adaton**

**Setting**

*Landform:* Stream terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Loamy alluvium

**Typical profile**

*H1 - 0 to 6 inches:* silt loam
*H2 - 6 to 80 inches:* silty clay loam

**Properties and qualities**

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 0 to 6 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* Very high (about 12.0 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3w
*Hydrologic Soil Group:* C/D
*Ecological site:* F133BY001TX - Depression
*Hydric soil rating:* Yes

**Description of Muskogee**

**Setting**

*Landform:* Stream terraces
*Landform position (three-dimensional):* Tread
*Microfeatures of landform position:* Mounds
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Loamy alluvium

**Typical profile**

*H1 - 0 to 15 inches:* silt loam

*H2 - 15 to 25 inches:* silty clay loam
*H3 - 25 to 80 inches:* clay

**Properties and qualities**

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 24 to 36 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* High (about 10.2 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2e
*Hydrologic Soil Group:* C
*Ecological site:* F133BY013TX - Terrace
*Hydric soil rating:* No

**Minor Components**

**Wrightsville**

*Percent of map unit:* 10 percent
*Landform:* Depressions on stream terraces
*Landform position (three-dimensional):* Tread
*Ecological site:* F133BY012TX - Wet Terrace
*Hydric soil rating:* Yes

# Data Source Information

Soil Survey Area: Bowie County, Texas
Survey Area Data: Version 21, Aug 31, 2023

# Map Unit Description

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

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

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

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

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

# Bowie County, Texas

## 2—Alusa loam

**Map Unit Setting**

*National map unit symbol:* m9lx
*Elevation:* 200 to 700 feet
*Mean annual precipitation:* 40 to 52 inches
*Mean annual air temperature:* 63 to 66 degrees F
*Frost-free period:* 210 to 230 days

*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Alusa and similar soils:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Alusa**

**Setting**

*Landform:* Interfluves
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Clayey residuum weathered from sandstone and shale

**Typical profile**

*H1 - 0 to 11 inches:* loam
*H2 - 11 to 48 inches:* clay
*H3 - 48 to 80 inches:* clay

**Properties and qualities**

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Poorly drained
*Runoff class:* High
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* About 0 to 12 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* High (about 10.3 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3w
*Hydrologic Soil Group:* D
*Ecological site:* F133BY002TX - Seasonally Wet Upland
*Hydric soil rating:* Yes

**Minor Components**

**Adaton**

*Percent of map unit:* 10 percent
*Landform:* Stream terraces
*Landform position (three-dimensional):* Tread
*Ecological site:* F133BY001TX - Depression
*Hydric soil rating:* Yes

**Wrightsville**

*Percent of map unit:* 10 percent
*Landform:* Depressions on stream terraces
*Landform position (three-dimensional):* Tread

*Ecological site:* F133BY012TX - Wet Terrace
*Hydric soil rating:* Yes

**Annona**

*Percent of map unit:* 5 percent
*Landform:* Stream terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Ecological site:* R087BY002TX - Claypan Savannah
*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Bowie County, Texas
Survey Area Data: Version 21, Aug 31, 2023

# Map Unit Description

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

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

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

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

# Bowie County, Texas

## 4—Annona loam, 1 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* m9mm
*Elevation:* 200 to 500 feet
*Mean annual precipitation:* 40 to 48 inches
*Mean annual air temperature:* 64 to 68 degrees F
*Frost-free period:* 210 to 280 days

*Farmland classification:* Farmland of statewide importance

**Map Unit Composition**

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

**Description of Annona**

**Setting**

*Landform:* Stream terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Linear
*Across-slope shape:* Convex
*Parent material:* Clayey alluvium of quaternary aged derived from mixed sources

**Typical profile**

*H1 - 0 to 12 inches:* loam
*H2 - 12 to 45 inches:* clay
*H3 - 45 to 80 inches:* clay

**Properties and qualities**

*Slope:* 1 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Very high
*Capacity of the most limiting layer to transmit water (Ksat):* Very low to moderately low (0.00 to 0.06 in/hr)
*Depth to water table:* More than 80 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Calcium carbonate, maximum content:* 5 percent
*Gypsum, maximum content:* 2 percent
*Maximum salinity:* Nonsaline to very slightly saline (0.0 to 2.0 mmhos/cm)
*Available water supply, 0 to 60 inches:* Moderate (about 8.7 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 3e
*Hydrologic Soil Group:* D
*Ecological site:* R087BY002TX - Claypan Savannah
*Hydric soil rating:* No

**Minor Components**

**Adaton**

*Percent of map unit:* 5 percent
*Landform:* Stream terraces
*Landform position (three-dimensional):* Tread
*Ecological site:* F133BY001TX - Depression

*Hydric soil rating:* Yes

**Sawyer**

*Percent of map unit:* 5 percent
*Landform:* Marine terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Ecological site:* F133BY005TX - Loamy Upland
*Hydric soil rating:* No

**Alusa**

*Percent of map unit:* 5 percent
*Landform:* Interfluves
*Ecological site:* F133BY002TX - Seasonally Wet Upland
*Hydric soil rating:* Yes

# Data Source Information

Soil Survey Area: Bowie County, Texas
Survey Area Data: Version 21, Aug 31, 2023

# Map Unit Description

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

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

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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

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

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

Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

# Bowie County, Texas

## 35—Sardis silt loam, 0 to 1 percent slopes, frequently flooded

### Map Unit Setting

*National map unit symbol:* 2tzrq
*Elevation:* 50 to 150 feet
*Mean annual precipitation:* 42 to 59 inches
*Mean annual air temperature:* 50 to 74 degrees F

*Frost-free period:* 215 to 265 days
*Farmland classification:* Not prime farmland

**Map Unit Composition**

*Sardis and similar soils:* 75 percent
*Minor components:* 25 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sardis**

**Setting**

*Landform:* Flood plains
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Parent material:* Loamy alluvium

**Typical profile**

*A - 0 to 5 inches:* silt loam
*Bw - 5 to 48 inches:* silty clay loam
*Cg - 48 to 80 inches:* silty clay loam

**Properties and qualities**

*Slope:* 0 to 1 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Somewhat poorly drained
*Runoff class:* Low
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately high to high (0.60 to 2.00 in/hr)
*Depth to water table:* About 18 to 36 inches
*Frequency of flooding:* Frequent
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* High (about 11.6 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 5w
*Hydrologic Soil Group:* C
*Ecological site:* F133BY017TX - Loamy Bottomland
*Hydric soil rating:* No

**Minor Components**

**Una**

*Percent of map unit:* 10 percent
*Landform:* Flood plains
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Ecological site:* F133BY018TX - Clayey Bottomland
*Hydric soil rating:* Yes

**Guyton**

*Percent of map unit:* 10 percent
*Landform:* Flood plains

*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Ecological site:* F133BY017TX - Loamy Bottomland
*Hydric soil rating:* Yes

**Urbo**

*Percent of map unit:* 5 percent
*Landform:* Flood plains
*Down-slope shape:* Linear
*Across-slope shape:* Linear
*Ecological site:* F133BY018TX - Clayey Bottomland
*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Bowie County, Texas
Survey Area Data: Version 21, Aug 31, 2023

# Map Unit Description

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

Soils that have profiles that are almost alike make up a *soil series*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. Soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Alpha silt loam, 0 to 2 percent slopes, is a phase of the Alpha series.

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

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

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Additional information about the map units described in this report is available in other soil reports, which give properties of the soils and the limitations, capabilities, and potentials for many uses. Also, the narratives that accompany the soil reports define some of the properties included in the map unit descriptions.

# Bowie County, Texas

## 36—Sawyer silt loam, 0 to 3 percent slopes

### Map Unit Setting

*National map unit symbol:* m9mh
*Elevation:* 150 to 450 feet
*Mean annual precipitation:* 48 to 54 inches
*Mean annual air temperature:* 61 to 66 degrees F
*Frost-free period:* 190 to 230 days

*Farmland classification:* All areas are prime farmland

**Map Unit Composition**

*Sawyer, affr 25-30, and similar soils:* 80 percent
*Minor components:* 20 percent
*Estimates are based on observations, descriptions, and transects of the mapunit.*

**Description of Sawyer, Affr 25-30**

**Setting**

*Landform:* Marine terraces
*Landform position (three-dimensional):* Tread
*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Parent material:* Loamy residuum weathered from sandstone and shale

**Typical profile**

*H1 - 0 to 6 inches:* silt loam
*H2 - 6 to 26 inches:* silty clay loam
*H3 - 26 to 80 inches:* clay

**Properties and qualities**

*Slope:* 1 to 3 percent
*Depth to restrictive feature:* More than 80 inches
*Drainage class:* Moderately well drained
*Runoff class:* Medium
*Capacity of the most limiting layer to transmit water (Ksat):* Moderately low to moderately high (0.06 to 0.20 in/hr)
*Depth to water table:* About 24 to 36 inches
*Frequency of flooding:* None
*Frequency of ponding:* None
*Available water supply, 0 to 60 inches:* High (about 10.4 inches)

**Interpretive groups**

*Land capability classification (irrigated):* None specified
*Land capability classification (nonirrigated):* 2e
*Hydrologic Soil Group:* C
*Ecological site:* F133BY005TX - Loamy Upland
*Hydric soil rating:* No

**Minor Components**

**Adaton**

*Percent of map unit:* 10 percent
*Landform:* Stream terraces
*Landform position (three-dimensional):* Tread
*Ecological site:* F133BY001TX - Depression
*Hydric soil rating:* Yes

**Eylau**

*Percent of map unit:* 10 percent
*Landform:* Interfluves

*Down-slope shape:* Convex
*Across-slope shape:* Linear
*Ecological site:* F133BY005TX - Loamy Upland
*Hydric soil rating:* No

## Data Source Information

Soil Survey Area: Bowie County, Texas
Survey Area Data: Version 21, Aug 31, 2023

# APPENDIX C

Code and Table 20.3-1 of ASCE 7-16, we recommend using **Site Class C (Very Dense Soil and Soft Rock)** for seismic design.

## 6 PRELIMINARY FOUNDATION SYSTEM RECOMMENDATIONS

Based on the anticipated loads and the subsurface conditions, we anticipate shallow foundations (strip and/or spread footings) or straight-sided drilled shafts are suitable to support the proposed warehouse structures. Each structure should only be supported by a single type of foundation system. The foundation system may consist of one of the above foundation types, a ground supported floor slab, and ground modification of the upper 8 feet of the building pads. The proposed ground modification is to limit the potential vertical rise (PVR) to about 1 inch. Ground modification will consist of controlled subgrade recompaction, and grade raise fill construction to the pad design grades. The foundation system including ground modification depths are shown in the schematic cross-sections below.

**Figure 3: Foundation System Illustration: Shallow Foundations**

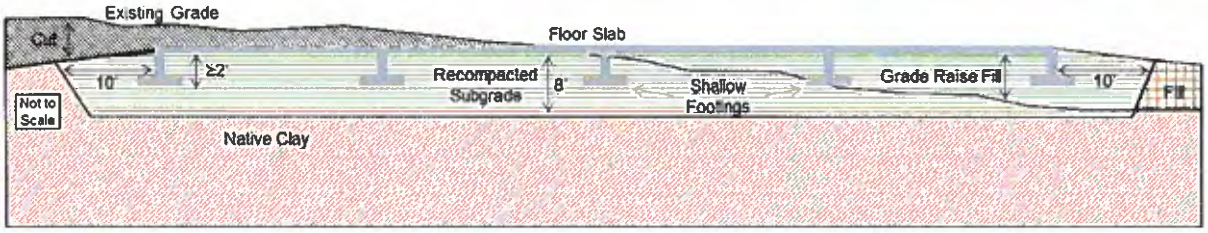
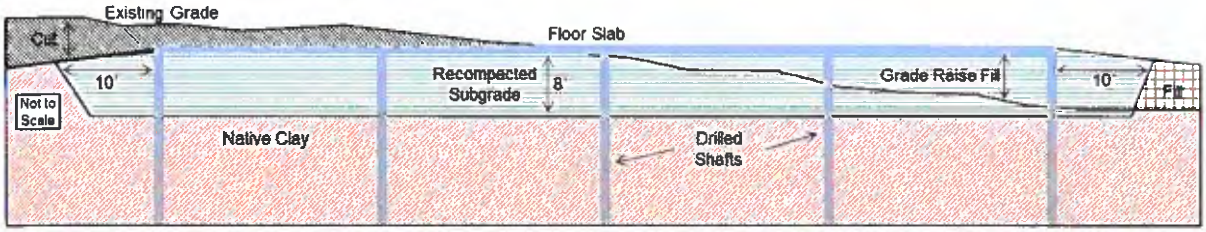



**Figure 4: Foundation System Illustration: Straight-Sided Drilled Shafts**




The foundation systems, when designed and constructed properly, should tolerate ground movement up to 1 inch. The subgrade design should result in the following ground stability conditions when constructed as required in this report. The following parameters should be used for design of the structural foundation system.

**Table 6: Summary of Ground Improvement Depths for Foundation Design**

| Material | Thickness from Existing Elevation (feet) | Estimated Swell Pressure (psf) | Swell Potential at Finished Pad (inches) |
|---|---|---|---|
| Imported Fill (if used) | 1 | Negligible | Negligible |
| Recompacted Subgrade | 8 | 800 | Negligible |
| Native Soils | 8+ | 4,000 | <1 |

### 6.1 Ground Modification and Subgrade Treatments - Preliminary

Existing grades below the building slab shall be excavated, mixed and recompacted as prescribed below. Subgrade reconstruction is designed to restructure the in-place cohesive soils such that strength and volume change can be controlled. Determination of the compaction energies and compaction efficiencies required for the existing soil property ranges enable this control.

Excavate to an 8-foot depth below the finished pad grade, mix the encountered soils, replace and recompact as specified in this report. This ground modification measure is designed to stabilize an increased strength and control swell potential and swelling pressures of the upper fat clay subgrade.

The subgrade excavation should extend at least 10 feet beyond the building perimeters and/or foundations, whichever distance is further, to allow for adequate edge treatment. The grade raise fill and recompacted subgrades should be constructed to the planned finished grade elevations. The fully compacted subgrade should be scarified, mixed with lime and pulverized in accordance with Rone Specification 400 (Appendix B) to provide a lime treated pad cap to be used as a working surface during construction. Lime treatment should extend to a depth of at least 6 inches and include at least 6 percent lime by dry weight (27 pounds per square yard). A moisture barrier should also be placed immediately beneath the concrete slab. As an alternative to the lime treated pad cap, an 8-inch layer of crushed limestone, or recycled concrete meeting TxDOT Item 247 (Type A, C or D and Grade 1, 2 or 5) may be used as the building pad cap. The crushed limestone or recycled concrete should not extend beyond the building perimeter.

### 6.2 Excavation Safety Considerations

All excavations should be sloped, shored, or shielded in accordance with Occupational Safety and Health Administration (OSHA) requirements. In accordance with Texas state law, the design and maintenance of excavation safety systems is the sole responsibility of the construction

contractor. OSHA Standards 29 CFR – 1926 Subpart P, including Appendices A and B, should be referenced for guidance in the design of such systems.

## 7 SITE PREPARATION FOR CONSTRUCTION

### 7.1 General

Existing foundations, structures, deleterious materials, debris, utilities, and other manmade features should be removed, and existing utilities should be relocated in accordance with the project plans and specifications.

### 7.2 Existing Surface Grades

Clear and grub all tree stumps and root systems as required by the work except where trees or shrubs must be maintained according to the design drawings. Except as otherwise specified or indicated in the drawings or specifications, all materials resulting from clearing and grubbing operations shall be properly disposed.

Clear all vegetation and strip the surficial topsoil as required to remove all roots and organic matter from all work areas of the site. Remove any undocumented fill from structural areas. In no case shall any spoil or other unsuitable material resulting from clearing, grubbing and stripping operations be utilized within any fill materials used onsite.

### 7.3 Excavations

All excavations should be performed to the limits and grades indicated in the design documents. Bedrock was not encountered in any of the borings, although hard clay was encountered. This study was not performed to evaluate the difficulty of ripping, processing and/or excavating the on-site materials, or estimating the volume of those excavated materials. Shallow groundwater was encountered in many of the borings, and dewatering or other groundwater control measures may be required during site grading and building pad preparations.

The earthwork contractor should have experience in construction and excavation within these materials. The contractor must use his or her own experience when making decisions regarding means, methods and costs to accomplish the proposed construction, including excavation tools, excavation rates, and number of trucks.

## 8 CONSTRUCTION OF SUBGRADE FILLS - PRELIMINARY

Foundation fill elements are critical components of any foundation system. Strength and stability of the fill is essential to limiting subgrade movements below foundations, floor slabs, and pavements. Mechanical soil compaction is designed to improve the engineering properties of soils, yet due to inadequate compaction controls, the desired compaction standards are often not achieved. The soil construction specifications in this report provide for effective compaction control, including direct data verification and real-time control.

The preliminary fill construction specifications provided in this report are designed for the specific geotechnical requirements of this project. The specifications provide the construction controls needed to prepare cohesive fills for saturation and drying potential. If the specified controls are not properly implemented throughout the fill construction, the fills will be vulnerable to strength loss and swelling with saturation, and potential shrinkage from drying. The initiation of shrinkage or swelling usually leads to increased shrink-swell cycles with moisture variation over time.

The design of these soil compaction specifications includes estimates of compacted soil properties corresponding to varying compaction energies and compaction efficiencies, enabling assessment of the final compacted performance of the fill.

The construction specifications below will prepare the fills for potential saturation; however, the environments of these fills must maintain generally moist conditions without excessive drying. In many cases, equilibrium moisture ranges can be established during construction, but in other cases equilibrium moisture cannot be achieved without ongoing maintenance following construction. Potential maintenance requirements for fills on this project are discussed in **Section 12 Site Completion and Maintenance.**

### 8.1 Subgrade Preparation

After site clearing, the exposed subgrade should be prepared for construction of foundation fills. All areas that will underlie foundations, floor slabs, or pavements will require ground modification as presented in the following sections.

Exposed subgrades in cut areas should be scarified to a depth of 8 inches and recompacted wet of the optimum moisture content at full compaction in construction, to at least 95 percent of maximum density in construction, as generated by a CAT 563 footed compactor or approved equivalent. Field verification testing will be conducted in accordance with **Section 8.5 Quality Control and Field Verification Testing**. Any areas where the specified properties are not achieved often indicate a soft or low modulus subgrade. If testing confirms that soft soils underlie any section of the recompacted surface, those sections must be excavated deeper and recompacted in lifts as required by the Geotechnical Engineer.

### 8.2 Subgrade Fill Construction

Foundations and pavements generally include a structural fill element. These fill elements are critical to ground modification requirements and the strength and stability of each foundation. Fill construction requirements depend on the design purpose and service conditions of each fill. Each fill element should be constructed to achieve the properties required for the long term stability of each foundation. Each completed lift of fill placed shall be kept moist by application of water by use of water truck or similar process to preserve the soil moisture content prior to application of subsequent fill lifts or permanent protective cover such as pavement or floor slabs.

#### 8.2.1 Project Fills

The fill elements identified for this project are listed below:

- Recompaction of existing subgrade below the warehouse structure and surrounding loading dock area
- Grade raise fills for warehouse building pads and surrounding loading dock and parking areas
- Utility trench backfill
- General fills for site grading and drainage

#### 8.2.2 Fill Material Requirements

The following table provides general property requirements and applications for the cohesive soils that may be used as fill on this project.

**Table 7: Fill Material**

| Material | Source | Property Ranges | Use |
|---|---|---|---|
| Native Clay | On-Site | NA | Grade Raise Fill<br>Utility Trench Backfill<br>Building and Pavement Subgrade |
| Imported Fill (optional) | Import | CL: 15 ≤ PI ≤ 35 or Flexible Base<br>Percent silt ≤ 20% | Building Pad Cap |

The excavated on-site soils should be well mixed before re-use as fill. The mixing should include the fat and lean clays with any sands and silts encountered. Fill should be free of organics, debris, large rocks (greater than 4 to 6 inches) and all other deleterious material. Mixing should be able to be achieved by excavating and relocating. Additional handling is not anticipated. Clay clods should be broken down with proper moisture and compaction during earthwork operations.

### 8.2.3 Borrow Selection

Rone can assist the contractor in the selection of borrow sources and compactor pairings in order to avoid or reduce moisture amendment needs during construction. With this assistance, permissible soil property limits may also be expanded by matching the compaction energy of specific compactors with the soil and moisture ranges of fill material.

For improved control and more consistent fill properties, stratified borrow sources approved for use as fill should be excavated in a manner to reasonably produce consistent mixing and increased uniformity of the fill materials. The Geotechnical Engineer of Record can provide additional guidance for this as needed.

## 8.3 Preliminary Fill Construction Specifications

All fill soils should be placed in consistent loose lift thicknesses and compacted fully and uniformly across each lift. The moisture content at the time of compaction should be wet of the optimum moisture content in construction as defined by the field compaction curves provided in this report. Any moisture modifications that may be required should be performed before compaction. Each lift should be compacted using at least the minimum number of passes required to achieve full compaction as provided by the Geotechnical Engineer of Record.

The preliminary compaction control specifications for soil construction provided below are developed for each fill required on this project based on predetermined compaction performance of compactor and soil combinations relative to design requirements. The recommended controls have been optimized based on source soil and moisture ranges assessed from the site investigation and typical compactor ranges suitable for these fills and fill volumes. The specifications employ Family-of-Curve methods for the curves produced in construction in order to use the compactors performance for control and accommodate soil and moisture variation during construction. Preliminary REC™ compaction design reports supporting this analysis and process control requirements are attached to this report. The construction specifications and supporting illustrations of the performance, range and limits of construction for each project fill are provided below. At the end of this section, a table is provided as a summary and quick reference of each specification. Additional information can also be provided on the relative performances of alternative compactors for changes during construction and optimal selection by the contractor.

All completed lifts should be protected by subsequent lifts placed as soon as practical during construction. Completed lifts shall be kept wet to avoid drying where subsequent construction cover is delayed. Completed lifts damaged by desiccation, erosion, construction traffic, or other disturbances shall be scarified and re-compacted according to the process control requirements for that particular fill. Control of lift thickness is critical to achieve full compaction with the required number of compactor passes. Grade stakes or GPS equipment should be utilized by the earthwork contractor to ensure that loose lifts do not exceed the maximum allowable given herein.

### 8.3.1 Subgrade Recompaction and Grade Raise Fill

The building pad subgrade should be fully and uniformly compacted to final pad elevation. Moisture levels should be wet of the optimum moisture content during construction as required in **Section 6.1**, according to the following process control specifications. The recompacted subgrade should extend at least 8 feet below finished pad elevation.

A CAT 563, or equivalent footed compactor approved by the **Geotechnical Engineer** should be used to compact in 9-inch loose lifts to a minimum dry density of 90.0 pounds per cubic foot (pcf) at wet-of-optimum moisture during construction and to a maximum air content of 7.4 percent. The optimum moisture content and maximum density in construction are determined from the field moisture-density curves (field compaction curves) generated by the compactor for the range of

soils used in construction. This family-of-curve range for the specified compactor energy is provided in the **CHARTS** section of the appendix.

The **Compaction and Performance Design Chart 1a** provides the preliminary performance and design construction range for the specified compactor and the in-situ moisture ranges relative to the design moisture range for construction. This specification range can be refined with more soil information prior to and/or during construction. An illustration of this preliminary specification is provided on the **Compaction Control Chart 1b**. The Compaction Control Chart includes the required construction range and minimum number of passes required for full lift compaction. The construction range provided is only valid for full lift compaction using at least the minimum number of passes. Additional control specifications are noted on the chart. It is critical for the strength and stability of the fill that each lift is fully and uniformly compacted using at least the minimum number of passes for the compactor-soil range combination. **Chart 1b** can be used as a separate reference during construction. The REC™ Compaction Design Reports covering the soil ranges at the site are included in the **CHARTS** section of the appendix.

### 8.3.2 Utility Trench Backfill

Utility trench backfill should consist of on-site clay uniformly compacted in 6-inch loose lifts wet of the optimum moisture contents in construction to an air content not exceeding 7.4 percent. Optimum moisture is determined from representative standard Proctor curves normalized on the lab line-of-optimums for the soil range used and corrected according to standard dry unit weight relations. Use hand-operated compaction equipment approved by the Geotechnical Engineer of Record. The family-of-curves and construction acceptance range will be provided by the Geotechnical Engineer of Record.

The general performance, range and limits of this construction using an approved compactor are illustrated on the **Compaction Performance and Design Chart 2a** and on the **Compaction Control Chart 2b; however,** it should be refined as necessary prior to construction using additional subsurface information

### 8.3.3 General Site Fills for Site Grading and Drainage

General fill for landscaping, grading, and drainage may consist of on-site clay. General fill should be compacted in 12-inch loose lifts using approved compaction equipment. Visual compaction

controls for wet-of-optimum compaction may be used. Topsoil in landscape areas does not require compaction beyond that achieved incidentally during spreading and grading.

### 8.3.4 Preliminary Compaction Specification Summary

The following summary table is provided for quick reference purposes. The table does not fully encompass or replace the compaction specifications provided for each fill in the sections above.

**Table 8: Preliminary Compaction Specification Summary**

| Property | Building Pad Pavement Subgrade Embankment Fill | Utility Trench Backfill | General Grading |
|---|---|---|---|
| **Material** | On-site Clay | On-site Clay | On-site Clay |
| **Compactor Equivalent** | CAT 563 | CAT 563 or Hand operated | NA |
| **Maximum Lift Thickness (inches)** | 9 | 6 | 12 |
| **Minimum Number of Passes** | 8 | NA | NA |
| **Maximum Air Voids (%)** | 7.4 | 7.4 | NA |
| **Minimum Dry Density (pcf)** | 90.0 | 86.0 | NA |
| **Minimum Moisture Content (%)** | 18.0 | 20.5 | NA |

### 8.4 Construction Ramps

Construction access ramps into and out of the building pad over excavation do not constitute adequate fill construction and should be considered a temporary provision. Soil access ramps should enter pad excavation from further cutbacks (outside of pad design limits), or ramps may be constructed within the pad design limits, provided they are constructed according to the fill specifications provided in this report. Temporary access ramps built within the pad excavation limits without further cutback should be removed and reconstructed per pad specs.

### 8.5 Quality Control and Field Verification Testing

Before fill construction, the property ranges of fill materials should be determined using index property testing. During construction, index properties should be obtained periodically and upon changes in material, color, texture or excavation procedures. Field compaction curves should be obtained upon unexpected changes in soil properties, compactor, or lift thickness, and at minimum frequencies, recommended by Rone based upon the property ranges of each fill material and expected variations. Borrow material sampling during construction should be

planned and coordinated to fit the required production rates, and generally at least two days in advance of the compaction of corresponding fill lifts.

Rone should monitor compaction and conduct verification testing during all fill construction. Verification testing of compacted lifts should be conducted at appropriate frequencies to ensure that compaction controls are satisfied and design requirements are achieved in construction. The engineer should monitor the number of compactor passes, lift thickness, air content, moisture, and density for each fill.

We recommend that Rone assist in developing a work plan for effective process controls designed for engineering requirements, the construction plan, production needs, and direct data verification records. We strongly encourage Rone be included in the pre-bid process with earthwork contractors to provide guidance in regard to fill controls for this project. A pre-construction meeting including the general contractor, earthwork contractor and soils engineer is critical to an effective launch of the project.

Nuclear density gauges are recommended for field testing of compacted lifts. Rone will provide the specific gravity ($G_s$) values required for each fill, based on compactor performance and the soil variation expected during construction. The Geotechnical Engineer must also be able to monitor the specific gravity setting remotely in real-time based on the gauge readings in the field.

### 8.6 Construction Oversight

Design requirements and recommendations presented in this report are based on critical controls during the earthworks and soil construction process. The monitoring required to verify the controls are correctly implemented is essential to proper fill construction. The requirements of this report are based on limited geotechnical, geologic and hydrogeologic information about the subsurface conditions. Subgrade conditions have been interpolated and estimated between borings and subsurface testing locations. Anomalies are often encountered during construction. The potential for subsurface variation from the conditions used for design could result in design changes and/or increased geotechnical risk during and/or following construction.

We recommend that Rone be retained to provide the controls needed for proper soil construction, monitor earthwork operations, observe foundation construction, evaluate materials, and conduct

periodic testing during the soil construction phase of the project. This enables the geotechnical engineer to verify design conditions, manage ground risk, verify compliant construction, adjust design requirements when unanticipated conditions are encountered, assist the builder, and represent owner interests. A pre-construction meeting including the general contractor, earthwork contractor and soils engineer is critical to an effective launch of the project.

## 9 BUILDING FOUNDATION STRUCTURE – PRELIMINARY

As discussed previously, both shallow foundations and straight-sided drilled shafts are feasible to support the proposed buildings. Floor slabs can be grade-supported, provided the ground modification is constructed as recommended in the final report. Ground movement potential will be limited with the design provisions recommended; however, the grade-supported slab should be designed to accommodate the design potential vertical ground movement of one inch.

### 9.1 Shallow Foundations

The proposed structures may be supported on shallow, continuous and/or spread footings bearing in controlled fill. The minimum recommended widths for shallow foundations are 24 inches for continuous strip footings and 36 inches for isolated column footings. Shallow foundations bearing at least 2 feet below exterior grade/finished floor elevation may be designed using a net allowable bearing capacity of 2,600 psf when founded in properly constructed engineered fill as recommended in this report. We recommend larger footings at corners where panel loading is higher to help distribute loading and reduce cracking of the continuous perimeter grade beam. We recommend a minimum footing width of 5 feet for this application.

### 9.2 Shallow Foundation Construction

The geotechnical engineer or his representative should monitor shallow foundation construction to confirm conditions are as anticipated. Foundation excavations should be dry and free of loose material. We recommend that the final 6 inches of the footing excavation be performed with a smooth bucket. Reinforcing steel and concrete should be placed within two days, or sooner, to reduce deterioration of the bearing surface. Prolonged exposure or inundation of the bearing surface will negatively affect strength and compressibility characteristics. If delays occur, the excavation should be deepened as necessary and cleaned to provide a fresh bearing surface. If extended exposure of the bearing surface is anticipated, a "mud-slab" should be used to protect

the bearing surface. Shallow foundations may be earth-formed, provided that a smooth, vertical excavation can be established and maintained throughout placement of reinforcing steel and concrete.

### 9.3 Drilled Straight Shafts

Alternatively, a straight-sided drilled shaft foundation system may be used to support the proposed structure. Straight-sided drilled shafts are typically installed into the stronger materials at greater depths which usually provides sufficient compression, uplift and lateral resistance.

Drilled shaft design recommendations consider that the upper 8 feet of soils will be either controlled grade raise or modified native soils as described in **Section 8 Construction of Subgrade Fills - Preliminary**. We recommend the drilled shafts be extended at least 20 feet below existing grades, and into the stiff native clay. Drilled shafts may be designed based on the recommendations below. Drilled straight shafts founded at this depth may be proportioned using a net allowable end bearing pressure of 4,000 psf with an allowable skin friction of 500 psf. Skin Friction should be ignored in the upper 12 feet of the shaft. This bearing pressure is based on a design safety factor of 2.5 against shear failure of the foundation bearing soils and should be used for dead load plus sustained live load. The allowable end bearing pressure can be increased for transient loads in accordance with applicable building codes. Foundation settlement for drilled shafts constructed as described above should be less than ½ inch.

The uplift forces on the drilled shafts due to swelling of the clay soils can be approximated using a uniform uplift pressure of 1,800 psf acting over the perimeter of the shaft to a depth of 12 feet below the final pad elevation for structures outside the prepared building pad such as screen walls, enclosures, or light standards. The uplift pressure may be reduced to 500 psf for portions of the shaft within controlled fill and may be neglected within select fill. The shafts should contain sufficient full length reinforcing steel to resist uplift forces. The uplift forces can be resisted by the dead load on the shafts plus the allowable skin friction resistance in the portion of the shaft below the minimum penetration depth, or below the bottom of the casing (if needed), whichever is deeper.

For constructability, we recommend a minimum shaft diameter of 18 inches. Adjacent shafts should have a minimum center-to-center spacing of 3 shaft diameters (based on the larger shaft).

Reduced shaft spacing could result in reduced shaft capacity for both uplift forces and gravity forces. Rone should be contacted to review reduced shaft spacing on a case-by-case basis.

### 9.4 Lateral Design for Drilled Shafts

Lateral load analysis should be performed for drilled shafts subjected to horizontal loads. Drilled shafts will provide lateral load capacity from the passive soil resistance developed on the side of the shafts. The lateral load analysis can be performed using computer programs such as L-PILE. The upper 5 feet of soils should be neglected for lateral support. The following parameters can be used for the L-PILE analysis.

**Table 9: L-PILE Input Parameters**

| Material Description | p-y Curve Model | $C_u$ (psf) | $\epsilon_{50}$ | k (pci) | Unit Weight (pcf) |
|---|---|---|---|---|---|
| Controlled Fill/Select Fill | stiff clay w/o free water | 1,400 | 0.007 | 800 | 125 |
| Native Clay | stiff clay w/o free water | 2,000 | 0.007 | 750 | 120 |

For lateral loads, the reduction factors (p-multipliers) presented in "Drilled Shafts: Construction Procedures and Design Methods" published by the Federal Highway Administration (FHWA) are recommended for use. The reduction factors depend on their relative position within the group. Only two positions (front and back row) are identified, as research has shown that all shafts or piles in or behind the second row of in-line groups behave similarly.

**Table 10: Lateral Load Group Reduction Factors**

| Shaft Spacing (Diameters) | Reduction Factors | |
|---|---|---|
| | Front Row | Back Row (s) |
| 3 | 0.90 | 0.50 |
| 4 | 0.95 | 0.65 |
| 5 | 1.00 | 0.80 |

It should be noted that factors of safety are not generally applied to the lateral load analysis. A performance criterion, or "limit state" is usually considered.

### 9.5 Design and Construction Factors for Drilled Shafts

The geotechnical engineer or senior project manager should be onsite at the beginning of drilled shaft operations to initiate observation and testing procedures, and confirm the intent of the geotechnical recommendations contained in this report. The construction of all drilled shafts should be observed by experienced geotechnical personnel to document conformance with project documents and confirm the following:

- shafts are plumb and within the acceptable tolerance
- groundwater seepage is correctly handled
- sides of shaft are not sloughing or caving
- minimum penetration into the bearing strata or below the bottom of the casing (if used)
- bearing surface is clean
- proper concrete mix design and slump
- proper removal of casing

Groundwater seepage was encountered in the borings at shallow depths and is likely to be encountered during drilled shaft excavation. The risk of encountering groundwater seepage is increased during or after periods of precipitation. We recommend a test pier program prior to the start of construction to assess current ground water levels at the site and the constructability of drilled shafts without the use temporary of steel casings. Reinforcing steel cages and concrete should be placed in the shafts immediately after the excavation has been completed, dewatered, cleaned and observed. Complete installation of individual shafts should be accomplished the same day they are excavated. Prolonged air exposure or inundation of the bearing surface could deteriorate the bearing material.

If casing is used, a full head of concrete should be maintained within the casing during removal. In no case should water be allowed to infiltrate the concrete of the shaft. Vibratory casing removal is recommended and is required for friction shafts. Complete installation of a shaft should be accomplished at least 48 hours before beginning another excavation located within four shaft diameters, center-to-center. If groundwater is encountered, it will be displaced during concrete placement. A sump may be excavated immediately adjacent to each shaft to collect displaced water.

Concrete should have a slump of 6 to 8 inches and the concrete mix design should allow for sufficient working time. The concrete should not be allowed to strike the casing sidewall or steel reinforcement during placement. Submersible pumps may be required to control seepage; the

concrete must be placed using a tremie if groundwater cannot be kept at a depth of 1 inch or less during concrete placement. Mushrooming of the drilled shafts should not be allowed in the upper 12 feet of the shaft since this condition will result in an increase in uplift forces acting on the shaft. Rone should be contacted for further evaluation and recommendations if excessive groundwater seepage or caving occurs.

### 9.6 Grade Supported Slab

The floor slabs may be grade-supported, provided that it is designed to tolerate the estimated potential vertical subgrade movement following subgrade recompaction. We recommend that the upper 6 inches consist of lime treated subgrade prepared according to Rone Specification 400, included in Appendix B. We recommend 6 percent lime by dry weight will be required to treat the subgrade materials for the building pad caps. Following lime treatment, a 6-mil plastic moisture barrier should be placed over the completed pad before floor slab construction.

As an alternative to the lime treated pad cap, select fill may also be considered. Select fill should be at least 12 inches thick and may consist of a sandy clay or clayey sand having a liquid limit of less than 40, a plasticity index (PI) between 7 and 20, and a silt content below 20 percent. Processed limestone or recycled concrete meeting TxDOT Item 247 Type 1-2, or 5, Grade A, C, or D may also be used.

### 9.7 Grade Beams/Tilt Wall Panels

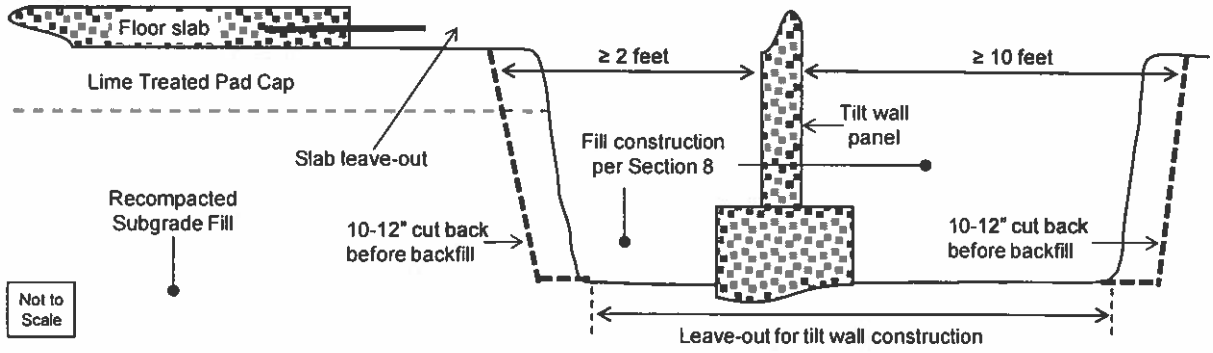
Floor slabs may be connected to the perimeter beams/tilt wall panels. A void space is not required between the subgrade and the grade beams/tilt wall panels, provided that subgrade preparation is performed as recommended in this report.

Given that grade-supported floor slabs will be constructed with a potential vertical movement of approximately 1 inch, interior wall connections should be constructed such that the estimated potential movement can be tolerated. If the floor slab is structurally connected to the perimeter wall and/or interior foundations, we recommend that the following tasks be completed:

- Perimeter leave-out backfill should be constructed as outlined in the figure below to reduce the potential for differential swell near perimeter walls.
- Subgrade reconstruction should extend at least 10 feet beyond the perimeter of the structure and any adjacent flatwork that is sensitive to movement.
- A saw-cut or physical construction joint should be installed approximately 6 to 8 feet inside the building perimeter to assist in controlling potential hinge cracks that may occur.

To facilitate tilt-wall panel installation, a perimeter "leave-out" can be constructed as illustrated below. The excavation for the leave-out should extend at least 10 feet outside the building perimeter, and 2 feet to the inside.

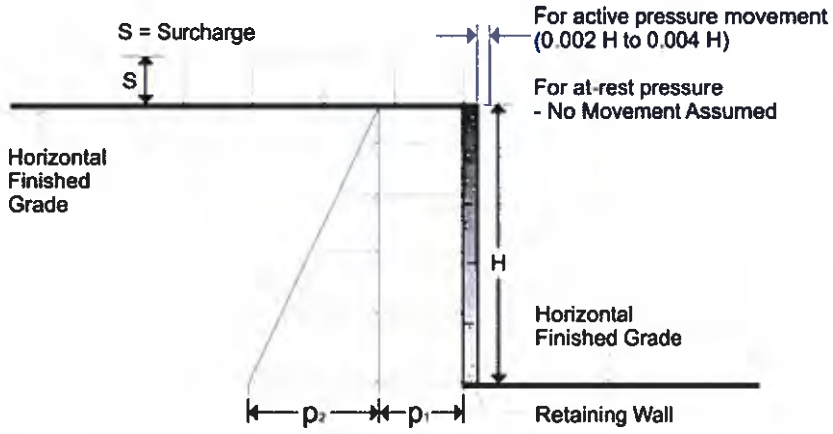
**Figure 5: Edge Leave-Out Schematic**




## 10 LATERAL EARTH PRESSURES

Lateral earth pressures will be influenced by structural design, conditions of the wall restraint, methods of construction and/or compaction, the type of materials being retained, and drainage conditions. Walls that will be restrained from movement and rotation (rigid wall) should be designed using at-rest earth-pressures. The equivalent fluid pressures (triangular distribution) provided below may be used for horizontal backfill in a drained condition. To design for a drained condition, the wall must include an adequate drainage system. The provided equivalent fluid pressures do not include a Factor of Safety and do not provide for dynamic pressures on the wall.

## Figure 6: Lateral Earth Pressure Diagram




## Table 11: Lateral Earth Pressures

| Material | Condition | Equivalent Fluid Pressure, pcf | |
|---|---|---|---|
| | | Drained | Undrained |
| Free Draining Granular Soil | At-Rest, k = 0.45 | 55 | 90 |
| | Active, k = 0.30 | 38 | 81 |
| On-Site Clay Soil | At-Rest, k = 0.79 | 100 | 112 |
| | Active, k = 0.67 | 84 | 104 |

Conditions applicable to the table above include:

- A maximum in-situ total unit weight of 125 pcf
- Properly compacted horizontal backfill
- No surcharge loads (construction equipment, pavement, footings, floor slabs, etc.)

The values provided in the table above are for a full "wedge" of material behind the wall, where the backfill extends horizontally 1 to 2 feet away from the bottom of the wall and then slopes upward and away from the wall at a slope of 1H:1V (horizontal to vertical), or flatter, and has a horizontal finished grade. The location and magnitude of permanent surcharge loads (if present) should be determined, and additional pressures generated by these loads should be considered during design. Surcharge loads can be factored using the appropriate earth-pressure coefficient values provided in the table above.

### 10.1 Wall Drainage

Retaining walls, or below grade walls should be expected to collect water due to condensation, surface water infiltration, and other means. Drainage should be provided behind all below grade walls to reduce the development of hydrostatic pressure and limit saturation of the backfill and foundation soils. Collector pipes should be placed at or slightly below the bottom level of the wall to prevent the collection of water in the drainage material beneath the collector pipes. Pipes should connect to a sump or gravity drainage system to prevent the accumulation of water behind the walls. Gravity lines should include a backflow preventer to block water from being transmitted into the drainage layer in the event of flooding near the gravity outfall.

The drainage material should consist of free-draining, clean, granular fill. This material should be compatible with ASTM C33, sizes 4 through 9. The drainage layer should extend at least 12 inches from the back face of the wall. A geosynthetic wrap should enclose the granular backfill to reduce the infiltration of fines. The top 2 feet of backfill should consist of clay materials with a plasticity index of 25 or more, compacted as recommended in the charts based on the zoning location, and extending at least 5 feet beyond the wall excavation to reduce surface water infiltration into the underlying fill.

### 10.2 Wall Backfill

Free-draining backfill soils should be placed in maximum lifts of 1 foot and lightly consolidated by use of a small hand-operated compactors or other appropriate methods to adequately compact the backfill. Heavy compactors and grading equipment should not be allowed to operate within 15 feet of the crest of the wall to avoid developing excessive additional temporary or long-term lateral soil pressures. If onsite clayey soils are used, these materials should be placed in maximum 6-inch lifts and compacted as recommended in the charts based on the zoning location.

## 11 PAVEMENTS

This report includes preliminary recommendations for rigid pavement design. While some minor differential movement should be anticipated, if the provisions of this report are strictly adhered to in construction, the pavement subgrades can be expected to be relatively stable. To the extent the provisions of this report are not adhered to in construction, increased risk of ground movement should be expected. Design of the proposed pavement sections should factor the performance of the subgrade construction provided for in this report.

### 11.1 Rigid Pavements

For this project, traffic loading and frequency conditions were estimated for various conditions as no specific traffic information was provided. The following information was used in our analysis:

- design life of 20 years
- k-value of 150 pci for modified clay subgrade, and 200 for lime treated soils
- reliability of 90 percent
- initial serviceability, po, of 4.5 and a terminal serviceability, pt, of 2.0 for concrete pavements
- concrete modulus of rupture of 540 psi
- load transfer coefficient of 2.7
- drainage coefficient of 1.0

The preliminary pavement thickness determinations were performed in accordance with the "1993 AASHTO Guide for the Design of Pavement Structures" guidelines. The minimum pavement sections are presented in the table below. These pavement sections are based on estimated traffic volumes. A more precise design can be made with detailed traffic loading information during the final geotechnical study.

**Table 12: Minimum Pavement Sections and Allowable Traffic**

| Traffic Use | Portland Cement Concrete (inches) | Design ESAL for Flexural/Compressive Strength (psi) | | |
|---|---|---|---|---|
| | | 540/3,500 | 580/4,000 | 627/4,500 |
| Vehicle Drive Lanes and Parking Areas | 6 | 447,000 | 565,000 | 724,000 |
| Dumpster Areas / Light Truck Traffic / Fire Lanes [1] | 7 | 1,277,000 | 1,605,000 | 2,069,000 |
| Moderate Truck Traffic | 8 | 1,965,000 | 2,573,000 | 3,222,000 |

1. Please refer to local municipal requirements for fire lanes. Use the design criteria which will result in the stronger, more durable pavement section.

The concrete minimum 28-day compressive strength should be selected based on the expected traffic. As a minimum, reinforcing steel should consist of #3 bars spaced at a maximum of 18 inches on center in each direction.

Pavement recommendations are based on the estimated loading conditions and commonly accepted design procedures that should provide satisfactory performance for the design life of the pavement. Concrete pavement should have between 4 and 6 percent entrained air. Hand-placed concrete should have a maximum slump of 5 inches. A sand-leveling course should not

be permitted beneath pavements. All steel reinforcement, dowel spacing/diameter and pavement joints should conform to applicable city standards.

Saw cutting should be performed in specified locations to control cracking due to shrinkage. Saw cutting should begin as soon as the concrete has obtained enough strength to keep from raveling, but before cracks can be initiated internally. Saw cut depths generally range from ¼ to ⅓ of the pavement thickness, but should be performed as directed by the civil engineer.

### 11.2 Pavement Base Course

Lime treatment of the pavement subgrade will enhance the performance of the pavement system, particularly in areas that are subjected to heavy loading during and/or following construction. We recommend 6 inches of lime treated subgrade beneath concrete pavements that will be subjected to heavy loads during and/or after construction. Auto parking areas can be excluded from lime treatment, provided heavy construction traffic is limited.

At this time, we estimate approximately 9 percent hydrated lime by weight (40½ pounds per square yard for a 6-inch thickness) will be required to adequately treat the pavement subgrade, though the actual lime requirement should be determined based on the in-place soil properties and soluble sulfate levels after the pavement subgrade has reached final grade. Lime treatment should be performed in accordance with Rone Specification 400, included in Appendix B. Lime treated subgrade should have a PI between 7 and 20.

Sulfate testing on selected samples during the geotechnical investigation indicated sulfate levels less than 600 ppm. Based on historic elevated sulfate levels in the region, we recommend that additional sulfate testing be performed on the pavement subgrade material once final subgrade elevations are achieved as the movement of soils during cut and fill operations can distribute the sulfates variably across the site. Sulfate levels should be less than 3,000 ppm. Where sulfate levels exceed 3,000 ppm, the double-lime application procedures, and higher quantities of lime may be required.

The treated subgrade should extend a minimum of 2 feet outside the curb line. This will improve the edge support of the pavement and reduce the effects associated with shrinkage during dry periods. Sand or other granular fill should not be used as a leveling course beneath the pavement,

as these more porous materials increase water migration beneath the pavement, causing heave and strength loss of the subgrade.

### 11.3 Pavement Construction and Maintenance Recommendations

It is important that the recommended moisture content and compaction be maintained until the concrete is placed. Maintenance after construction should include regular observation to identify and seal cracks. A flexible joint material should be used to seal cracks as they degrade, which can occur during the design life of pavements.

## 12 SITE COMPLETION AND MAINTENANCE

### 12.1 Site Grading and Drainage

The geotechnical design for this project accounts for limited assessment of hydro-geologic conditions and intends to provide for efforts to maintain stable, moist subgrade conditions in a uniform manner after construction. Site grading and drainage plans should support this intention where possible. Site grading and drainage should be efficient in paved areas and less efficient in lawn and landscape areas. Roof runoff should be collected by gutters and downspouts, and discharge onto paved areas draining away from the building.

### 12.2 Landscaping and Irrigation

Subgrade moisture levels should be maintained around the building perimeter before and during construction. Irrigated landscaping and lawn areas are recommended with even distribution around the structures. Irrigated areas will serve as supplemental moisture sources surrounding the foundations and pavement areas. Accordingly, regular and uniform irrigation would be required in these areas, particularly during dry and hot weather periods. Above-grade planters may also be considered around the perimeter of the building with regular irrigation to maintain light perimeter infiltration along pavement joints.

## 13 STUDY CLOSURE

This study is preliminary in nature, and the comments and recommendations contained in this report should not be used as final geotechnical design criteria. Structure-specific supplemental

# APPENDIX D

**DEPARTMENT OF THE ARMY**
**CORPS OF ENGINEERS, FORT WORTH DISTRICT**
**P. O. BOX 17300**
**FORT WORTH, TEXAS 76102-0300**

April 24, 2023

Regulatory Division

SUBJECT: Project Number SWF-2023-00035, TexAmericas Center

Mr. Chad Martin
Stantec
8401 Shoal Crek Boulevard Suite 100
Austin, TX 78757-7621
Chad.a.martin@stantec.com

Dear Mr. Martin:

This letter is in regard to the information received March 30, 2023, concerning the delineation of water features on approximately 600 acres associated with the Tex Americas Complex located in New Boston, Bowie County, Texas. This project has been assigned the above referenced Project Number which should be included in all future correspondence concerning this project.

Based on the information provided, as well as other information available to us, we concur with the delineation of wetlands, other special aquatic sites, and other waters (as defined in the Federal Register, Vol. 82, No. 4 dated January 6, 2017) as shown on the plan entitled "Concurrence Map," consisting of 1 sheet, dated March 30, 2023. This concurrence does not impart any determination relative to jurisdictional status concerning any water features on the site.

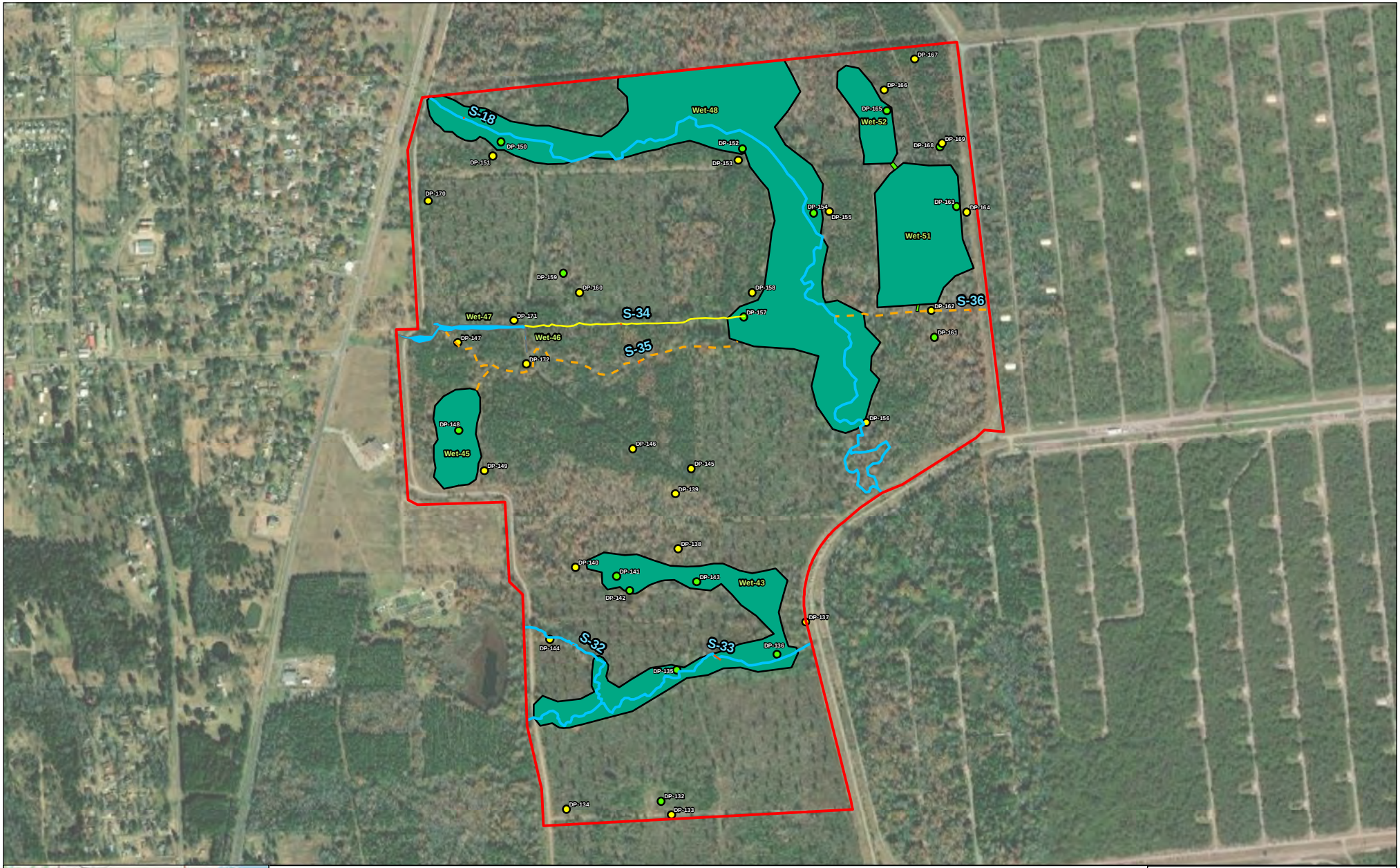
This determination does not convey any permit, property rights, either in real estate or material or any exclusive privileges, nor does it authorize any injury to property or invasion of rights or any infringement of Federal, State, or local laws or regulations. This determination does not eliminate the requirements to obtain State or local permits or approvals as needed. Any regulated activities that may be proposed to occur within waters of the US will require authorization from the Corps of Engineers associated with the project.

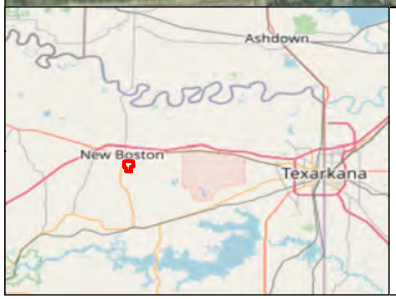
Thank you for your interest in our nation's water resources. If you have any questions concerning this determination, please contact Andy Gray at (817) 647-2026 or andrew.a.gray@usace.army.mil and refer to your assigned project number.

Please help the regulatory program improve its service by completing the survey on the following website: http://corpsmapu.usace.army.mil/cm_apex/f?p=regulatory_survey.

Sincerely,

For: Brandon W. Mobley
Chief, Regulatory Division




**Legend**

- Project Boundary
- Ephemeral Stream
- Intermittent Stream
- Perennial Stream
- Upland Datapoint
- Wetland Datapoint
- Hydrologic Connection
- Palustrine Forested Wetland
- Palustrine Unconsolidated Bottom Wetland

0 990
Feet

Stantec

TexAmericas Center - West Central Campus
Wetland Delineation
Bowie County, Texas

Concurrence Map

| Date: | Project No: | Map: |
|---|---|---|
| March 2023 | 237800380 | 1 |

Date Created: 3/30/2023 Date Revised: 3/30/2023 File Path: U:\237800380\07_historical\E320201502 - 12K Wetland Delineation\GIS\MXDs\West\Delineated Concurrence Map.mxd
GIS Analyst: cohoffmann

Data Source: Basemap: Bing Maps Aerial (2020)

# APPENDIX E

Last Update: 9/1/2023

# BOWIE COUNTY

## AMPHIBIANS

**southern crawfish frog** *Lithobates areolatus areolatus*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G4T4 | State Rank: S3 |

**Strecker's chorus frog** *Pseudacris streckeri*

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

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

## BIRDS

**Bachman's sparrow** *Peucaea aestivalis*

Open pine woods with scattered bushes and grassy understory in Pineywoods region, brushy or overgrown grassy hillsides, overgrown fields with thickets and brambles, grassy orchards; remnant grasslands in Post Oak Savannah region; nests on ground against grass tuft or under low shrub

| | | |
|---|---|---|
| Federal Status: | State Status: T | SGCN: Y |
| Endemic: N | Global Rank: G3 | State Rank: S1B |

**bald eagle** *Haliaeetus leucocephalus*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S3B,S3N |

**Franklin's gull** *Leucophaeus pipixcan*

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

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

# BOWIE COUNTY

## BIRDS

**piping plover** *Charadrius melodus*

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

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

**Sprague's pipit** *Anthus spragueii*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G3G4 | State Rank: S3N |

**swallow-tailed kite** *Elanoides forficatus*

The county distribution for this species includes geographic areas that the species may use during migration. Time of year should be factored into evaluations to determine potential presence of this species in a specific county. Lowland forested regions, especially swampy areas, ranging into open woodland; marshes, along rivers, lakes, and ponds; nests high in tall tree in clearing or on forest woodland edge, usually in pine, cypress, or various deciduous trees.

| | | |
|---|---|---|
| Federal Status: | State Status: T | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S2B |

**white-faced ibis** *Plegadis chihi*

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

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

# BOWIE COUNTY

## BIRDS

**wood stork** *Mycteria americana*

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

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

## FISH

**blackside darter** *Percina maculata*

Restricted to the Red River Basin in the northeast part of the state although specimens have been taken in the lower Trinity and San Jacinto rivers; Often found in clear, gravelly streams.

| | | |
|---|---|---|
| Federal Status: | State Status: T | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S1 |

**blackspot shiner** *Notropis atrocaudalis*

Occurs from the lower Brazos River to the Sabine River drainage; Red River drainage. Small to moderate size tributary streams in runs and pools over all types of substrates.

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

**chub shiner** *Notropis potteri*

Brazos, Colorado, San Jacinto, and Trinity river basins. Flowing water with silt or sand substrate

| | | |
|---|---|---|
| Federal Status: | State Status: T | SGCN: Y |
| Endemic: N | Global Rank: G4 | State Rank: S2 |

**goldeye** *Hiodon alosoides*

Restricted to the Red River basin; adults in quiet turbid water of medium to large lowland rivers, small lakes, marshes and muddy shallows connected to them.

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

**highland stoneroller** *Campostoma spadiceum*

Rare, restricted range in U.S; in Texas only found in Aiken Creek, a tributary of the Sulphur River. Bright red or red-orange coloration in median and paired fins. Found in small, stony-bottomed upland headwaters to small rivers with relatively clear water and substantial base flow and current velocities (Cashner et al. 2010).

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G4G5 | State Rank: SNR |

# BOWIE COUNTY

## FISH

**ironcolor shiner** *Notropis chalybaeus*

Found only in northeastern streams from the Sabine to the Red River with the exception of an isolated population found in the San Marcos River headwaters. Found primarily in acidic, tannin-stained, non-turbid, sluggish Coastal Plain streams and<br />rivers of low to moderate gradient. Occurs in aggregation, often at the upstream ends of pools, with a moderate to sluggish current and sand, mud, silt or detritus substrates. Usually associated with aquatic vegetation.

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

**Mississippi silvery minnow** *Hybognathus nuchalis*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: | Global Rank: G5 | State Rank: S4 |

**orangebelly darter** *Etheostoma radiosum*

Streams, creeks, and small to moderate-sized rivers in the Red River basin. Riffle areas of gravel-bottoms streams with moderate to high currents.

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

**paddlefish** *Polyodon spathula*

Species occurred in every major river drainage from the Trinity Basin eastward, but its numbers and range had been substantially reduced by the 1950's; recently reintroduced into Big Cypress drainage upstream of Caddo Lake. Prefers large, free-flowing rivers but will frequent impoundments with access to spawning sites.

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

**Red River shiner** *Notropis bairdi*

Red River basin; typically found in turbid waters of broad, shallow channels of main stream, over bottom mostly of silt and shifting sand.

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

**shovelnose sturgeon** *Scaphirhynchus platorynchus*

Found only in the Red River below Denison Dam (Lake Texoma). Evidence of the presence of this species in the lower Pecos River, during prehistoric times, strongly suggests that it likely occurred in many Texas rivers. Inhabits flowing water over sandy bottoms or near rocky points or bars.

| | | |
|---|---|---|
| Federal Status: SAT | State Status: T | SGCN: Y |
| Endemic: N | Global Rank: G4 | State Rank: S2 |

# BOWIE COUNTY

## FISH

**silver chub** *Macrhybopsis storeriana*

Red River and Brazos River basins. Mainly restricted to large, often silty rivers. Ranges over gravel to silt substrates but found more commonly over silt or mud bottom.

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

**silverband shiner** *Notropis shumardi*

In Texas, found from Red River to Lavaca River; Main channel with moderate to swift current velocities and moderate to deep depths; associated with turbid water over silt, sand, and gravel.

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S4 |

**taillight shiner** *Notropis maculatus*

Restricted to the Sulphur and Cypress drainages in northeast Texas; Quiet, usually vegetated oxbow lakes, ponds, or backwaters.

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S1 |

**western creek chubsucker** *Erimyzon claviformis*

Eastern Texas streams from the Red River to the San Jacinto drainage. Habitat includes silt-, sand-, and gravel-bottomed pools of clear headwaters, creeks, and small rivers; often near vegetation; occasionally in lakes. Spawning occurs in river mouths or pools, riffles, lake outlets, or upstream creeks. Prefers headwaters, but seldom occurs in springs.

| | | |
|---|---|---|
| Federal Status: | State Status: T | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S2S3 |

## INSECTS

**American bumblebee** *Bombus pensylvanicus*

Habitat description is not available at this time.

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

## MAMMALS

**big brown bat** *Eptesicus fuscus*

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

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

# BOWIE COUNTY

## MAMMALS

**black bear** *Ursus americanus*

Generalist. Historically found throughout Texas. In Chisos, prefers higher elevations where pinyon-oaks predominate; also occasionally sighted in desert scrub of Trans-Pecos (Black Gap Wildlife Management Area) and Edwards Plateau in juniper-oak habitat. For ssp. luteolus, bottomland hardwoods, floodplain forests, upland hardwoods with mixed pine; marsh. Bottomland hardwoods and large tracts of inaccessible forested areas.

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

**eastern red bat** *Lasiurus borealis*

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

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

**eastern spotted skunk** *Spilogale putorius*

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

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

**hoary bat** *Lasiurus cinereus*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G3G4 | State Rank: S3 |

**long-tailed weasel** *Mustela frenata*

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

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

**mountain lion** *Puma concolor*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S2S3 |

**muskrat** *Ondatra zibethicus*

# BOWIE COUNTY

## MAMMALS

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

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

**southeastern myotis bat** *Myotis austroriparius*

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

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

**swamp rabbit** *Sylvilagus aquaticus*

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

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

**tricolored bat** *Perimyotis subflavus*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G3G4 | State Rank: S2 |

## REPTILES

**alligator snapping turtle** *Macrochelys temminckii*

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

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

**eastern box turtle** *Terrapene carolina*

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

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

# BOWIE COUNTY

## REPTILES

**prairie skink** *Plestiodon septentrionalis*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S2 |

**pygmy rattlesnake** *Sistrurus miliarius*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G5 | State Rank: S2S3 |

**slender glass lizard** *Ophisaurus attenuatus*

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

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

**Texas horned lizard** *Phrynosoma cornutum*

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

| | | |
|---|---|---|
| Federal Status: | State Status: T | SGCN: Y |
| Endemic: N | Global Rank: G4G5 | State Rank: S3 |

**timber (canebrake) rattlesnake** *Crotalus horridus*

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

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G4 | State Rank: S4 |

## PLANTS

**Arkansas meadow-rue** *Thalictrum arkansanum*

Mostly deciduous forests on alluvial terraces and upper drainages of hardwood slope forests at contacts with calcareous prairies; flowering March-April, withering by midsummer

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G2Q | State Rank: S2 |

# BOWIE COUNTY

## PLANTS

**Arkansas oak** *Quercus arkansana*

At the Cass County location, it occurs with Quercus stellata, Q. marilandica and Q. incana in a young pine plantation on deep sandy soils; Perennial; Flowering spring

| | | |
|---|---|---|
| Federal Status: | State Status: | SGCN: Y |
| Endemic: N | Global Rank: G3 | State Rank: S1 |

**Sutherland hawthorn** *Crataegus viridis var. glabriuscula*

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

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

# APPENDIX F

March 23, 2012

Robert Grundborg
Commander's Representative
Department of the Army
Lone Star Army Ammunition Plant
Highway 82 West
Texarkana, TX 756505-9101

Re: Project review under Section 106 of the National Historic Preservation Act of 1966
Final Report: *Phase II Archaeological Investigations at Red River Army Depot and Lone Star Army Ammunition Plant, Bowie County, Texas.* (ARMY)

Dear Mr. Grundborg:

Thank you for allowing us to review the above referenced final report. This letter serves as further comment on the proposed BRAC undertaking at Red River Army Depot (RRAD) and Lone Star Army Ammunition Plant (LSAAP) from the State Historic Preservation Officer, the Executive Director of the Texas Historical Commission.

The review staff, led by Bill Martin, has completed its review. After examining the document, we concur with your determination that following archeological sites are ineligible for inclusion in the National Register of Historic Places (NRHP): 41BW276, 41BW278, 41BW497, and 41BW749. It now appears that all of the archeological sites at the installations have been evaluated and none have been determined eligible for inclusion in the NRHP. Therefore, we believe that the plant closure will have no effect on historic properties.

Thank you for your cooperation in this federal review process, and for your efforts to preserve the irreplaceable heritage of Texas. **If we can be of further assistance, please contact Bill Martin at 512/463-5867.**

Sincerely,

William A. Martin

for
Mark Wolfe, State Historic Preservation Officer

MW/wam

cc: Nancy Parrish, COE-FWD

# National Register of Historic Places Eligibility Status of 29 Archaeological Sites on TexAmericas Center Lands, Bowie County, Texas

*Bo Nelson and Timothy K. Perttula*

**Technical Report No. 118, Tejas Archaeology (Pittsburg, Texas), May 2022**

## Introduction

The TexAmericas Center is a special purpose district, or Local Redevelopment Authority, of the state of Texas. The 2005 Base Realignment and Closure (BRAC) Commission recommended the closure of the Lone Star Army Ammunition Plant (LSAAP) and the realignment of the Red River Army Depot (RRAD) in Bowie County, Texas. The downsizing of the defense industry allowed the TexAmericas Center to acquire properties within the LSAAP and RRAD facilities. The TexAmericas Center properties are being developed into a commercial and industrial district to support the expansion of business in the region (Figure 1).

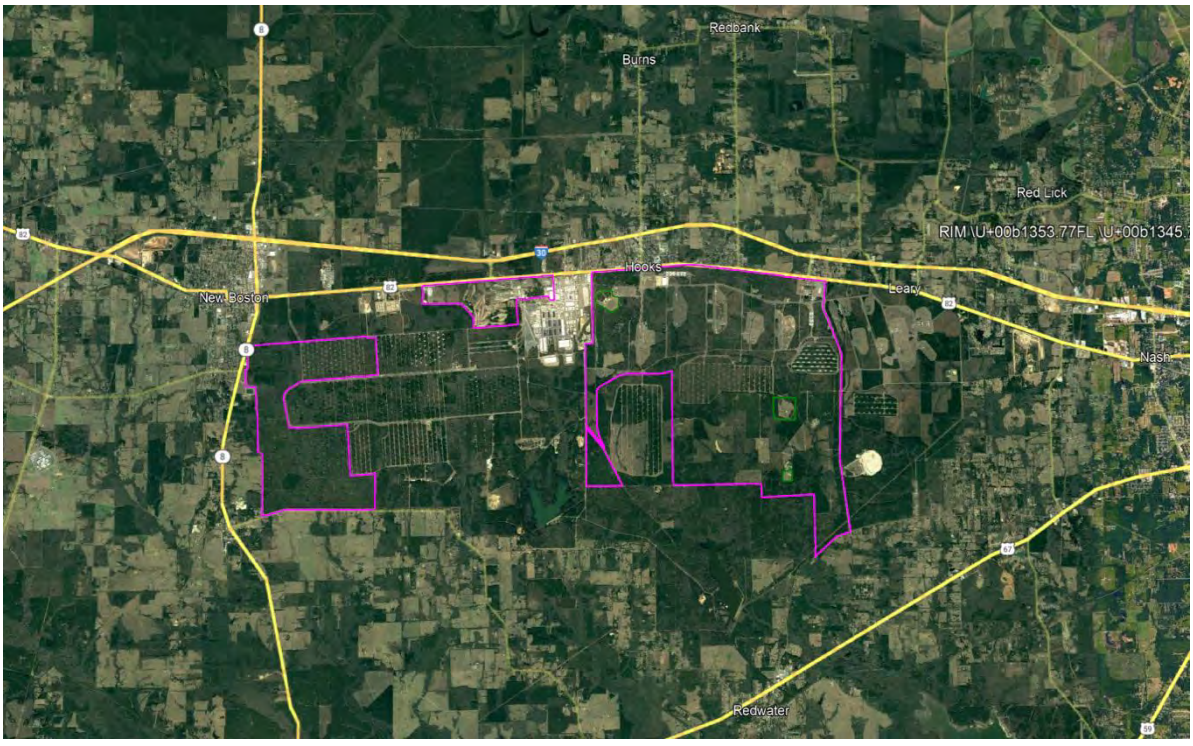



**Figure 1. TexAmericas Center property in Bowie County, Texas.**

In the 2010 real estate transfer documents between the U.S. Army and the TexAmericas Center incorporated preservation covenants ensuring the protection of 29 archaeological sites om the property until such time as National Register of Historic Places (NRHP) eligibility determinations can be completed for each of the sites (Figure 2).

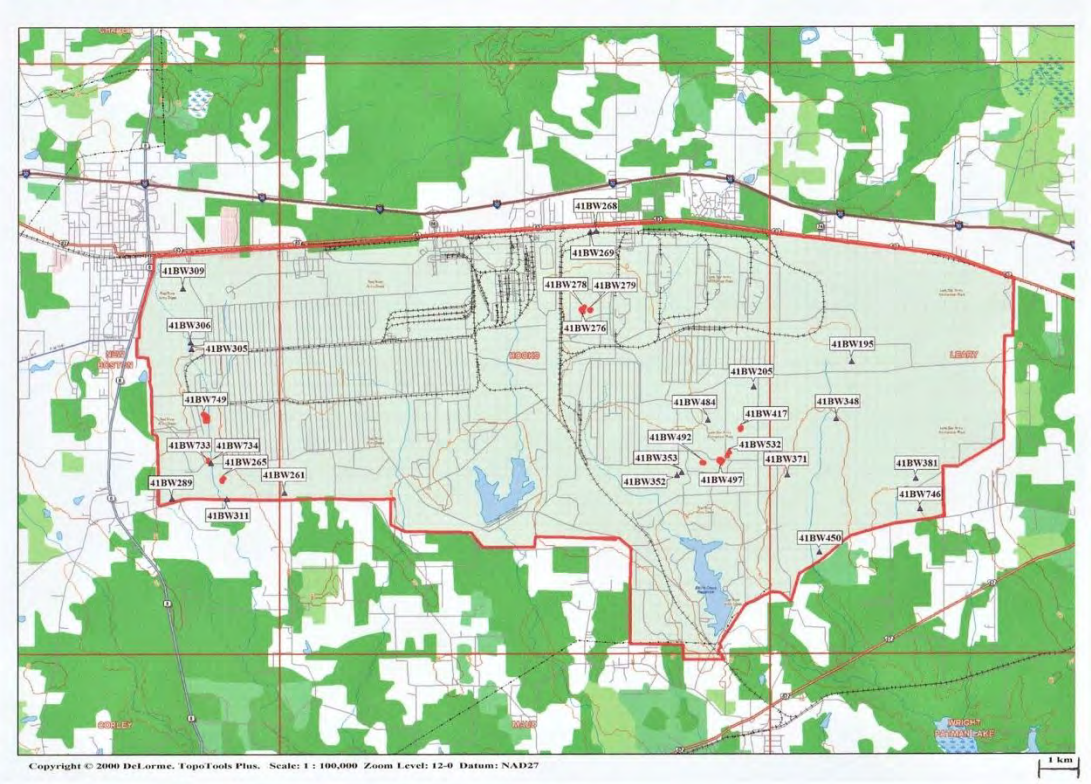



**Figure 2. The locations of the 29 sites on the LSAAP and RRAD, Bowie County, Texas.**

Also, before the transfer of properties, the U.S. Army, the Texas Historical Commission (THC), the State Historic Preservation Office (SHPO), and the Advisory Council of Historic Preservation (ACHP) developed a Programmatic Agreement (PA) regarding the sites with an unknown or undetermined NRHP eligibility. The PA stipulated that the archaeological sites will be evaluated for NRHP eligibility, and that evaluation will be completed as necessary and as funding is available.

In the interim, sine 2010 several of the specifically archaeological sites in the group of 29 sites have had NRHP eligibility evaluations and the TexAmericas Center has not been informed of the results of these evaluations. Though no new development is planned at the 29 protected archaeological sites, the TexAmericas Center has requested Tejas Archaeology to consult with the THC about the current NRHP and protection status of the 29 archaeological sites, and what are TexAmericas Center's responsibilities concerning each of the archaeological sites.

A review of the Texas Archeological Sites Atlas (2022) was conducted to gather information on the 29 previously recorded archaeological sites within the TexAmericas properties. Archaeological site forms, THC National Register Eligibility Reviews, any available archaeological testing reports, and a 2013 Integrated Cultural Resource Management Plan (ICRMP) were consulted for the 29 archaeological sites. These are: 41BW195, 41BW205, 41BW261, 41BW265, 41BW268, 41BW269, 41BW276,

41BW278, 41BW279, 41BW289, 41BW305, 41BW306, 41BW309, 41BW311, 41BW348, 41BW352, 41BW353, 41BW371, 41BW381, 41BW417, 41BW450, 41BW484, 41BW492, 41BW497, 41BW532, 41BW733, 41BW734, 41BW746, and 41BW749.

## Archaeological Site Histories

### 41BW195 (Figure 3)

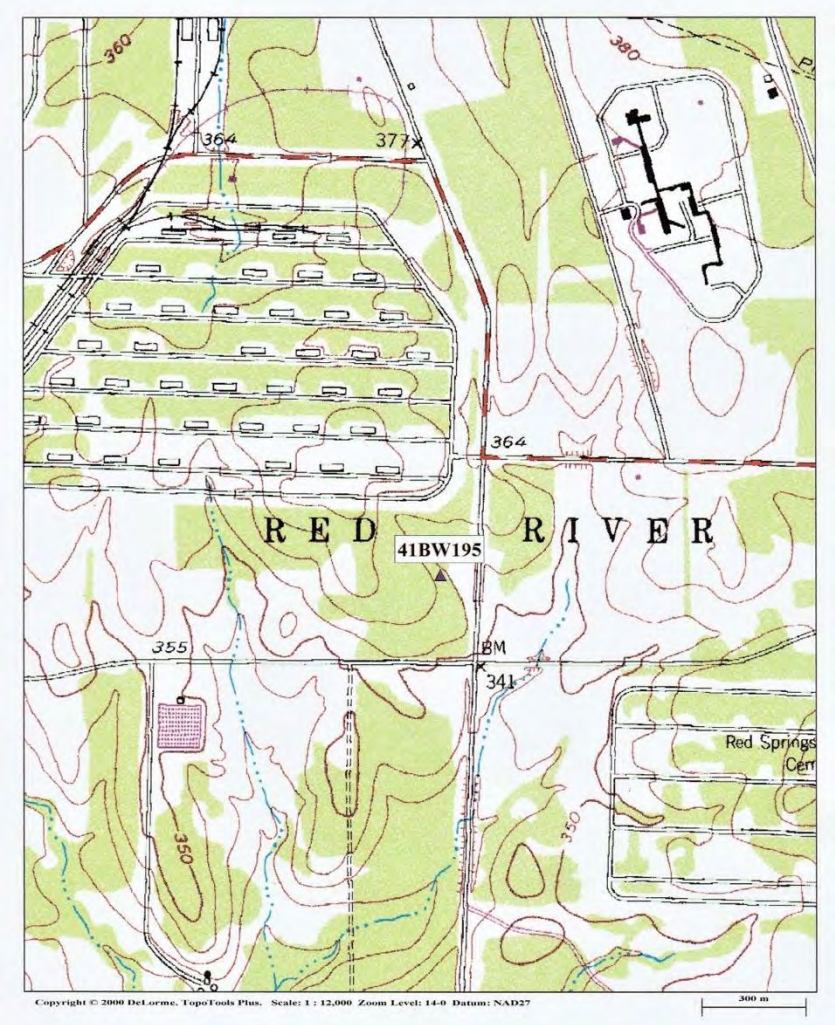



**Figure 3. Location of 41BW195.**

41BW195 was recorded in 1988 by the University of North Texas (UNT) as a late 19th to early 20th century site. The historic artifacts recovered were cut and wire nails, solarized glass, a metal fragment, and brick fragments. The site was recommended for preservation and archival research. In a 1990 report, Geo-Marine, Inc. used archival research to determine that the Cantrell family had a farmstead at the location between 1875 and 1920 (Peter and Cliff 1990). Geo-Marine recommended test excavations to determine the National Register of Historic Places (NRHP) eligibility of this site.

In 2010, Earth Search Inc. conducted additional archival research confirming that the Cantrell family lived on the property from 1872 until 1917. After 1917, the property was purchased by the Heard family, absentee landowners until 1941 when the U. S. Government acquired the property. Earth Search determined that the property was an Anglo-American farmstead (Parrish et al. 2012), but its NRHP eligibility was not determined.

**41BW205 (Figure 4)**

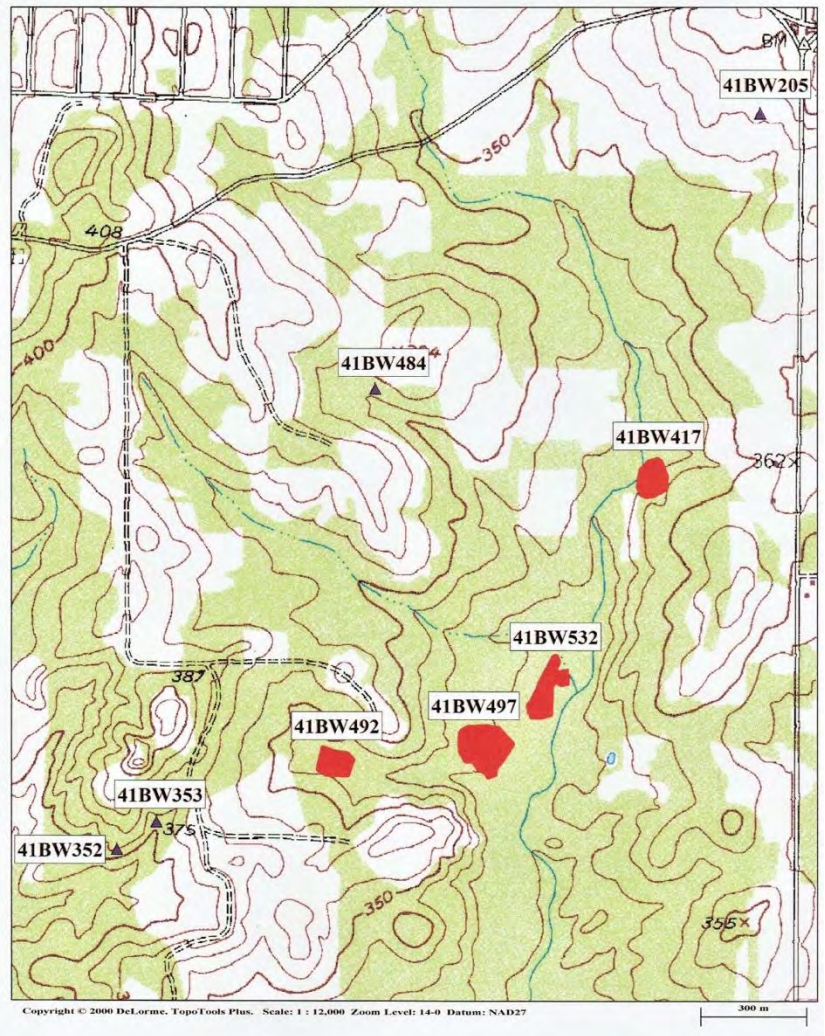



**Figure 4. Locations of 41BW205, 41BW352, 41BW353, 41BW417, 41BW484, 41BW492, 41BW497, and 41BW532.**

This site was recorded in 1989 by the UNT as a prehistoric site of unknown age with an unspecified number of lithic debris recovered in two shovel tests. The site was recommended for preservation. The site form listed only that it was a prehistoric site of unknown age, but a 1990 report by Geo-Marine, Inc. also listed a 20th century historic

component present at the site. Geo-Marine recommended additional archival research and site preservation (Peter and Cliff 1990).

In 2010, Earth Search Inc. conducted archival research that established that a George W. Tiller lived on the site in 1905 before selling the property three years later to the J. I. Skinner family. The Skinner's retained the property until the U.S. Government acquired it in 1941. Earth Search determined that the property was an Anglo-American farmstead (Parrish et al. 2012). Its NRHP eligibility was not determined.

**41BW261 (Figure 5)**

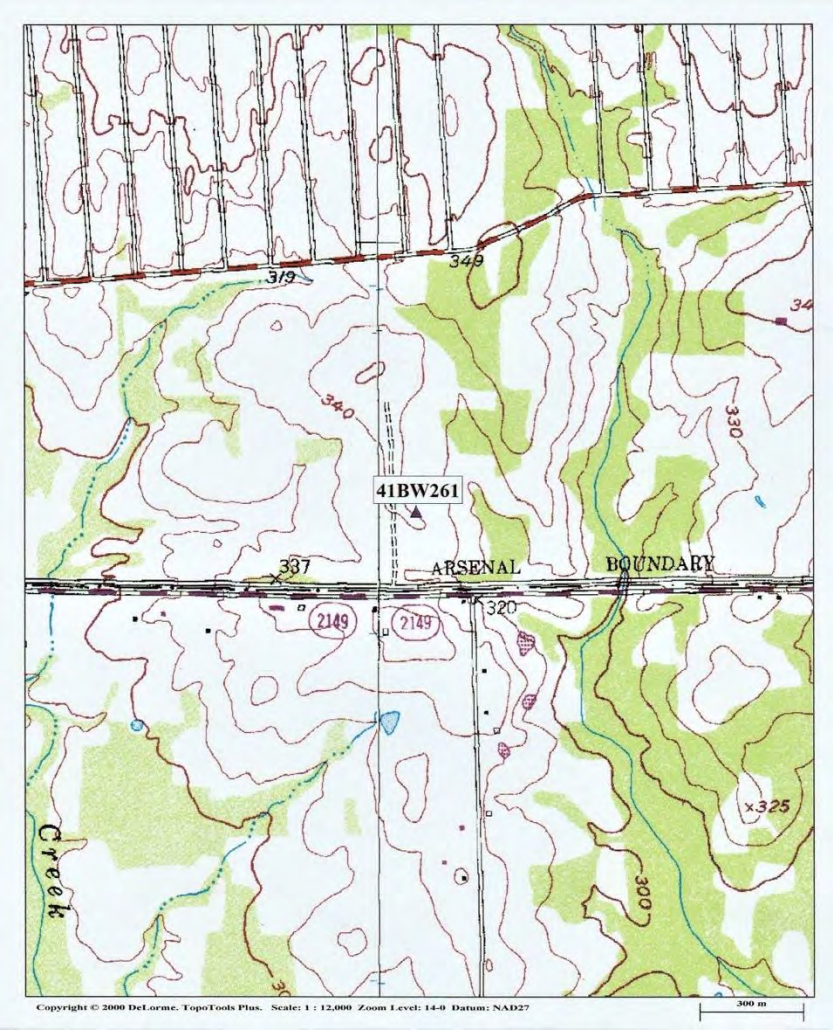



**Figure 5. Location of 41BW261.**

41BW261 was recorded in 1989 by the UNT as an early 20th century historic site with nails, whiteware, stoneware, and milk glass recovered on the surface and in shovel testing. The site was recommended for preservation and archival research (Peter and Cliff 1990).

In 1997, Prewitt and Associates, Inc. revisited the site and recommended it as having an unknown NRHP eligibility (Gadus and Freeman 1998). In 2010, Earth Search, Inc. conducted archival research for the historic component, documenting that the property was owned by African Americans, Jacob, and Cynthia Perkins, from 1880-1921 (Parrish et al. 2012). An Integrated Cultural Resources Management Plan (ICRMP) for the Red River Army Depot by New South in 2013 listed the site as ineligible for inclusion in the NRHP (New South 2013).

**41BW265 (Figure 6)**

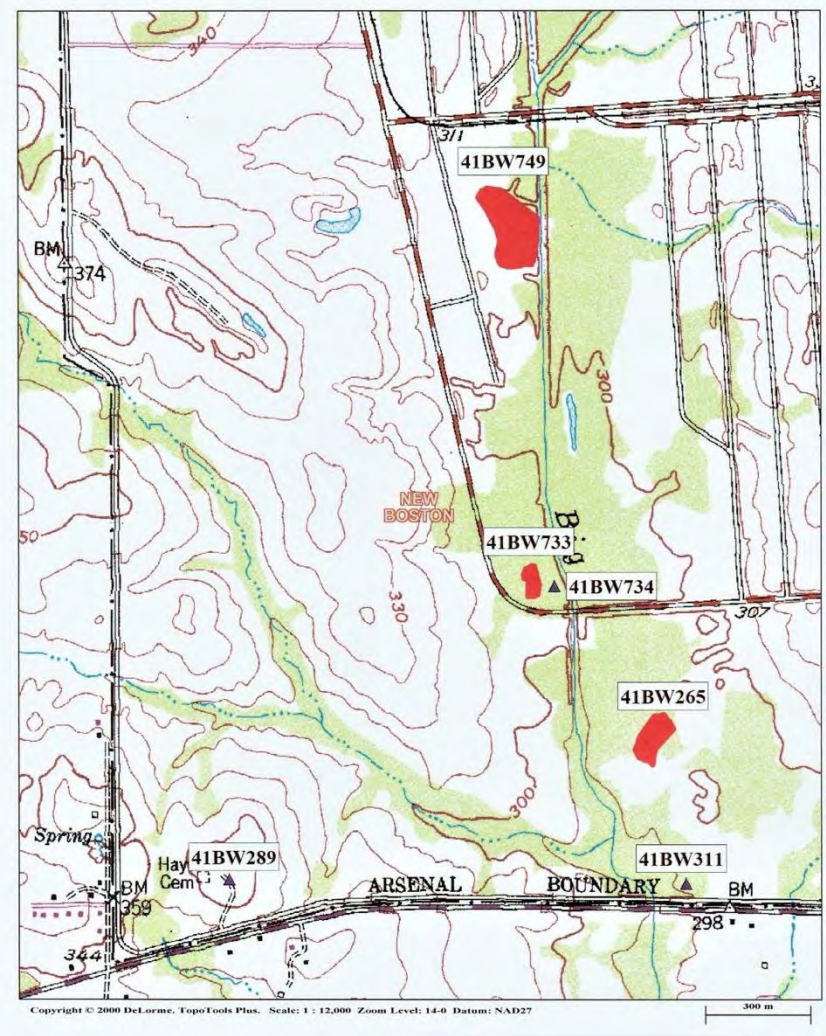



**Figure 6. Locations of 41BW265, 41BW289, 41BW311, 41BW733, 41BW734, and 41BW749.**

41BW265 was recorded in 1989 by the UNT as a prehistoric site of unknown age that contained lithic debris. The site was recommended for preservation (Peter and Cliff 1990). In 1997, Prewitt and Associates revisited the site and recovered additional but unspecified amount of lithic debris in four shovel tests and recommended that the site may have the potential for eligibility in the NRHP (Gadus and Freeman 1998).

In 2010, Earth Search, Inc. conducted testing investigations at the site, recovering lithic debris, tool fragments, a hammerstone, and five dart points. Earth Search recommended that the site was not eligible for inclusion in the NRHP (Parrish et al. 2012). The ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for inclusion in the NRHP (New South 2013).

**41BW268 (Figure 7)**

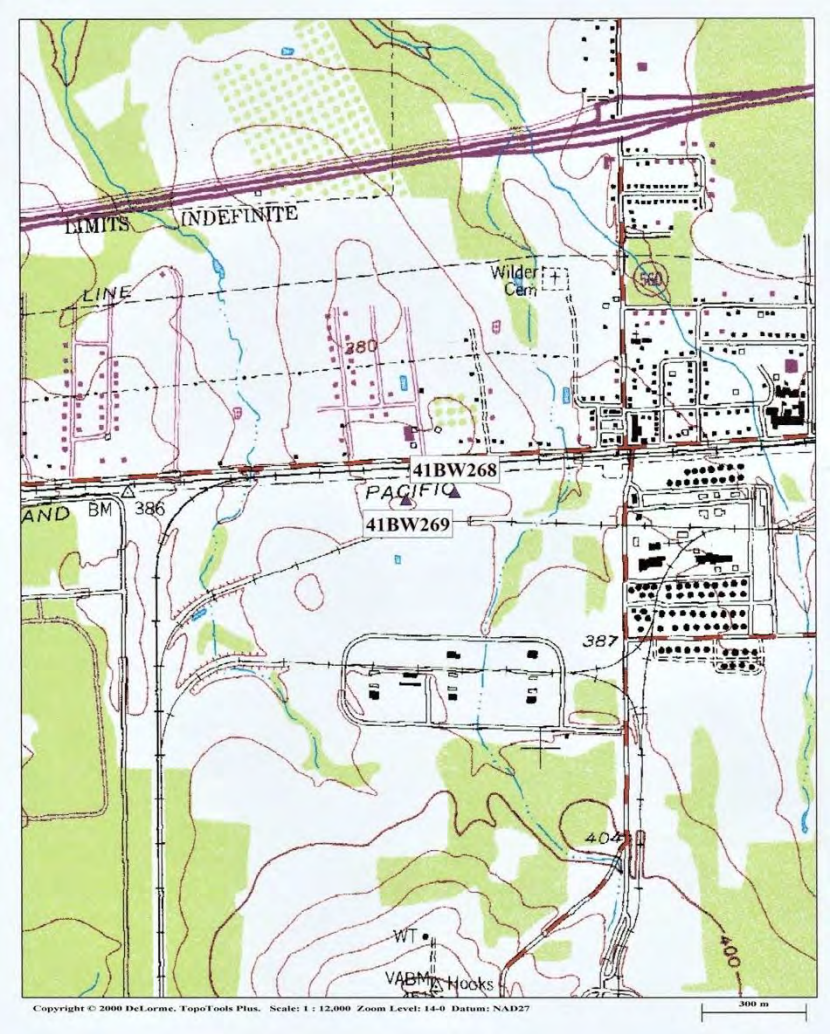



**Figure 7. Locations of 41BW268 and 41BW269.**

41BW268 was recorded in 1988 by Geo-Marine, Inc. as an early 20th century farmstead with a cistern feature and a small number of historic artifacts recovered in shovel testing. Artifact analysis and archival researched resulted in a determination that the site was occupied between 1880 and 1940. Geo-Marine recommended additional archival research and site preservation (Peter and Cliff 1990). In 2010, Earth Search Inc. conducted additional archival research for the site that indicated that the R. M. Hooks family purchased the property in 1886, lived on and farmed the land until his wife Amy

sold the property to the U.S. Government in 1941. Earth Search determined that the property was an Anglo-American farmstead (Parrish et al. 2012).

**41BW269 (Figure 7)**

Site 41BW269 was recorded in 1988 by Geo-Marine, Inc. as an early 20th century farmstead with glass, ceramics, and tin cans on the surface and recovered in shovel testing. Artifact analysis suggested an occupation range between 1850 and 1920. Geo-Marine recommended additional archival work and site preservation (Peter and Cliff 1990). In 2010, Earth Search Inc. conducted additional archival research, and the property was also owned by the R. M. Hooks family on the same tract of property as 41BW268. The two site locations are in close proximity, and it is the home of a daughter of R. M. and Amy Hooks. The property was sold to the U.S. Government in 1941. Earth Search determined that the site was an Anglo-American farmstead (Parrish et al. 2012).

**41BW276 (Figure 8)**

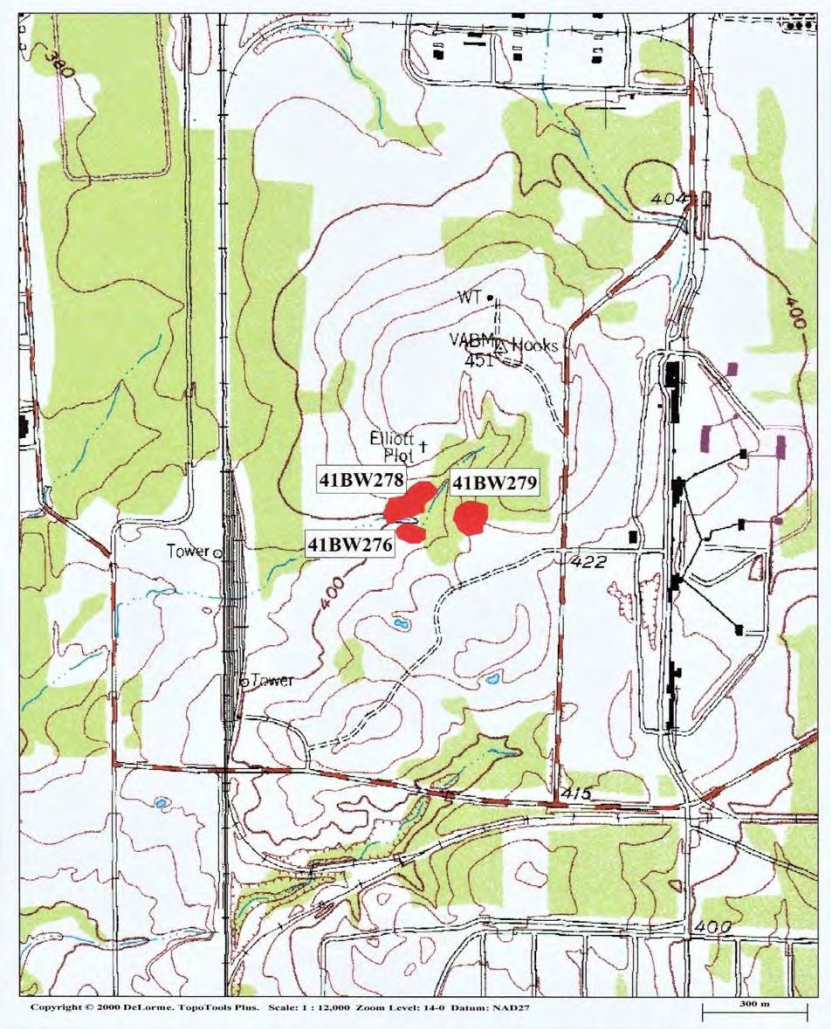



**Figure 8. Locations of 41NW276, 41BW278, and 41BW279.**

Site 41BW276 was recorded in 1988 by Geo-Marine, Inc. as a prehistoric site of unknown age with a mid- to late 19th century historic component. Shovel testing recovered prehistoric lithic debris and a dart point, as well as pre-1901 cut nails, glass, and stoneware ceramics. Geo-Marine recommended additional archival work and site preservation (Peter et al. 1989).

In 2010, Earth Search, Inc. conducted testing investigations at the site, identifying occupations of Paleoindian, Early to Late Archaic, Woodland, Early Caddo, and late 19th to early 20th century components. The testing recovered prehistoric ceramics, lithic debris, tools/tool fragments, an arrow point, and five dart points along with historic ceramics, a cut nail, and pieces of metal. Earth Search recommended the site had the potential to be eligible for inclusion in the NRHP (Parrish et al. 2012). The 2012 THC review, however, determined that the site was not eligible for inclusion in the NRHP.

**41BW278 (Figure 8)**

Site 41BW278 was recorded in 1988 by Geo-Marine, Inc. as a prehistoric and historic site. Shovel tests recovered prehistoric lithic debris, a bifacial tool, a ceramic sherd, fire-cracked rock, and a piece of historic metal. Geo-Marine recommended archival work and site preservation (Peter and Cliff 1990). In 2010, Earth Search, Inc. conducted testing investigations at the site and identified it as having prehistoric Early to Late Archaic and Woodland period occupations with a late 19th-early 20th century historic component. Test units recovered prehistoric ceramics, lithic debris, tool fragments, an arrow point, and nine dart points, along with historic ceramics, cut nails, and metal. Earth Search recommended the site as having the potential for inclusion in the NRHP (Parrish et al. 2012). The 2012 THC review determined that the site was not eligible for inclusion in the NRHP.

**41BW279 (Figure 8)**

Site 41BW279 was recorded in 1988 by Geo-Marine, Inc. as a prehistoric and historic site. Shovel tests recovered prehistoric lithic debris along with historic glass and stoneware ceramics. Geo-Marine recommended archival work and site preservation (Peter and Cliff 1990). In 2010, Earth Search, Inc. conducted test excavations at the site, recovering lithic debris and two dart points. Earth Search recommended that the site was not eligible for inclusion in the NRHP (Parrish et al. 2012).

**41BW289 (Figure 6)**

Site 41BW289 was recorded in 1989 by Geo-Marine, Inc. as a historic site with a well feature and surface artifacts of glass, whiteware and stoneware ceramics, cut nails, coal fragments, a piece of lead, and bricks. Geo-Marine recommended archival work and site preservation. Archival research by Geo-Marine determined that the site was likely the home site of first the Lindsay family, then the McDuffie family, and finally the Hays family. Geo-Marine recommended test excavations to determine the site's NRHP

eligibility (Peter and Cliff 1990). In 2010, Earth Search Inc. conducted additional archival research confirming that the Lindsay, McDuffie, and Hays families previously lived on the property. The Lindsay family purchased the property in 1860 and lived there until 1883. After 1883, the property was purchased by the J. C. McDuffie family. The McDuffie family owned the property until 1898, when it was sold to Simeon L. Hays. In 1927, Simeon L. Hays conveyed the property to his son, Jerry L. Hays. Jerry L. Hays and his wife Willie owned the property until 1941 when the U. S. Government acquired the property.

Earth Search determined that the property was inhabited by Anglo-American families from 1860 through 1941 (Parrish et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW305 (Figure 9)**

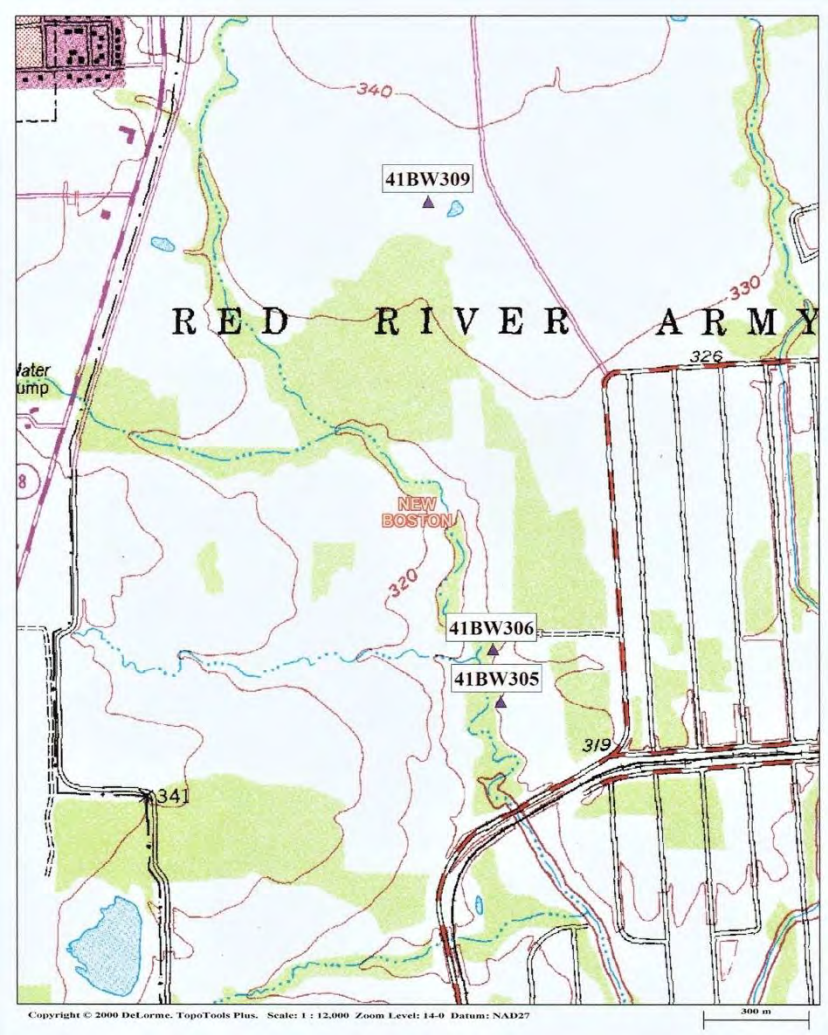



**Figure 9. Locations of 41BW305, 41VW306, and 41BW309.**

Site 41BW305 was recorded in 1989 by Geo-Marine, Inc. as a historic site with a cistern feature with a washtub on the surface, and whiteware ceramics, glass, metal, nails, and brick recovered in shovel tests. Geo-Marine recommended archival work and site preservation (Peter and Cliff 1990).

In 1997, Prewitt and Associates, Inc. revisited the site and documented the cistern feature and surface artifacts. They recommended the site as having potential for NRHP eligibility (Gadus and Freeman 1998). In 2010, Earth Search Inc. conducted additional archival research on the portion of property in the John Ball Headright Survey. In 1848, James Moss purchased 380-acres of the John Ball Headright Survey at a Sheriff's sale. In 1860, James Moss willed the property to his son, O. P. Moss. The 1870 Bowie County Census shows O. P. Moss living in the R. A. Haynie household on the property. In 1901, O. P. Moss sold the property to Sam Ball. Sam Ball and his family lived on the property, and in 1917 he conveyed the property to H. J. Hinckley. A few months later H. J. Hinckley sold the property to L. K. Davis, who then in turn sold the property to Harvey and Ruth Davis. Harvey and Ruth Davis lived on the property until 1941 when they conveyed the property to the U. S. Government.

Earth Search determined that the property was owned and resided on by Anglo-American families (Parrish et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW306 (Figure 9)**

Site 41BW306 was recorded in 1989 by Geo-Marine, Inc. as a historic site with a cistern feature with whiteware ceramics, glass, and brick recovered in shovel tests. Geo-Marine recommended archival work and site preservation (Peter and Cliff 1990). In 1997, Prewitt and Associates, Inc. revisited the site and documented the cistern feature and surface artifacts and recommended that the site had the potential for NRHP eligibility (Gadus and Freeman 1998). In 2010, Earth Search Inc. conducted additional archival research that determined that 41BW306 is located on the same tract of property as 41BW305 and they share the same landownership history (Parrish et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW309 (Figure 9)**

Site 41BW309 was recorded in 1989 by Geo-Marine, Inc. as a historic site with a cistern feature, a chimney fall, and brick foundation footers. Surface and shovel testing documented whiteware ceramics, glass, nails, and machine-made bricks. Geo-Marine recommended archival work and site preservation (Peter and Cliff 1990).

In 2010, Earth Search Inc. conducted additional archival research on the 1838 Wm. Thompson Headright Survey. Thompson retained the property until 1851, when after his death, Bowie County Land Commissioners partitioned and distributed his estate amongst his heirs. One of the heirs, Nancy Laoby, passed the tract of property to her

heirs, H. R. Laoby and J. W. Laoby. In 1881, the Laoby's sold the property to J. H. Smelser. Smelser was a Bowie County Land Commissioner and owned the property until 1900. After 190 and until 1913, the property was sold to six different owners. Up until 1913, records indicate all the previous landowners resided in other locations besides on this specific property. After the purchase of the property in 1913 by H. M. Davidson, the Davidsons lived on the property until 1932, when the tract was conveyed to E. M. Follis. E. M. Follis owned the property for two years before selling it to L. C. Hurley in 1934. Hurley soon conveyed the property to Robert A. Cox, who in turn sold the property to M. C. Wells in 1935. Wells was the last land transaction until the 1941 purchase by the U.S. Government. Earth Search determined that the property was occupied by a series of Anglo-American landowners (Parrish, et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW311 (Figure 6)**

Site 41BW311 was recorded in 1988 by Geo-Marine, Inc. as a prehistoric and historic site. A historic chimney feature is on the site, while shovel tests recovered prehistoric lithic debris along with historic glass, cut and wire nails, metal fragments, sewing straight pins, and whiteware and stoneware ceramics. Geo-Marine recommended archival work and site preservation (Peter and Cliff 1990).

In 1997, Prewitt and Associates, Inc. revisited the site and documented the chimney feature. They recommended that the site had the potential for NRHP eligibility (Gadus and Freeman 1998).

In 2010, Earth Search Inc. conducted additional archival research on the Francis Sythe Headright Survey. In 1846, Sythe assigned the property to Robert C. McDaniel. From 1846 until 1888, numerous Bowie County land speculators bought and sold the property. In 1888, S. L. Hayes owned the property, but the property at some unknown point had been acquired by W. D. Hayes. W. D. Hayes sold the property to Jack Fricks in 1899. A conveyance deed showing a later acquisition of the property by Tom Nicholson was not located, but in 1941, Nicholson sold the property to the U. S. Government. Earth Search did not determine who specifically may have lived on the property, but all the property transactions were by Anglo-Americans (Parrish et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW348 (Figure 10)**

Site 41BW348 was recorded in 1989 by Geo-Marine, Inc. as a historic site. A chimney feature was documented along with metal and bricks on the surface, while glass, nails, and stoneware ceramics were recovered in shovel tests. Geo-Marine recommended test excavations to determine the site's eligibility for inclusion in the NRHP (Peter and Cliff 1990).

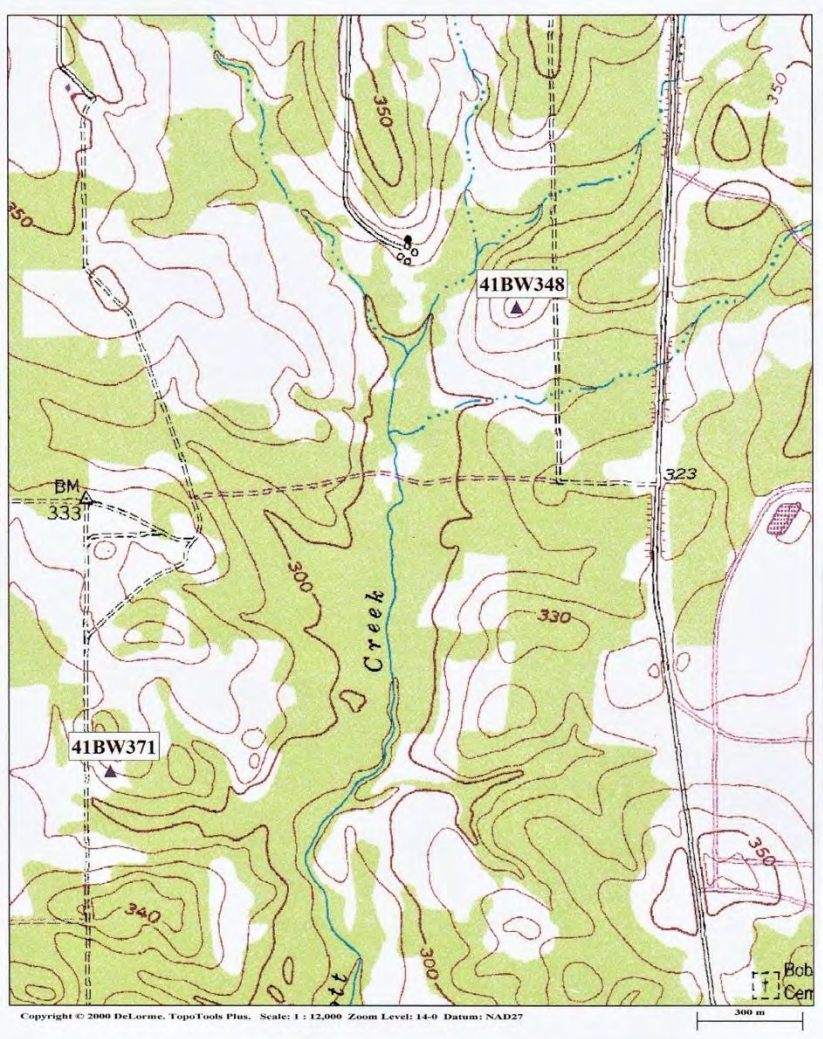



**Figure 10. Locations of 41BW348 and 41BW371.**

In 2010, Earth Search Inc. conducted additional archival research on the 1849 Mary Burnside Headright Survey. By 1859, Mary Burnside was deceased, and her estate was partitioned among her heirs. In 1863, the tract with 41BW348 was sold to Betsy Jarrett. Jarrett retained the property until 1887, when the property was conveyed to C. L. Taylor. In that same year, Taylor sold the property to W. J. Bethard, who two months later sold the property to R. S. Fant. In 1903, Fant conveyed the property to Minerva Ann Watson. Minerva and her husband Phillip Watson continued to own the property until 1931 when the property was conveyed to George Gabour. Gabour's heirs sold the property to the U.S. Government in 1941. Earth Search did not determine who lived at the property, but all the owners were Anglo-American (Parrish et al. 2012).

**41BW352 (Figure 4)**

Site 41BW352 was recorded in 1989 by Geo-Marine, Inc. as a historic site with a brick and concrete structure foundation, root cellar, and two cistern features. Additional brick and ceramic pipe tiles were noted on the surface. Geo-Marine recommended shovel

testing to determine site limits and test excavations to determine its NRHP eligibility (Peter and Cliff 1990).

In 1997, Prewitt and Associates, Inc. revisited the site and noted the features and surface artifacts of brick and ceramic tiles and recommended that the site was not eligible for inclusion in the NRHP due to past disturbances to the site (Gadus and Freeman 1998). In 2010, Earth Search Inc. conducted additional archival research on the 1849 William Young Headright Survey. In 1853, Ward Taylor acquired the property, and in 1875 Ward granted the property as a gift to his heirs. In 1884 Ward Taylors descendants conveyed the property to R. L. Trigg and P. S. Ramseur, and within two months Trigg conveyed his interest to Ramseur. P. S. Ramseur died in November 1908, and his widow, Fannie Ramseur, conveyed the property to the Texas Baptist Memorial Sanitarium. The Sanitarium held the property until 1910, then they sold it to C. C. Crump. Crump the same month sold the property to the Southern Realty Company and James Gould. In 1915, Gould purchased the realty company's interest, and in 1917, sold the property to Louis Heilbron. Heilbron kept the property until 1918, then selling it to Les Krouse. Krouse sold the property to D. F. Johnson in the same month as he purchased the property. A 1930 foreclosure proceeding were filed against D. F. Johnson, and the property sold at a sheriff's sale to Interstate Security Corporation. The Interstate Security Corporation sold the property in the same year to P. B. Elliott. In 1933, Elliott conveyed the property to Jim Branson, who sold it to H. F. Holden a year later. Holden conveyed the property to Gloria Mullikin in 1939, and Mullikin sold the property to the U.S. Government in 1941. Earth Search was unable to determine who the residents that lived on the property, but determined the property was only owned by Anglo-Americans (Parrish, et al. 2012).

**41BW353 (Figure 4)**

Site 41BW353 was recorded in 1989 by Geo-Marine, Inc. as a historic site. A cistern feature was documented with glass, metal bricks, and cement fragments noted on the surface. Geo-Marine recommended shovel tests to determine site limits and then test excavations to determine the site's eligibility for inclusion in the NRHP (Peter and Cliff 1990). In 2010, Earth Search Inc. conducted additional archival research on the property that 41BW353 is located on, and the site shares the same landownership history as 41BW352 (Parrish et al. 2012).

**41BW371 (Figure 10)**

Site 41BW371 was recorded in 1989 by Geo-Marine, Inc. as a historic site. A well and rock and cement erosional wall features were documented with glass noted on the surface. Geo-Marine recommended shovel tests to determine site limits as well as test excavations to determine the eligibility of the site for the NRHP (Peter and Cliff 1990).

In 1997, Prewitt and Associates, Inc. revisited the site and documented that recent disturbance had removed the features and recommended the site was not eligible for inclusion in the NRHP (Gadus and Freeman 1998). In 2010, Earth Search Inc. conducted

additional archival research on the 1838 J. A. Talbot Headright Survey, where 41BW371 is located. J. A. Talbot was a merchant residing in the town of Boston in Bowie County. He kept the property until 1867, when he sold it to Thomas S. Elliott. In 1892, the Elliott heirs sold the property to R. S. Fant. Fant sold the property to E. G. Wells in 1903. The property was later sold in 1909 to J. G. George. George owned the property until 1913, then sold it to M. A. Hart. The deed records do not reflect how R. E. White acquired the property between 1913 and 1917, but he sold the property to W. T. & O. L. Adams. In 1919, the Adams sold the property to E. A. Langston. Langston owned the property for the next 18 years, selling it in 1937 to Berta Mae Hubbard, and later the same year, Hubbard sold it to W. E. McKemie. McKemie had the tract until 1941 when the U. S. Government acquired the property. Earth Search determined that the property was owned by Anglo-Americans, but not specifically who lived at the site (Parrish et al. 2012).

**41BW381 (Figure 11)**

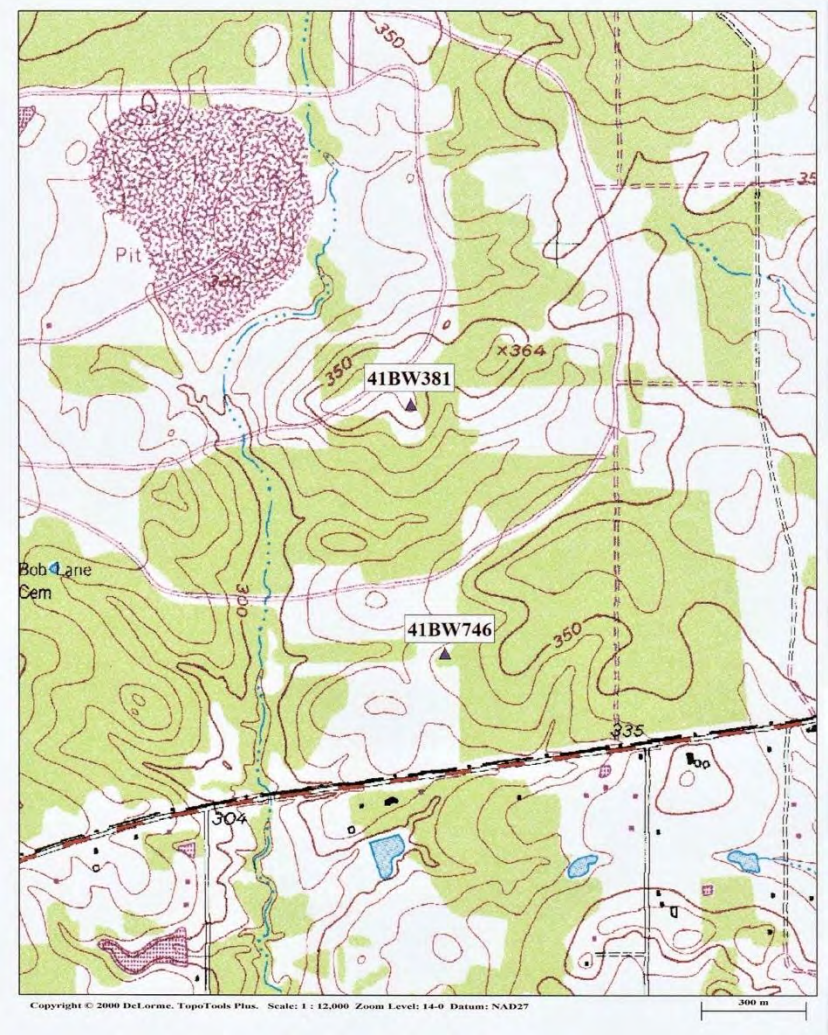



**Figure 11. Locations of 41BW381 and 41BW746.**

Site 41BW381 was recorded in 1989 by Geo-Marine, Inc. as a historic site. Several large rocks were documented along with glass, stoneware ceramics, and wire nails recovered in shovel tests. Geo-Marine recommended test excavations to determine the site's eligibility for inclusion in the NRHP status (Peter and Cliff 1990).

In 1997, Prewitt and Associates, Inc. revisited the site and documented a chimney base and possible cistern features. Also noted on the surface was window glass, container glass, whiteware ceramics, a mason jar lid, and a flow blue ceramic sherd. Prewitt and Associates, Inc. determined the site was late 19th to early 20th century farmstead and recommended the site had potential to be NRHP eligible (Gadus and Freeman 1998). The 1998 Texas Historical Commission (THC) review of the site information concluded that the site's NRHP eligibility was undetermined.

In 2010, Earth Search Inc. conducted additional archival research on the property of the location of 41BW381. The site is within the 1842 J. W. Lane Headright Survey patented to John W. Lane. In 1853, Lane sold the property to A. R. Moores. Moores retained the property until 1868 when it was sold to land speculator W. M. Campbell. Campbell conveyed the property to W. H. H. Moores in 1873. W. H. H. Moores retained a portion of the property, selling 75 acres to Eli Boone in 1881. In 1931 after the death of Eli Boone, his heir G. F. Boone received the tract with the site until 1941 when the U. S. Government bought the property. Earth Search determined the property was owned by Anglo-Americans, and the Boone family may have lived at the site (Parrish et al. 2012).

**41BW417 (Figure 4)**

Site 41BW417 was recorded in 1993 by Geo-Marine, Inc. as a prehistoric site of unknown age with small amount of lithic debris and an arrow point fragment recovered in shovel tests. Geo-Marine recommended test excavations to determine its eligibility for inclusion in the NRHP (Cliff et al. 1996). A 1996 THC review of the site information resulted in an undetermined NRHP eligibility. In 2010, Earth Search, Inc. conducted testing investigations at the site, documenting a low-density prehistoric site with only lithic debris. Earth Search recommended that the site was not eligible for inclusion in the NRHP (Parrish et al. 2012).

**41BW450 (Figure 12)**

Site 41BW450 was recorded in 1990 by Geo-Marine, Inc. as a prehistoric and historic site. A prehistoric bifacial tool and lithic debris, along with glass, whiteware ceramics, nails and metal were recovered in shovel tests. Geo-Marine recommended test excavations to determine the site's eligibility for inclusion in the NRHP (Cliff et al. 1996). A 1994 THC review did not determine the site's NRHP status. In 2010, Earth Search, Inc. conducted archival research for the historic component at the site, documenting that the property was owned by African Americans, Robert, and Lucinda Lane from 1883 to 1909 (Parrish et al. 2012). In 2019, New South Associates conducted testing investigations at the site, recovering prehistoric and historic artifacts with no

associated features. New South noted heavy erosional and mechanical disturbance to the site.

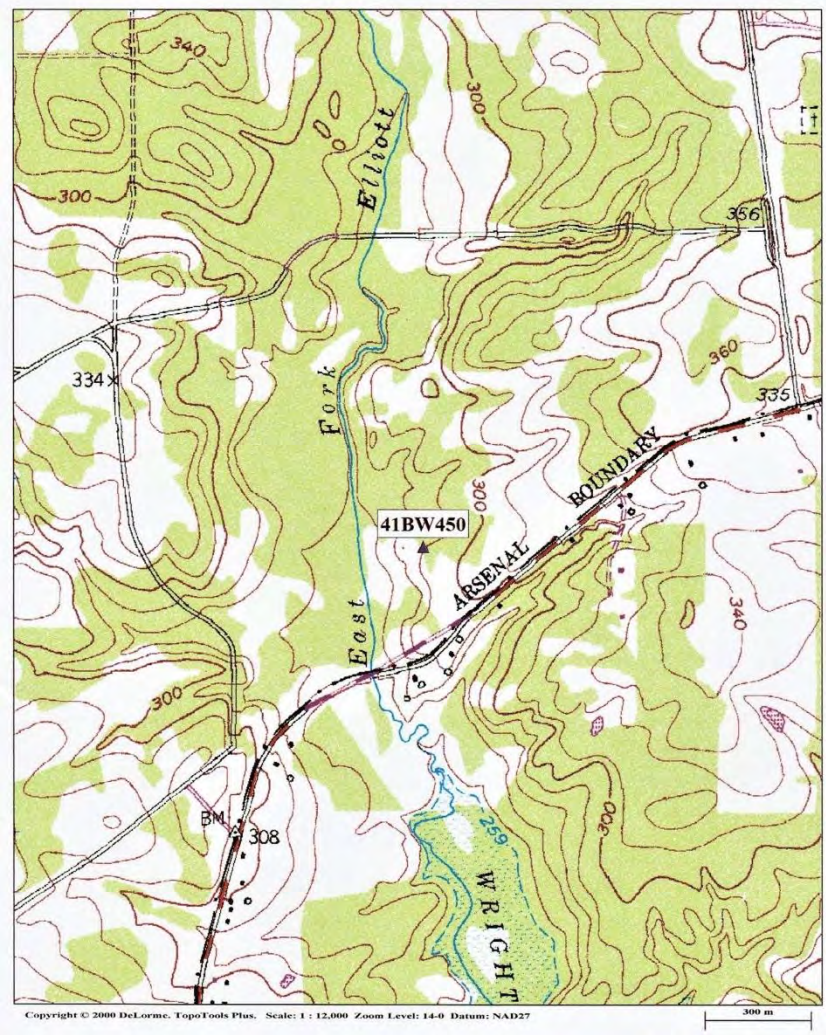



**Figure 12. Locations of 41BW450.**

**41BW484 (Figure 4)**

Site 41BW484 was recorded in 1993 by Geo-Marine, Inc. as a prehistoric site. An arrow point fragment along with lithic debris were recovered in shovel tests. Geo-Marine considered the site to have good contextual integrity and fair research potential and suggested that further archeological research would be needed for an NRHP determination (Cliff et al. 1996). A 1996 THC review listed the site status as having an undetermined eligibility for the NRHP. In 2010, Earth Search, Inc. was to conduct testing investigations at the site, but the site location was not relocated, and no testing took place at the site (Parrish et al. 2012).

**41BW492 (Figure 4)**

Site 41BW492 was recorded in 1993 by Geo-Marine, Inc. as a prehistoric site. Numerous pieces of lithic debris, a bifacial tool, a ground stone, and several fire-cracked rocks were recovered in shovel tests. Geo-Marine considered the site to have good contextual integrity and good research potential. They suggested that further archeological research would be needed for an NRHP determination (Cliff et al. 1996). A 1996 THC review listed the site as having an undetermined eligibility for inclusion in the NRHP.

In 2010, Earth Search, Inc. conducted testing investigations at the site, documenting an Archaic to Woodland prehistoric component, recovering a ceramic sherd identified as Williams Plain, a Gary dart point, bifacial tools, a moderate amount of lithic debris, cores, tested cobbles, and ground stone. Earth Search recommended that 41BW492 is not eligible for inclusion in the NRHP (Parrish et al. 2012).

**41BW497 (Figure 4)**

Site 41BW497 was recorded in 1993 by Geo-Marine, Inc. as a prehistoric site. A large amount of lithic debris along with fire-cracked rock were recovered in shovel tests. Geo-Marine considered the site to have a high artifact density with good contextual integrity and they suggested test excavations to determine the site's eligibility for inclusion in the NRHP (Cliff et al. 1996). A 1996 THC review considered the site as having an undetermined eligibility for the NRHP.

In 2010, Earth Search, Inc. conducted testing investigations at the site documenting an Archaic occupation as well as three arrow points from a later occupation. The testing recovered Gary dart points, arrow points identified as Alba, Bonham, and Clifton, a high density of lithic debris, numerous tested cobbles, bifacial tools, cores, and ground stone. Earth Search recommended that 41BW497 may be eligible for inclusion in the NRHP. They also suggested additional work at the site (Parrish et al. 2012). A 2012 THC review disagreed with Earth Search's recommendation and determined that the site was ineligible for the NRHP.

**41BW532 (Figure 4)**

Site 41BW532 was recorded in 1993 by Geo-Marine, Inc. as a prehistoric site. The shovel tests recovered seven ceramic sherds, a Gary dart point, a tool fragment, and a small amount of lithic debris. Geo-Marine considered the site to have good contextual integrity and good research potential and suggested that further archaeological research would be needed for an NRHP determination (Cliff et al. 1996). A 1996 THC review listed the site as having an undetermined eligibility for the NRHP.

In 2010, Earth Search, Inc. conducted testing investigations at the site, suggesting it has occupations of Middle Archaic and Late Caddo period ages. The test units documented ceramics (n=56), an Elam dart point, Gary dart points, a bifacial tool, and a

small amount of lithic debris. Earth Search recommended that 41BW532 was not eligible for inclusion in the NPHP, and that no further work was necessary at the site (Parrish et al. 2012).

**41BW733 (Figure 6)**

Site 41BW733 was recorded in 2008 by Earth Search, Inc. as an Archaic site. Shovel testing at the recovered an Ellis dart point and a small amount of lithic debris. Earth Search recommended further testing to determine its NRHP eligibility (Pokrant et al. 2009). A 2009 THC review considered the site as having an undetermined eligibility for inclusion in the NRHP. In 2010, Earth Search, Inc. conducted testing investigations at the site, documenting a Yarbrough dart point and an Ellis dart point, a moderate density of lithic debris, bifacial tools, and a ground stone fragment. Earth Search recommended that 41BW733 was not eligible for inclusion in the NPHP, and that no further work would be necessary at the site (Parrish et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW734 (Figure 6)**

Site 41BW734 was recorded in 2008 by Earth Search, Inc. as a prehistoric site. Shovel testing documented a small amount of lithic debris. Earth Search recommended further testing to determine its NRHP eligibility (Pokrant et al. 2009). A 2009 THC review listed the site as having an undetermined eligibility for inclusion in the NRHP.

In 2010, Earth Search, Inc. conducted testing investigations at the site, documenting a low density of lithic debris, and a few lithic tool fragments. Earth Search recommended that 41BW734 was not eligible for inclusion in the NPHP, and no further work would be necessary at the site (Parrish et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW746 (Figure 11)**

Site 41BW746 was recorded in 2008 by Earth Search, Inc. as a late 19$^{th}$ to early 20$^{th}$ century farmstead. Surface and shovel testing documented glass, ceramics, nails, a bed frame, galvanized buckets, and a car door. Earth Search concluded the site had integrity and further research potential and recommended archival research to help determine its NRHP eligibility (Pokrant et al. 2009). A 2009 THC review listed the site as ineligible for the NRHP.

Even though the THC considered the site as NRHP ineligible, Earth Search Inc. conducted additional archival research on the site property in 2010. The tract of property located in the 1842 J. W. Lane Headright Survey was sold by John W. Lane to A. R. Moores in 1853. By 1874, the A. R. Moores property had been partitioned among his heirs, and the tract with the site went to W. H. H. Moores. Sometime prior to 1902, W. H.

H. Moores conveyed a large land parcel to land speculators Samuel and James Vickery of Indiana. During that timeframe, the Vickery brothers had sold a tract to Thomas Payne, because in 1902, Payne conveyed the property to his son Bascom O. Payne. In 1913, Bascom O. Payne sold the property to H. S. Presley and his wife, Pearl. The Presley family sold the property with several structures to the U.S. Government in 1942. Earth Search determined the property was owned by Anglo-Americans, and the Presley family lived on the property (Parrish et al. 2012). An ICRMP for the Red River Army Depot by New South in 2013 listed the site as ineligible for the NRHP (New South 2013).

**41BW749 (Figure 6)**

Site 41BW749 was recorded in 2008 by Earth Search, Inc. as a prehistoric site. Fifty-nine shovel tests recovered a Gary dart point, Caddo ceramic sherds (n=8), a moderate amount of lithic debris (n=218), a preform, a core fragment, a ground stone fragment, and a biface fragment. Earth Search concluded the site had Late Archaic and Middle Caddo occupations with research potential, and that further archaeological testing would be needed to determine its NRHP eligibility (Pokrant et al. 2009). A 2009 THC review listed the site as having an undetermined eligibility for the NRHP.

In 2010, Earth Search, Inc. conducted testing investigations at the site. The eleven test units documented ceramics (n=37), arrow and dart points (m=11), lithic debris (n=1063), and tool fragments (n=11). Earth Search concluded the site has Late Archaic to Late Caddo periods, and recommended that 41BW749 was eligible for inclusion in the NRHP (Parrish et al. 2012). A 2012 THC review listed the site as ineligible for the NRHP.

## Summary and Recommendations

The research conducted on the site histories on the TexAmericas Center property in Bowie County, Texas, indicates that four sites have been determined by the THC as ineligible to the NRHP. The four sites had a National Register Eligibility Review form attached to the site forms: 41BW276, 41BW278, 41BW497, and 41BW749.

An additional 10 sites listed as NRHP ineligible are in the 2013 ICRMP (New South 2013). These 10 sites include 41BW261, 41BW265, 41BW289, 41BW305, 41BW306, 41BW309, 41BW311, 41BW733, 41BW734, and 41BW746. There are no NRHP determinations on these sites by the THC.

Four sites were recommended as ineligible to the NRHP by archaeological contractors, but no THC confirmation of these NRHP findings could be located (Parrish et al. 2012). The four sites include 41BW279, 41BW417, 41BW492, and 41BW532.

Another nine sites had archival research, but other than that being conducted, no NRHP determinations were done for them (Parrish 2012). These sites are 41BW195, 41BW205, 41BW268, 41BW269, 41BW348, 41BW352, 41BW353, 41BW371, and 41BW381. In 2019, New South Associates, Inc. completed test excavations at 41BW450,

but its NRHP eligibility is unknown at this time. Lastly, 41BW484 was not relocated during 2010 testing by Earth Search, Inc. (Parrish et al. 2012), and it is presumably not eligible for inclusion in the NRHP.

The TexAmericas Center is requesting that the THC to clarify the current NRHP status (i.de., undetermined, not eligible, or eligible) of each of the 29 archaeological sites on their property in Bowie County, Texas. We recommend that the THC consult with the appropriate federal agency to reach consensus determinations of NRHP eligibility on these 29 sites. Having this information will make it possible to assist in the preservation of any of the sites that have or maybe assessed as NRHP eligible on the TexAmericas Center property. as well as those that are of undetermined NRHP eligibility. Such sites must be protected until they can be evaluated for NRHP eligibility in future work.

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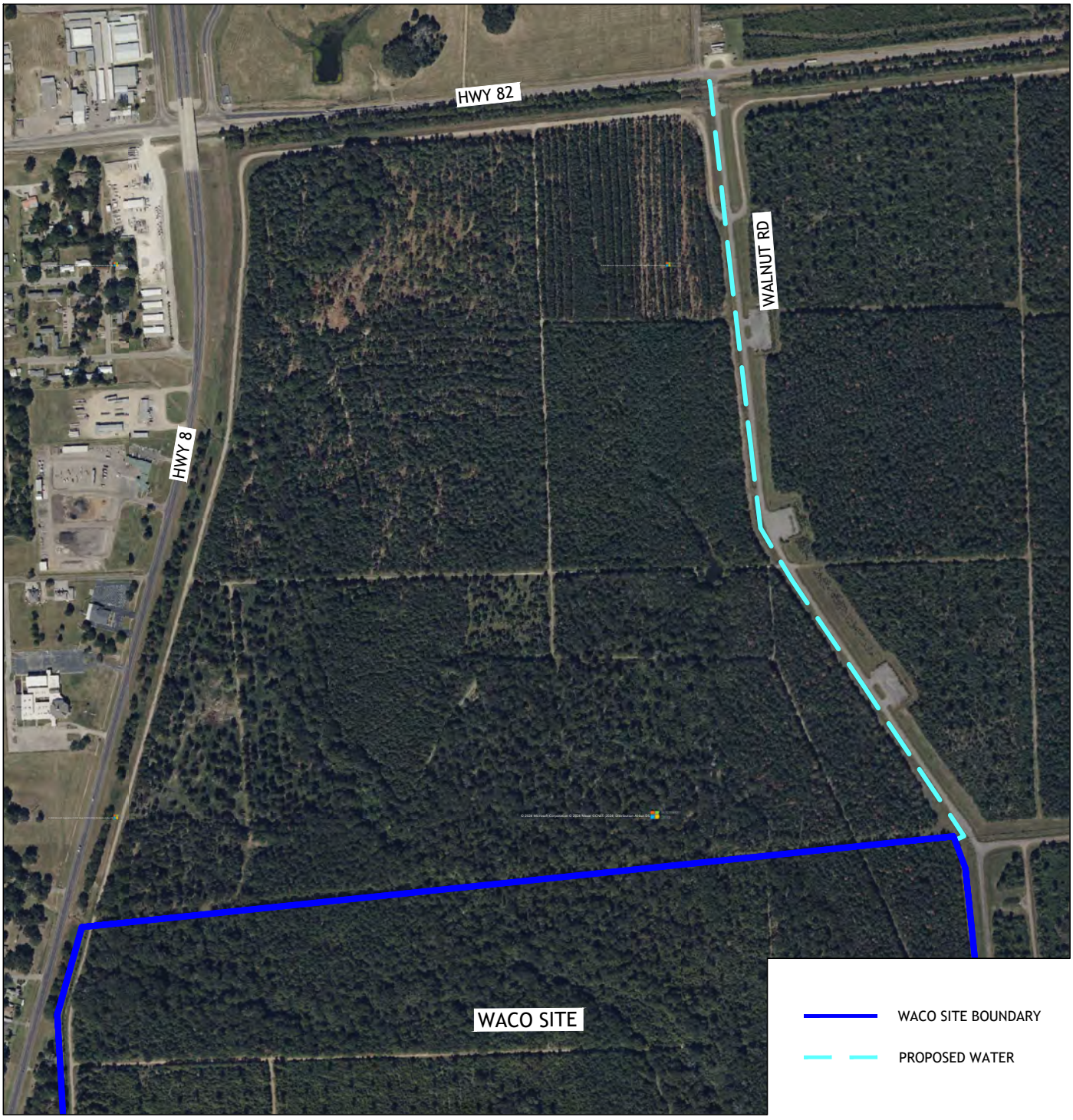
# APPENDIX G

# FIGURE G-1

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Texarkana USA

# WATER EXHIBIT
## WACO SITE
## TEXAMERICAS CENTER
## WEST CAMPUS
HOOKS, TEXAS

| DRAWN: | DESIGN: | DATE: | SCALE: | WCE #: |
|---|---|---|---|---|

# FIGURE G-2


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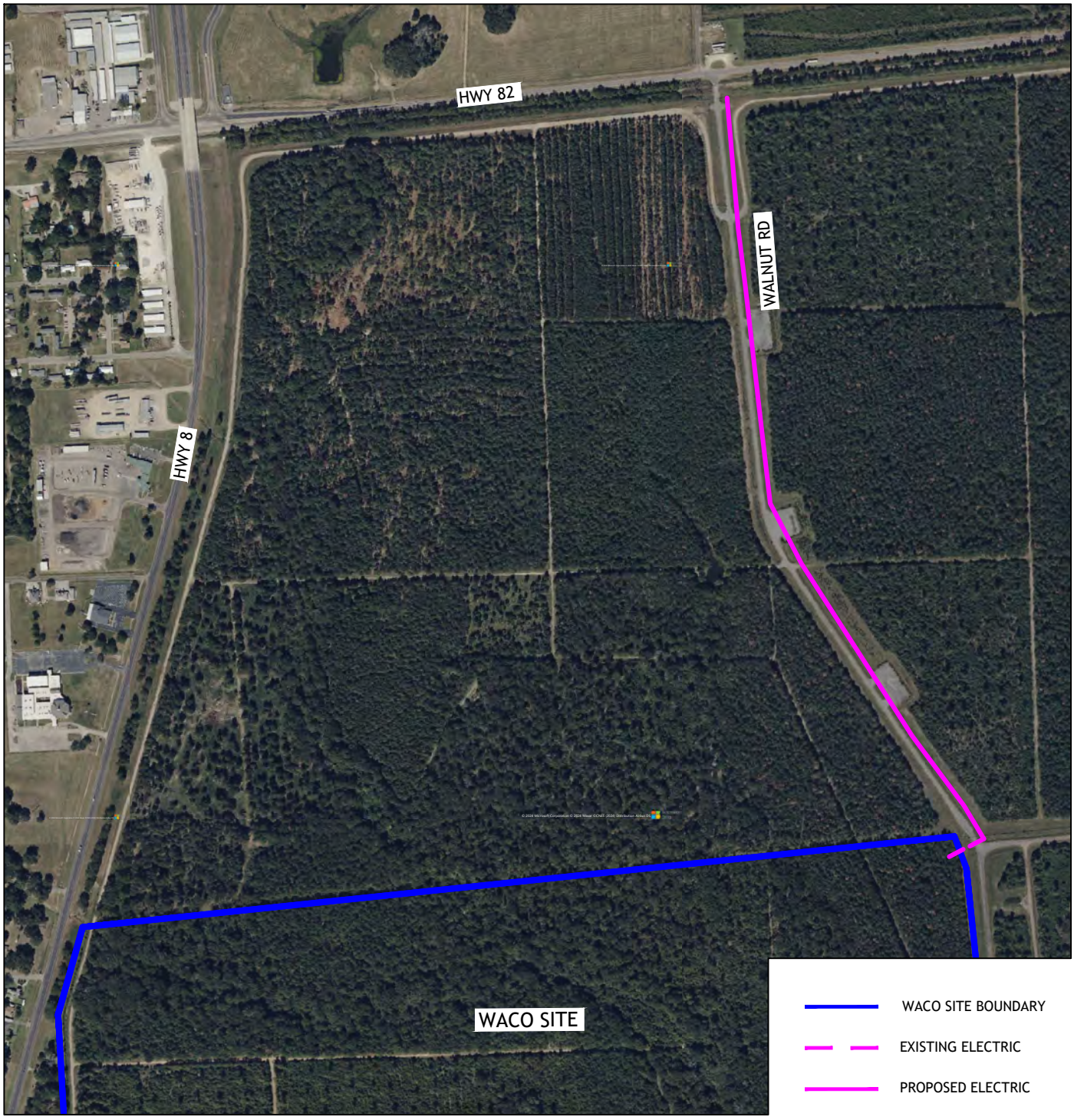
Texarkana USA

# WASTE WATER EXHIBIT
## WACO SITE
## TEXAMERICAS CENTER
## WEST CAMPUS
HOOKS, TEXAS

| DRAWN: | DESIGN: | DATE: | SCALE: | WCE #: |
|---|---|---|---|---|

# FIGURE G-3

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## ELECTRIC EXHIBIT
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## TEXAMERICAS CENTER
## WEST CAMPUS
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| DRAWN: | DESIGN: | DATE: | SCALE: | WCE #: |
|---|---|---|---|---|

# FIGURE G-4


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# GAS EXHIBIT
## WACO SITE
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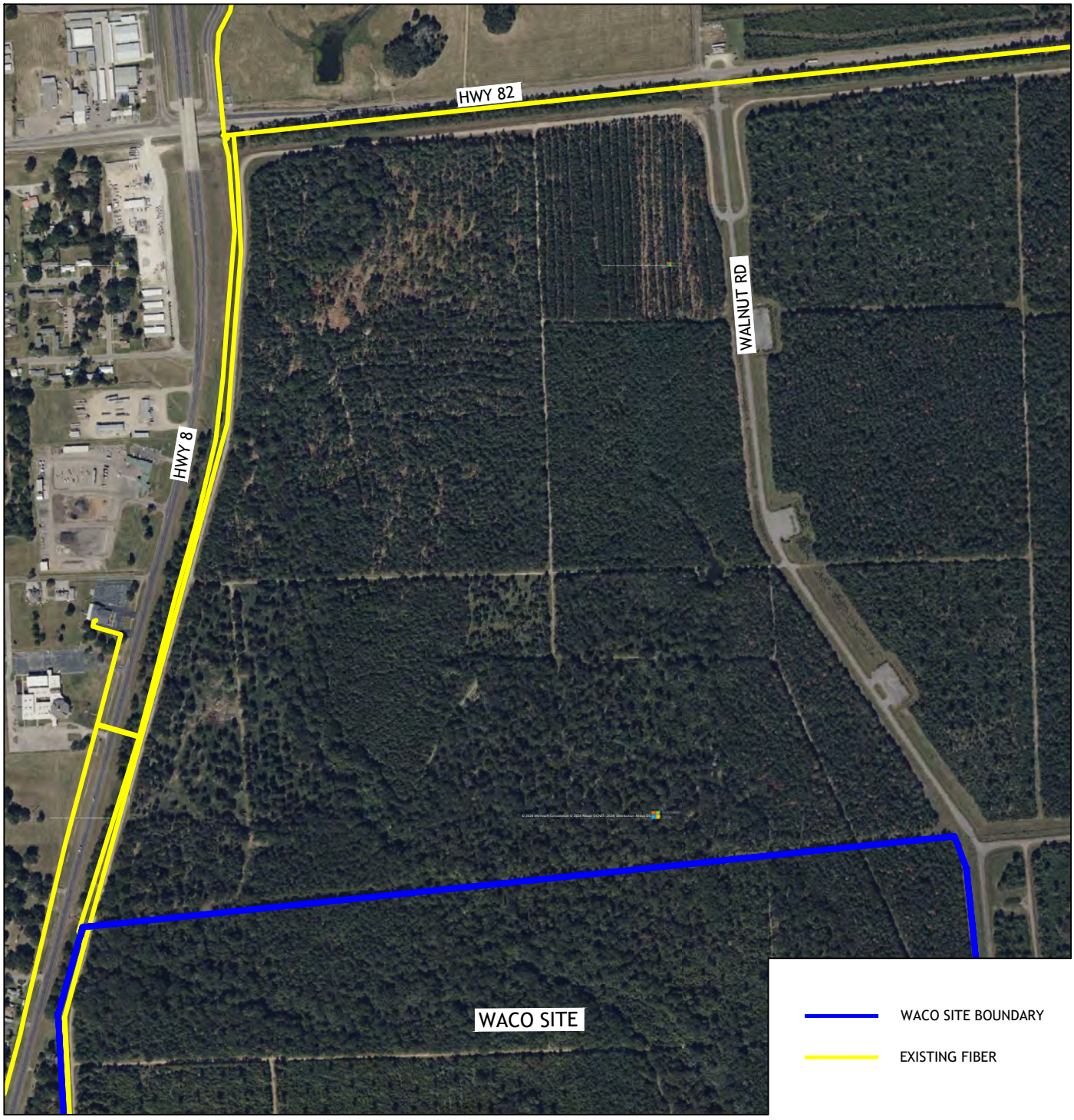
## WEST CAMPUS
HOOKS, TEXAS

| DRAWN: | DESIGN: | DATE: | SCALE: | WCE #: |
|---|---|---|---|---|

# FIGURE G-5

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|---|---|---|---|---|