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Archeological Survey Report Farm-to-Market Road 549 Improvements Project

Christopher Goodmaster

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Archeological Survey Report

Farm-to-Market Road 549 Improvements Project

From: State Highway 276
To: State Highway 205
CSJ: 1015-01-024
Rockwall County, Texas
February 2019

Prepared by: Integrated Environmental Solutions, LLC
Christopher Goodmaster, Principal Investigator
(972) 562-7672; cgoodmaster@intenvsol.com

The environmental review, consultation, and other actions required by applicable Federal environmental laws for this project are being, or have been, carried-out by TxDOT pursuant to 23 U.S.C. 327 and a Memorandum of Understanding dated December 16, 2014, and executed by FHWA and TxDOT.

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ABSTRACT

This report documents the substantive findings and management recommendations of an archeological survey conducted by Integrated Environmental Solutions, LLC (IES) for the Farm-to-Market Road (FM) 549 Improvements Project (CSJ 1015-01-024). The proposed project will expand and realign a portion of FM 549 southeast of the City of Rockwall, Rockwall County, Texas. As the project sponsor, the Texas Department of Transportation, is a political subdivision of the State of Texas, the proposed project will require coordination with the Texas Historical Commission (THC) prior to construction, per the provisions of the Antiquities Code of Texas (ACT).

The goal of this survey was to identify and document any archeological sites that could be adversely affected by the proposed development, and to evaluate such resources for their potential eligibility for listing as a State Antiquities Landmark (SAL) or eligibility for listing in the National Register of Historic Places (NRHP). The archeological survey was conducted by Principal Investigator Christopher Goodmaster and Field Technicians Joshua McCormick, Will Maddux, and Toby Settle on 08 January 2019 under Texas Antiquities Permit No. 8504. All work conformed to 36 Code of Federal Regulations (CFR) 800 and 13 Texas Administrative Code (TAC) 26, which outline the regulations for implementing Section 106 of the NHPA and the ACT, respectively. No archeological resources were documented within the 35.28-acre Area of Potential Effects (APE) as a result of this survey.

No artifacts were collected during this survey. All project records will be temporarily stored at the IES McKinney office and permanently curated at the Center for Archeological Research at The University of Texas at San Antonio. No additional archeological survey or evaluation is recommended within the APE as it is presently defined. However, if any archeological deposits or features are encountered during construction, the operators should stop construction activities in the vicinity of the inadvertent discovery and immediately contact the project cultural resources consultant to initiate coordination with TxDOT and the THC prior to resuming construction activities.

MANAGEMENT SUMMARY

This report presents the results of an archeological survey conducted by Integrated Environmental Solutions, LLC (IES), under subcontract to Dannenbaum Engineering Corporation - Dallas, LLC on behalf of the Texas Department of Transportation (TxDOT) Dallas District, for the proposed Farm-to-Market Road (FM) 549 Improvements Project (CSJ 1015-01-024). TxDOT Dallas District proposes to expand and realign a portion of FM 549 between State Highway (SH) 276 and SH 205 southeast of the City of Rockwall in Rockwall County, Texas. The purpose of these investigations was to conduct an inventory of archeological resources (as defined by Code of Federal Regulations, Title 36, Section 800.4 [36 CFR 800.4]) present within the proposed project area and to evaluate identified resources for their eligibility for inclusion in the National Register of Historic Places (NRHP), as per Section 106 (36 CFR 800) of the National Historic Preservation Act (NHPA) of 1966, as amended, or for designation as State Antiquities Landmarks (SALs) under the Antiquities Code of Texas (ACT; Texas Administrative Code, Title 13, Chapter 26 [13 TAC 26]) and was conducted under Texas Antiquities Permit No. 8504.

This archeological survey was conducted by Principal Investigator Christopher Goodmaster and Field Technicians Joshua McCormick, Will Maddux, and Toby Settle on 08 January 2019. A total of 32-person hours was required to complete this fieldwork. Background research, mapping, and geospatial analysis was performed by Project Archeologist and Geographic Information Systems (GIS) Specialist Thomas Chapman. IES Vice President and Cultural Resources Director Kevin Stone provided technical review and quality control of this document and provided general project oversight. This report was compiled through the efforts of Christopher Goodmaster, Thomas Chapman, and Kevin Stone.

The area of potential effects (APE) for this project is approximately 35.28 acres (ac); however, large portions of the APE have been subjected to extensive previous disturbances related to the construction and maintenance of FM 549. Therefore, this investigation focused on identifying high probability areas (HPA) for archeological resources prior to survey. HPA was defined as portions of the APE not previously surveyed and not significantly impacted by previous ground disturbances. Pedestrian reconnaissance was conducted within the 11.61-ac proposed new right-of-way (ROW) portion of the APE. Intensive pedestrian survey was limited to 6.93 ac of HPA.

No archeological historic properties (as defined in 36 CFR 800.16[1]) or archeological sites eligible for designation as SALs (13 TAC 26.12) are present within the APE examined during this survey. In addition, the historic-age Lawhorn Cemetery was determined not to extend into the APE. No artifacts were collected during this survey. All project records will be temporarily stored at the IES McKinney office and permanently curated at the Center for Archeological Research at The University of Texas at San Antonio. No additional archeological survey or evaluation is recommended within the APE as it is presently defined. Therefore, it is the recommendation of IES that the FM 549 Improvements Project (CSJ 1015-01-024) be permitted to continue without the need for further cultural resources investigations. However, if any archeological materials or features are encountered during construction, the operators should stop construction activities in the vicinity of the inadvertent discovery and immediately contact the project cultural resources consultant to initiate coordination with TxDOT and the THC prior to resuming construction activities.

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CHAPTER 1: PROJECT DESCRIPTION

1.1 Introduction

This report presents the results of an archeological survey conducted by Integrated Environmental Solutions, LLC (IES), under subcontract to Dannenbaum Engineering Corporation - Dallas, LLC on behalf of the Texas Department of Transportation (TxDOT) Dallas District, for the proposed Farm-to-Market Road (FM) 549 Improvements Project (CSJ 1015-01-024). TxDOT Dallas District proposes to expand and realign a portion of FM 549 between State Highway (SH) 276 and SH 205 southeast of the City of Rockwall in Rockwall County, Texas (**Figures 1.1** and **1.2**).

The purpose of these investigations was to conduct an inventory of archeological resources (as defined by Code of Federal Regulations, Title 36, Section 800.4 [36 CFR 800.4]) present within the proposed project area and to evaluate identified resources for their eligibility for inclusion in the National Register of Historic Places (NRHP), as per Section 106 (36 CFR 800) of the National Historic Preservation Act (NHPA) of 1966, as amended, or for designation as State Antiquities Landmarks (SALs) under the Antiquities Code of Texas (ACT; Texas Administrative Code, Title 13, Chapter 26 [13 TAC 26]). This project was conducted under Texas Antiquities Permit No. 8504.

A brief description of the proposed project area or Area of Potential Effects (APE), environmental and historical contexts, field and analytical methods, results of the investigations, and recommendations are provided in this document. Prepared in accordance with the Council of Texas Archeologists (CTA 2002) guidelines, this report satisfies the NHPA Section 106 and ACT requirements of the proposed project.

1.1.1 *Project Description*

The project proposes to widen approximately 2.08 miles (mi) of the existing FM 549 from a two-lane undivided roadway to a four-lane roadway with a 20-foot (ft) center turn lane median between SH 205 and SH 276. In addition to widening the roadway, the project will create a new segment of FM 549 extending south from FM 1139 to SH 205. The new segment of FM 549 will be entirely within the 2.08-mi project limit.

1.1.2 *Purpose and Need*

The current and anticipated population growth in the region has resulted in an increase of residential development and associated traffic congestion along the project area. According to the North Central Texas Council of Governments (NCTCOG) Mobility 2040 population forecast, Rockwall County population will grow 78 percent from 2017 to 2040. The traffic demand along FM 549 within the project limits has grown substantially and is expected to continue to grow. The existing road is insufficient to meet current and projected traffic demands.

The purpose of the FM 549 roadway widening is to improve access by making the existing roadway continuous, thus relieving congestion especially along SH 205 and improve traffic flow. The proposed FM 549 improvement project is needed because: (a) the existing route is not continuous, requiring motorist to use SH 205 to reach either segment of FM 549 and (b) is inadequate to meet current and future traffic demands.

Figure 1.1
General Location Map

County: Rockwall
State: Texas
Date map created: 1/22/2019
Source: (c) 2009 Microsoft Corporation and its data suppliers; ESRI 10.5 Streetmap
IES Project Ref: 04.182.005

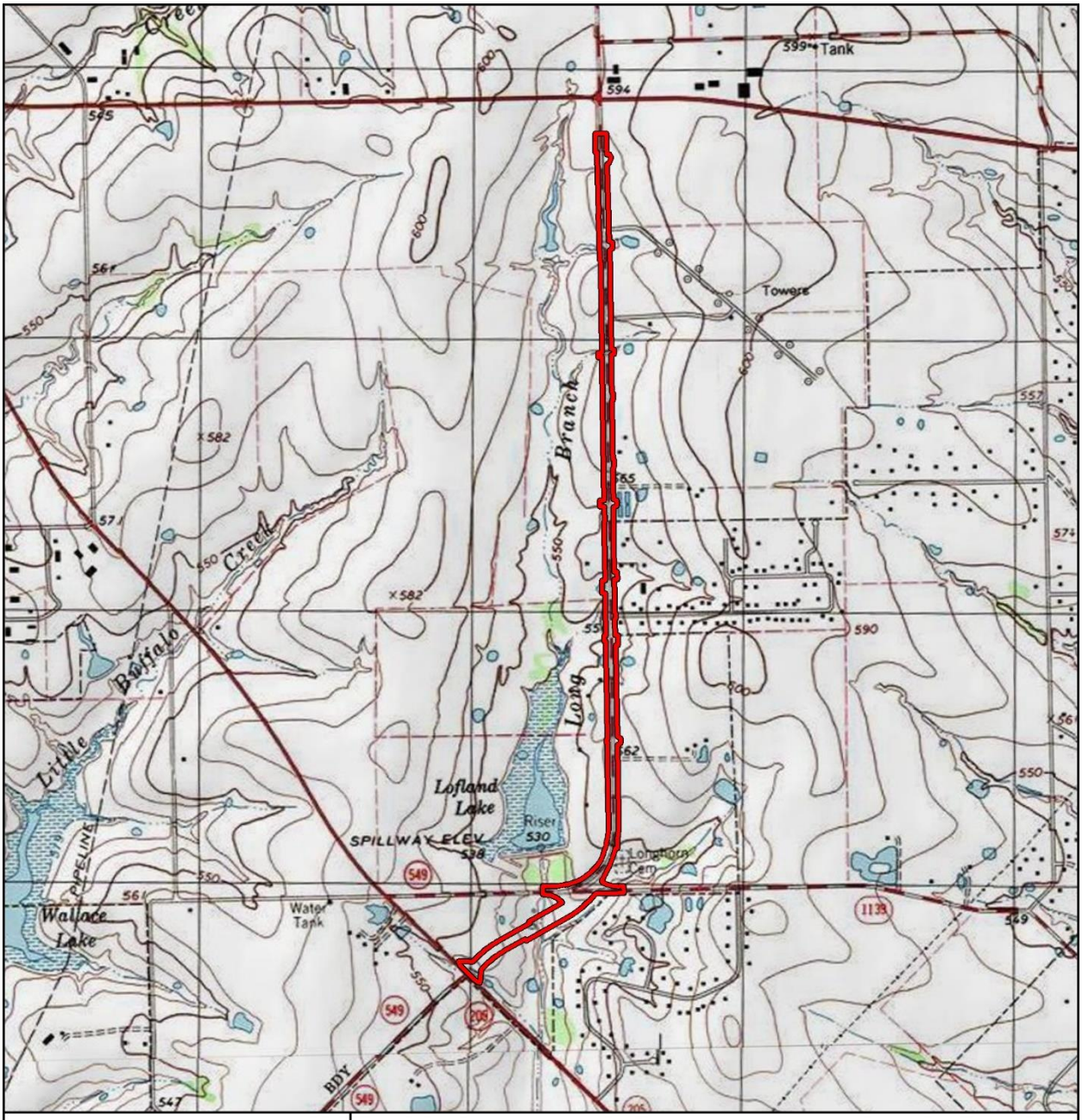

Figure 1.2
Topographic Setting

County: Rockwall
State: Texas
Date map created: 1/22/2019
Source: USGS Topographic Map
7.5-min quadrangle
Rockwall 1969
IES Project Ref: 04.182.005

1.2 Area Of Potential Effects for Archeological Resources

The APE is defined to encompass the limits of the existing ROW, proposed new ROW, permanent and temporary easements, utility relocations, and project-specific locations. The APE for archeological resources encompasses the 2.08-mi project corridor and the 100-to-830-ft-wide existing and new ROW and easements, totaling approximately 35.28 acres (ac).

1.2.1 *Description of Existing Roadway*

The existing FM 549 roadway within the project limits consists of two 10-ft-wide main lanes with 2-ft-wide shoulders. Currently, FM 549 contains ditches and terminates into FM 1139. The existing ROW within the APE is 23.67 ac.

1.2.2 *Description of Proposed Roadway*

The proposed FM 549 project would create four 12-to-14-ft-wide lanes with 2-ft-wide shoulders. The proposed improved roadway would also have a 6-to-18-ft-wide sodded median and 5-ft-wide sidewalks on both sides of the road. At specific locations, 12-ft-wide turn lanes will be added. A bridge would be constructed over Long Branch. Existing culverts would be extended for proposed drainage improvements. The proposed project would require approximately 11.61 ac of new ROW at various locations along the corridor. Details of the proposed design are shown on the project schematic, which has been uploaded to the TxDOT Environmental Compliance Oversight System (ECOS; **Attachment B**).

1.2.3 *Typical Depth of Impacts*

Typical depths of impacts would reach an estimated depth of 3 ft to accommodate grading and drainage improvements typical of multi-lane roadway infrastructure.

1.2.4 *Maximum Depth of Impacts*

The maximum depth of impacts is estimated to be approximately 70 ft for the construction of bridge piers within the Long Branch riparian corridor.

1.3 Administrative Information

Sponsor(s): TxDOT

Review Agency(ies): TxDOT, Texas Historical Commission (THC)

Principal Investigator: Christopher Goodmaster, MA, RPA

IES Project Number: 04.182.005

Date(s) of Field Work: 08 January 2019

Area Surveyed: 35.28 ac

Sites Recommended Eligible for NRHP Under Criteria in 36 CFR 60.4: None

Sites Recommended Eligible for SAL Under Criteria in 13 TAC 26: None

Sites Recommended Not Eligible for NRHP Under Criteria in 36 CFR 60.4: None

Sites Recommended Not Eligible for SAL Under Criteria in 13 TAC 26: None

Curation Facility: No artifacts were collected. All field notes and project-related records will be temporarily stored at the IES office in McKinney and permanently curated at the Center for Archeological Research (CAR) at The University of Texas at San Antonio (UTSA).

CHAPTER 2: ENVIRONMENTAL BACKGROUND

2.1 Climate

Rockwall County is located in the north-central part of the State of Texas. This region has a humid subtropical climate and an annual precipitation averaging approximately 38 inches (in). Precipitation usually falls as rain throughout the year, with July and August being the two driest months of the year. The subtropical region tends to have a relatively mild year-round temperature with occasional exceedingly hot and cold snaps (Estaville and Earl 2008).

2.2 Topography, Geology, and Soils

The Rockwall 7.5-minute U.S. Geological Survey (USGS) topographic quadrangle map illustrates that the APE is located within a gently undulating upland setting situated on the western flank of a dissected upland ridge that separates the Long Branch and Brushy Creek drainages. Along the dissected margins of the ridge, the APE crosses the headwaters of two unnamed streams south of SH 276. Within the southernmost portion of the APE, between FM 1139 and SH 205, the new proposed roadway extension will cross Long Branch and extend up a gently sloping ridge west of Long Branch before intersecting SH 205. Long Branch flows north-to-south across the APE and confluences with Little Buffalo Creek approximately 5 mi south of the APE (see **Figure 1.2**).

The APE is located within the Northern Blackland Prairie subregion of the Texas Blackland Prairie ecoregion (Griffith et al. 2007). The Northern Blackland Prairie is distinguished from surrounding regions by gently-rolling hills and fine-textured, black, clay-rich soils that primarily support prairie vegetation. Vertisols dominate the Blackland Prairie ecoregion and consist of high clay content soils that have significant shrink and swell potential. The APE is underlain by the Cretaceous-age Marlbrook Marl Formation (Kmb), which is comprised of clay, silt-size quartz grains, phosphate nodules, and marine megafossils (Bureau of Economic Geology 1987; USGS 2018).

The *Soil Survey of Kaufman and Rockwall Counties, Texas* (Pringle 1977) indicates that there are four soil map units within the APE (**Table 2.1**; **Figure 2.1**). The entire APE contains soils typical of upland settings within the Northern Blackland Prairie region. Soil data were reviewed from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Web Soil Survey (Web Soil Survey 2018).

Table 2.1: Soils within the APE

Soil Map Unit Description	Approximate Percentage of the APE
Fed2 - **Ferris clay, 5 to 12 percent slopes, eroded** - This component is described as clay located on ridges. Depth to bedrock is 39 to 60 in. The natural drainage class is well drained.	5.7
FhC - **Ferris-Heiden complex, 2 to 5 percent slopes** - This component is described as clay located on ridges. Depth to bedrock is 39 to 60 in. The natural drainage class is well drained.	25.5
HeC - **Heiden clay, 3 to 5 percent slopes** - This component is described as clay located on ridges. Depth to regolith is 40 to 65 in. The natural drainage class is well drained.	14.5
HoB - **Houston Black clay, 1 to 3 percent slopes** - This component is described as clay located on ridges. Depth to a root restrictive layer or bedrock is more than 80 in. The natural drainage class is moderately well drained.	54.4

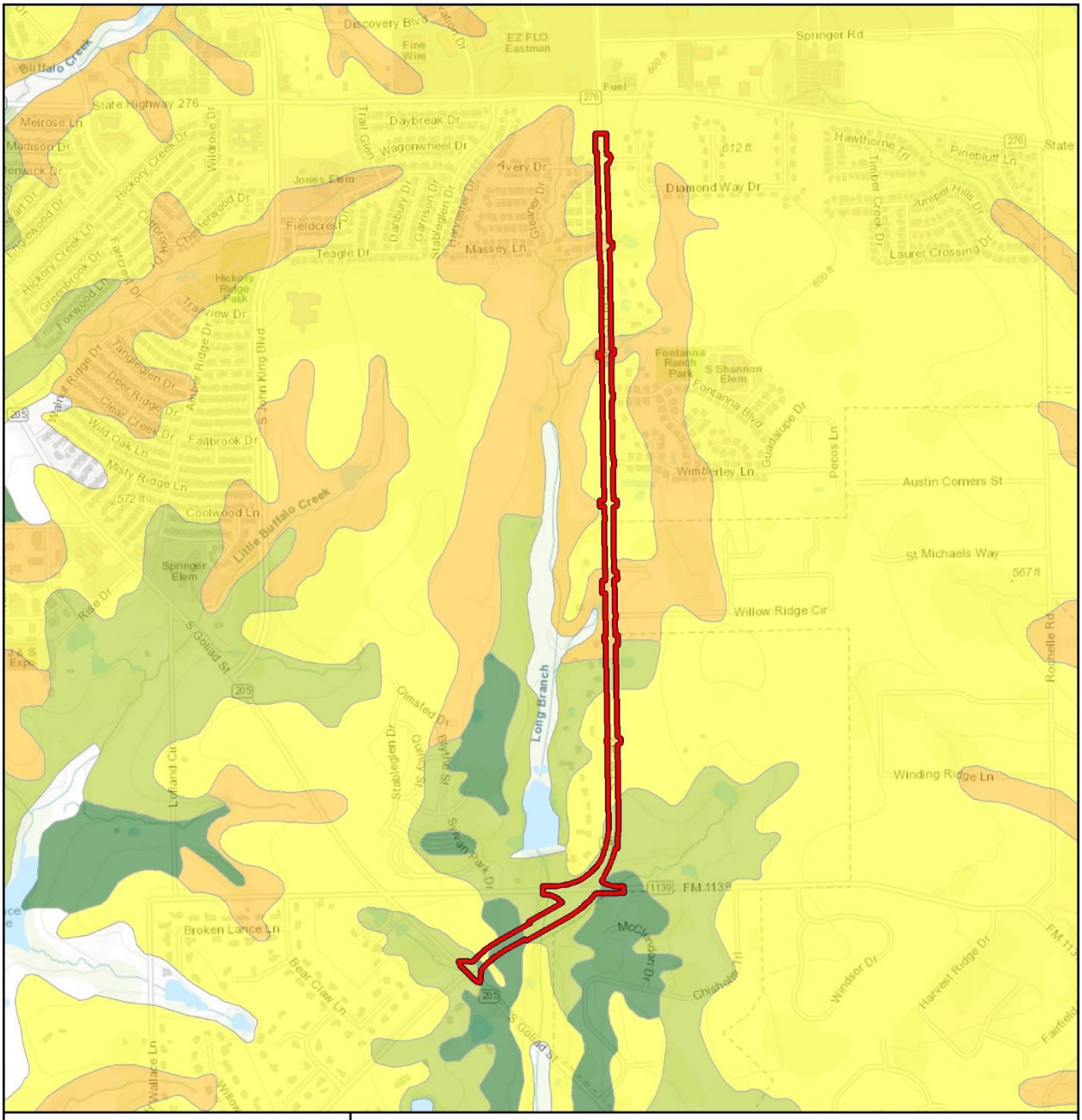

Figure 2.1
Soil Map Units Within and Adjacent to the APE

County: Rockwall
State: Texas
Date map created: 1/22/2019
Source: USDA NRCS Digital Soils Database
IES Project Ref: 04.182.005

Area of Potential Effects

Soil Description

- FeD2 - Ferris clay, 5 to 12 percent slopes, eroded
- FhC - Ferris-Heiden complex, 2 to 5 percent slopes
- HeC - Heiden clay, 3 to 5 percent slopes
- HoB - Houston Black clay, 1 to 3 percent slopes

N

1 inch = 2,000 ft

0 2,000 4,000 ft

CHAPTER 3: CULTURAL BACKGROUND

3.1 Archeological Sites Atlas Review

A file search within the Texas Archeological Sites Atlas (TASA) and the Texas Historic Sites Atlas (THSA), maintained by the THC and the Texas Archeological Research Laboratory (TARL), and the TxDOT Historic Districts and Properties of Texas (HDPT) databases identified no previously recorded archeological sites, NRHP properties or districts, or historical markers located within the APE or within 1 kilometer (km; 0.6 mi) of the APE (TASA 2018; THSA 2018; **Figure 3.1**). However, one historic-age cemetery abuts the southern portion of the APE northeast of the intersection of FM 549 and FM 1139. The Lawhorn Cemetery contains approximately 149 graves dating from 1881 to 1970. The cemetery is encompassed by a modern fence.

In addition, the TASA database indicates that one previously conducted professional cultural resources survey has been conducted within 1 km of the APE (**Table 3.1**). The previous survey terminates within the current APE and overlaps a 0.05-ac portion of the APE east of the intersection of Haymaker Drive and FM 549. The survey was conducted in 2006 by AR Consultants, Inc. for the proposed Lake Tawakoni Water Supply Project by the North Texas Water Municipal Water District. From the APE, the previous survey corridor extends east and southeast for approximately 31 mi before terminating at Lake Tawakoni in Van Zandt County (Todd 2006).

Table 3.1: Previous Surveys within 1 Km of the APE

Agency	ACT Permit No.	Firm/Institution	Date	Survey Type	Location (Approximate)
North Texas Municipal Water District (NTMWD)	4150	AR Consultants, Inc.	2006	Linear (intensive)	Overlaps a portion of the APE and extends east

3.2 Archeological Resources Potential

In addition to review of the TASA, THSA, and databases, several additional sources were referenced to determine the overall potential for encountering archeological sites within the APE. These sources included the *Soil Survey of Kaufman and Rockwall Counties, Texas* (Pringle 1977), the Geologic Atlas of Texas (Dallas Sheet), the USDA NRCS digital soil database for Kaufman County, the TxDOT Potential Archeological Liability Map (PALM) for the Dallas District, historical USGS topographic maps, the National Archives and Records Administration's (NARA) 1940 Census Enumeration District Maps of Rockwall County, the Texas Historic Overlay (THO) georeferenced map database, and both past and current aerial photography.

3.2.1 *Disturbance Analysis*

During the background review, it was established that ground-disturbing activities related to past land use, transportation development, and prolonged periods of erosion have transpired within the APE. Historical aerial photography indicates the APE was used for agricultural, pastoral, and transportation purposes since 1941 and presumably since the late 19th century. The 1918 USDA Rockwall County soil map depicts present-day FM 549 as a linear, north-to-south oriented roadway that paralleled the western boundary of Lawhorn Cemetery, north of a perpendicular intersection with present-day FM 1139. By 1953, FM 549 had been realigned to the current configuration, which includes a westward curve north of the FM 1139 intersection. FM 549 underwent two additional episodes of modification between 1996 and 2008. In 1996, FM 549 was widened and repaved to accommodate residential development within the immediate area. In 2008, FM 549 was further widened to feature an additional middle turning lane within

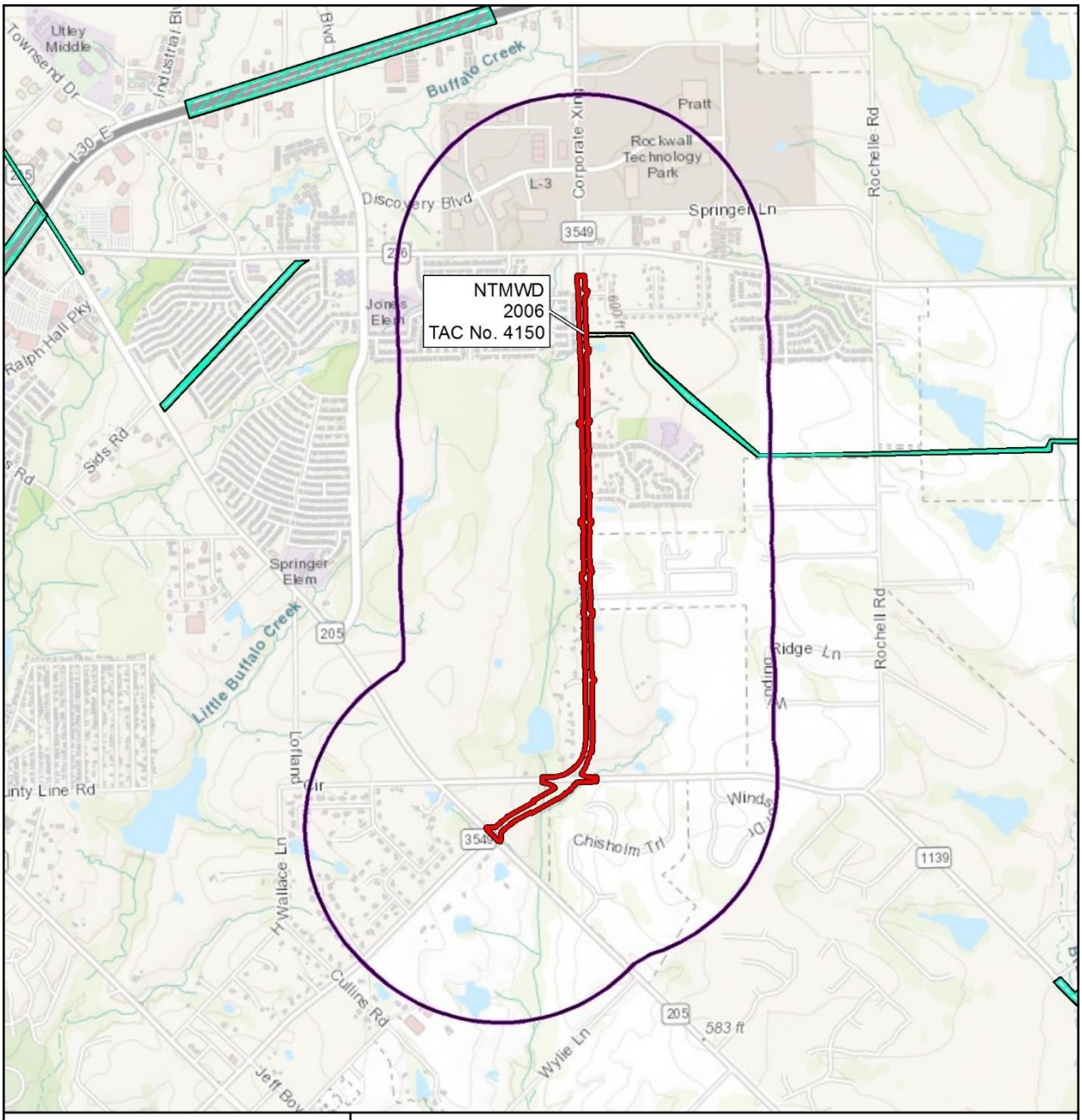

Figure 3.1
Previous Investigations
Within 1 Kilometer of the APE

County: Rockwall
State: Texas
Date map created: 1/30/2019
Source: (c) 2009 Microsoft Corporation and its data suppliers; ESRI 10.5 Streetmap
IES Project Ref: 04.182.005

Area of Potential Effects
1-km APE Buffer
Previous Archeological Survey - Area
Previous Archeological Survey - Linear

N

1 inch = 3,000 ft

0 3,000 6,000 ft

the northern and central portions of the APE and drainage culverts were replaced along the alignment. The FM 1139 shoulder, culverts, and drainage ditches have been regularly maintained since 1996.

A 1,740-ft-long section of the APE between FM 1139 and SH 205 will be realigned within new ROW to cross Long Branch within a setting that has remained undeveloped since 1953. This section of the APE was devoid of woody vegetation between 1941 and 1968, based on a review of historical aerial photographs. Between 1968 and 1981, woody vegetation began to establish within the Long Branch riparian corridor, which has continued to become increasingly overgrown. Historical and modern aerial photography indicates the portion of proposed new ROW west of Long Branch has experienced prolonged erosion since at least 1941. Aerial imagery from 2016 illustrates that a portion of this area was disturbed during vegetation removal. The portion of the APE east of Long Branch and south of FM 1139 appears to have been less disturbed and is still predominately covered by woody vegetation.

3.2.2 *Prehistoric Resource Potential*

Previous surveys within North-Central Texas have indicated that the majority of prehistoric sites are located adjacent to major perennial streams or near springs. Few prehistoric archeological sites have been previously recorded within the Blackland Prairie uplands of the East Fork Trinity River. Despite previous archeological investigations for the impoundment of nearby Lake Ray Hubbard, located approximately 3.6 mi to the west of the APE, little is known about prehistoric-period use or inhabitation of the Blackland Prairie uplands away from major river valleys. According to the TxDOT PALM for the Dallas District, the northern 1.6-mi portion of the APE has a low to moderate potential for containing shallow and deeply buried cultural materials in areas that retain contextual integrity (**Table 3.2**; **Figure 3.2**). The PALM indicates the southern 0.5-mi portion of the APE, which includes a 900-ft-long portion of the APE extending across the Long Branch riparian corridor, contains an elevated potential for the presence of shallow and deeply buried cultural deposits in areas with a reasonable degree of contextual integrity.

Based on the aforementioned ground-disturbances pertaining to residential and transportation development, much of the APE north of FM 1139 is not considered to have retained a reasonable contextual integrity. Subsequently, this portion of the APE has a low potential for containing prehistoric cultural deposits. The 900-ft section of the APE, south of FM 1139, is considered to have reasonable contextual integrity and is therefore considered to have the highest potential for containing prehistoric deposits.

Table 3.2: TxDOT PALM Score within the APE

PALM Score	Shallow Potential	Deep Potential	Acreage within APE	Percent of APE
0	Negligible	Negligible	0.15	0.4
1	Low	Low	3.55	10.1
2	Low	Moderate	9.84	27.9
3	Low	High	0.0	0.0
4	Moderate	Low	41.34	3.8
5	Moderate	Moderate	17.05	48.3
6	Moderate	High	0.00	0.0
7	High	Low	0.05	0.1
8	High	Moderate	3.30	9.4
9	High	High	0.0	0.0

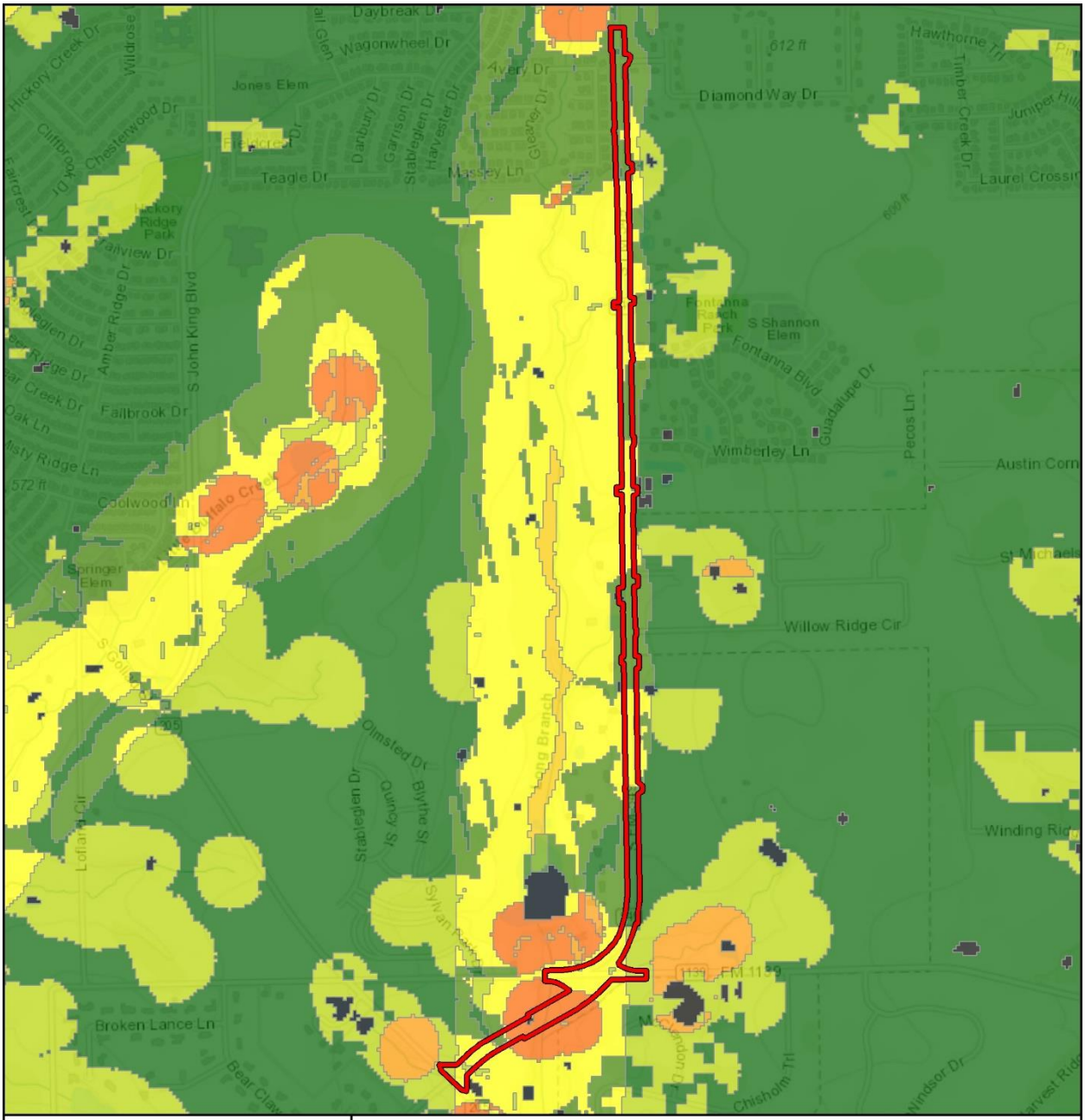

Figure 3.2
Potential Archeological Liability Map

County: Rockwall
State: Texas
Date map created: 1/30/2019
Source: (c) 2009 Microsoft Corporation and its data suppliers; ESRI 10.5 Streetmap; TxDOT ENV
IES Project Ref: 04.182.005

3.2.3 *Historic-Period Resource Potential*

Previously documented historic-age resources within the vicinity of the APE, and the East Fork Trinity River valley in general, primarily consist of archeological sites pertaining to late 19th to mid-20th century farmsteads, cemeteries, and structures such as culverts, bridges, houses, barns, and outbuildings. Typically, archeological sites associated with historic-period occupations in the region comprise surficial or near-surface artifact assemblages and dilapidated, collapsed, or demolished structures. As such, these resources typically do not retain sufficient integrity of design or association to be considered eligible for inclusion in the NRHP or designation as SALs.

Historically, the landscape within the APE was primarily used for agricultural and ranching purposes. A review of historical maps and aerial photography was conducted to determine the former locations of historic-age structures within and immediately adjacent to the APE. Although several historic-age structures were once located along the existing FM 549 ROW, these structures have long since been demolished and removed and the ranching/agricultural landscape has developed into a modern residential suburban environment. Although determining the presence of the earliest of these buildings and structures is problematic, maps depicting these features are available post-1917. The USDA soil map for Rockwall County depicts seven structures directly adjacent to the APE as early as 1918. Four of these 1918 structures were visually confirmed to have existed into the mid-20th century, based on reviews of 1953 and 1961 aerial photographs. The northernmost of these structures was a farmstead with a dwelling, a barn, and four outbuildings located approximately 400-ft south of Haymaker Drive on the east side of FM 549. These structures were demolished by 1981. Moving south, the next early-20th century structure was a dwelling with two outbuildings located 150-ft north of Wimberley Lane on the east side of FM 549. The dwelling and outbuildings were demolished by 2008. South of that former structure location, a barn and outbuilding were located at the intersection with Jams Lane on the west side of FM 549. The barn is still present on modern aerial photography and is located approximately 200-ft west of the APE. The final verified structure was a dwelling with three outbuildings located approximately 880-ft south of Willow Ridge Circle on the west side of FM 549. Modern photography depicts two domestic structures and an outbuilding in a different configuration currently present at that location. Aerial photography from 1968 depicts two additional dwellings. A dwelling was constructed approximately 300-ft north of Wimberley Lane on the east side of FM 549. This dwelling is present on modern aerial photography and is located approximately 100-ft east of the APE. A dwelling and barn were constructed approximately 350-ft north of Jams Lane on the east side of FM 549. The dwelling is present on modern aerial photography and the barn was demolished by 2013.

The earliest record detailing the location of the Lawhorn Cemetery is the 1918 USDA soil map for Rockwall County. The cemetery is located approximately 188-ft north of FM 1139 and immediately east of the APE. The Lawhorn Cemetery served the local Lawhorn family and residents of the nearby communities. Although internments range in date from 1880 to 1970, the majority of the internments date to between 1880 and 1930. The original alignment of FM 549 was depicted within the 1918 soil map, illustrating the road bounded the western limit of the cemetery. Aerial imagery since 1953 indicates that the cemetery boundary has not expanded. Based on modern aerial imagery, the cemetery measures approximately 268 ft north-to-south and 145-ft east-to-west.

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CHAPTER 4: METHODOLOGY

The archeological survey of the FM 549 Improvements Project (CSJ 1015-01-024) was designed to assess the potential of the APE to contain archeological resources and to document the presence of such resources within portions of the APE that retain sufficient contextual integrity for the preservation of archeological deposits. Prior to field work, IES staff conducted a historical and archeological records search to determine the presence of previously recorded archeological sites within the APE and within a 1-km radius of the APE. Additionally, ecological, geological, and soils data were reviewed to ascertain the prehistoric and historic-period archeological potential of the APE. Historical and recent topographic maps and aerial photography were also reviewed to identify areas of prior ground disturbance that would affect the presence and integrity of archeological deposits within the APE. The methods and frequency of shovel test excavations exceed the minimum requirements for fieldwork stipulated by the THC and CTA Archeological Survey Standards for Texas (CTA 2001).

4.1 Survey Methods

4.1.1 *High Probability Area Geospatial Modeling*

To develop the High Probability Area (HPA) model for prehistoric archeological site locations, areas containing moderate to high potential identified within the TxDOT PALM were selected within the APE. For historic-period HPA, historic-age structure locations identified within historical maps and aerial photographs were buffered to include a 1-ac area surrounding each identified structural feature. Final HPA limits were determined by comparing initial probability data to current land use, past disturbances, previous survey limits, and the combined prehistoric and historic HPA. For example, areas identified as containing historic-age buildings through archival research, but presently located within a developed setting, were not considered HPA within the final model. HPA do not denote the specific limits of intensive survey were expanded or contracted depending on reconnaissance survey field observations. Areas outside of designated HPA were assessed through reconnaissance survey and review of construction documents and historical aerial photography.

For the approximately 35.28-ac APE, the intensive pedestrian survey was limited to HPA. This was due to the extensive prior disturbances documented within the APE by the construction and maintenance of FM 549. The HPA identified for survey are represented within **Figure 4.1**. Areas outside of the designated HPA were assessed through pedestrian reconnaissance, windshield surveys, and/or aerial photography interpretation. Representative photographs detailing the rationale for designating areas outside the identified HPA as having negligible potential for preserving intact archeological deposits are provided in **Appendix A**. Other documentation methods included narrative notes, maps, and shovel test records.

4.1.2 *Intensive Survey*

In areas with the potential for preserving buried archeological materials, shovel tests were excavated to the top of culturally sterile soils; typically, the argillic (Bt) or calcareous (Bk) subsoil horizon. Each shovel test was at least 30 centimeters (cm) in diameter and was hand excavated in natural stratigraphic levels not exceeding 20 cm in thickness. Excavated soil was screened through ¼-in hardware mesh to facilitate the recovery of buried cultural material. If high clay content soils were encountered and could not be efficiently screened, excavated material was troweled through by hand and inspected for artifacts. Additionally, the physical properties of each arbitrary level were recorded. All shovel test locations were recorded using hand-held Trimble Geo7x Global Positioning System (GPS) units. Investigators documented the results of each shovel test on standardized forms.

Although the APE occupies approximately 35.28 ac, the identified HPA acreage was approximately 6.93 ac and pertained primarily to proposed new ROW. Although HPA methodology is not discussed within

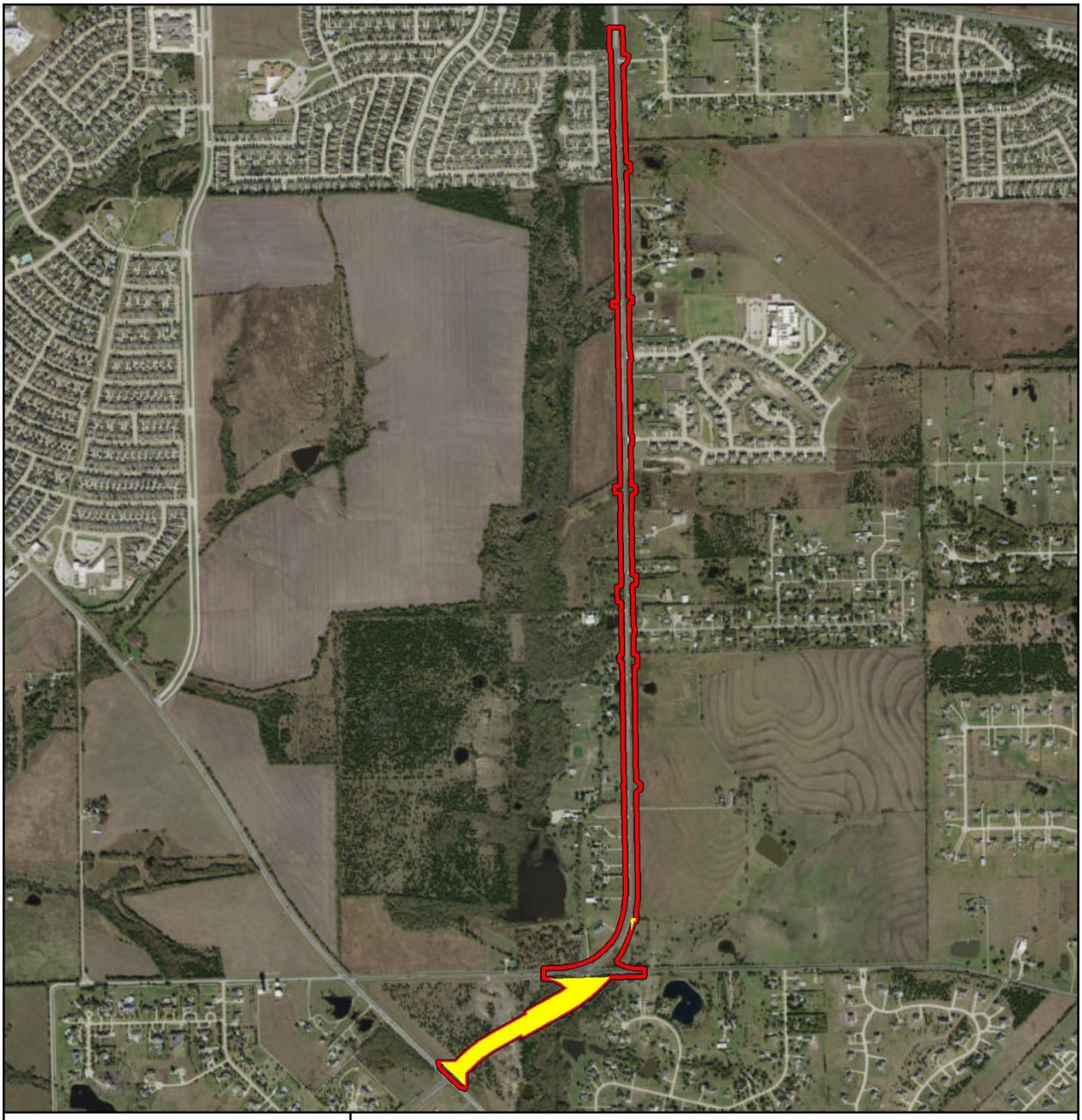

Figure 4.1
High Probability Areas

County: Rockwall
State: Texas
Date map created: 2/7/2019
Source: (c) 2009 Microsoft Corporation and its data suppliers; ESRI 10.5 Streetmap
IES Project Ref: 04.182.005

the CTA survey standards, using the standards as a guideline, at least 15 shovel tests would be required to meet the survey standards. However, the number of survey shovel tests varied from this amount based on the precise limits and intensity of disturbances, erosion, and topography observed during the intensive survey.

4.1.3 *Mechanical Scraping*

Approximately 0.06 ac of the APE is within 25 ft of the existing fence surrounding the Lawhorn Cemetery. Section 2.261(d) of the Memorandum of Agreement (MOA) between the TxDOT and the THC states that survey methods must include mechanical scraping to a depth adequate to determine whether grave shafts or burials occur in the APE within 25 feet of a known cemetery. To ensure compliance with the MOA, mechanical scraping and trenching was conducted within a 25-ft-wide buffer adjacent to the current boundary of the cemetery within the APE (**Figure 4.2**). As grave shafts are commonly identified during archeological investigations by rectangular soil stains that differ in color and texture from the surrounding, undisturbed matrix, specific attention was focused on identifying and investigating vertical and lateral soil variations. Exposed soil was examined in plan and profile to identify potential unmarked grave shafts. When soil variations were initially noted, more detailed inspection was conducted by cleaning the exposed soil profiles with a spade or trowel. Mechanical scraping was continued until undisturbed subsoil, regolith, or bedrock was encountered. Portions of the 25-ft buffer area were trenched to a depth greater than 6 ft to confirm the absence of modern fill and verify the absence of interments. Standardized soil descriptions and photographs were recorded along each excavation profile.

4.2 Curation

No artifacts were encountered during this survey. Records, files, field notes, forms, and other documentation will be included in the curation package. These documents will be organized and catalogued according to curation repository standards. All field-generated documents will be temporarily stored at the IES office and permanently curated at CAR.

Figure 4.2
Lawhorn Cemetery
Investigation Area

County: Rockwall
State: Texas
Date map created: 1/31/2019
Source: TNRIS Stratmap 2015 aerial imagery
IES Project Ref: 04.182.005

CHAPTER 5: RESULTS

Background and archival research conducted in preparation for this cultural resources survey indicated that one prior cultural resources investigation has taken place within 1 km of the proposed APE. No previously recorded archeological sites are present within the 1-km background research radius. Based on background information, HPA were identified that exhibited minimal evidence of prior ground disturbance. During this survey, the proposed new ROW and HPA were subjected to pedestrian reconnaissance survey and intensive survey via systematic shovel test sampling. Ground surface visibility was highly variable and irregular across the APE, ranging from 0 to 100 percent. Due to the proximity of the Lawhorn Cemetery to the APE, mechanical scraping was conducted within the portion of the APE that was within 25 ft of the present cemetery boundary. No archeological resources were documented within the APE.

5.1 Archeological Survey

5.1.1 *Pedestrian Survey Observations*

The APE is located within a historically agricultural environment that is rapidly transitioning to a suburban setting. The topography within much of the APE was generally level with gently undulating and sloping landforms in proximity to the Long Creek riparian corridor. Ground surface visibility varied considerably and ranged from 0 to 100 percent across the APE. Ground cover ranged from manicured turf grass within maintained residential lawns to dense woody and herbaceous understory species along the Long Branch riparian corridor.

The APE includes maintained ROW, suburban residential lawns, agricultural fields, and a riparian corridor. The portion of the APE north of FM 1139 is extensively disturbed by residential developments, buried utilities, and drainage improvements (**Appendix A**, **Photographs 1** through **10**). Field observations during pedestrian survey of the overall APE verified the presence of previous ground disturbances, comprised of existing ROW and narrow areas of proposed new ROW along the existing roadway. A series of drainage easements exist along the existing FM 549 ROW and were most recently improved in 2017. Numerous utilities are also within and immediately adjacent to the limits of the APE. A broad, generally triangular depression extends along the east side of FM 549, between the roadway and the cemetery. It is assumed that this depression represents the soil borrow pit resulting from the construction of the elevated roadway crown that FM 549 presently occupies as the alignment curves to the west.

5.1.2 *Intensive Survey Results*

The intensive archeological survey of the APE utilized a HPA survey method to adequately investigate portions of the APE that have retained potential for containing archeological deposits. During this survey, 17 shovel tests were excavated throughout the APE, targeting HPA within proposed new ROW for the realignment of FM 549 (**Figure 5.1**). In general, shovel tests were systematically excavated in two staggered transects within the proposed new ROW across the Long Branch riparian corridor and the adjacent uplands (**Appendix A**, **Photographs 11** through **16**). Soil profiles exposed within shovel tests consisted of very dark gray to dark gray (10YR 3/1 to 4/1) clay loam that gradually transitioned to grayish brown (10YR 5/2) silty clay.

5.1.3 *Lawhorn Cemetery Investigation Results*

The Lawhorn Cemetery was established by William Lawson Lawhorn in the early 1880s as a community cemetery. The cemetery contains over 150 burials. Most of the interments within the cemetery date to the late 19th and early 20th centuries, with several mid-to-late 20th century graves represented. The current

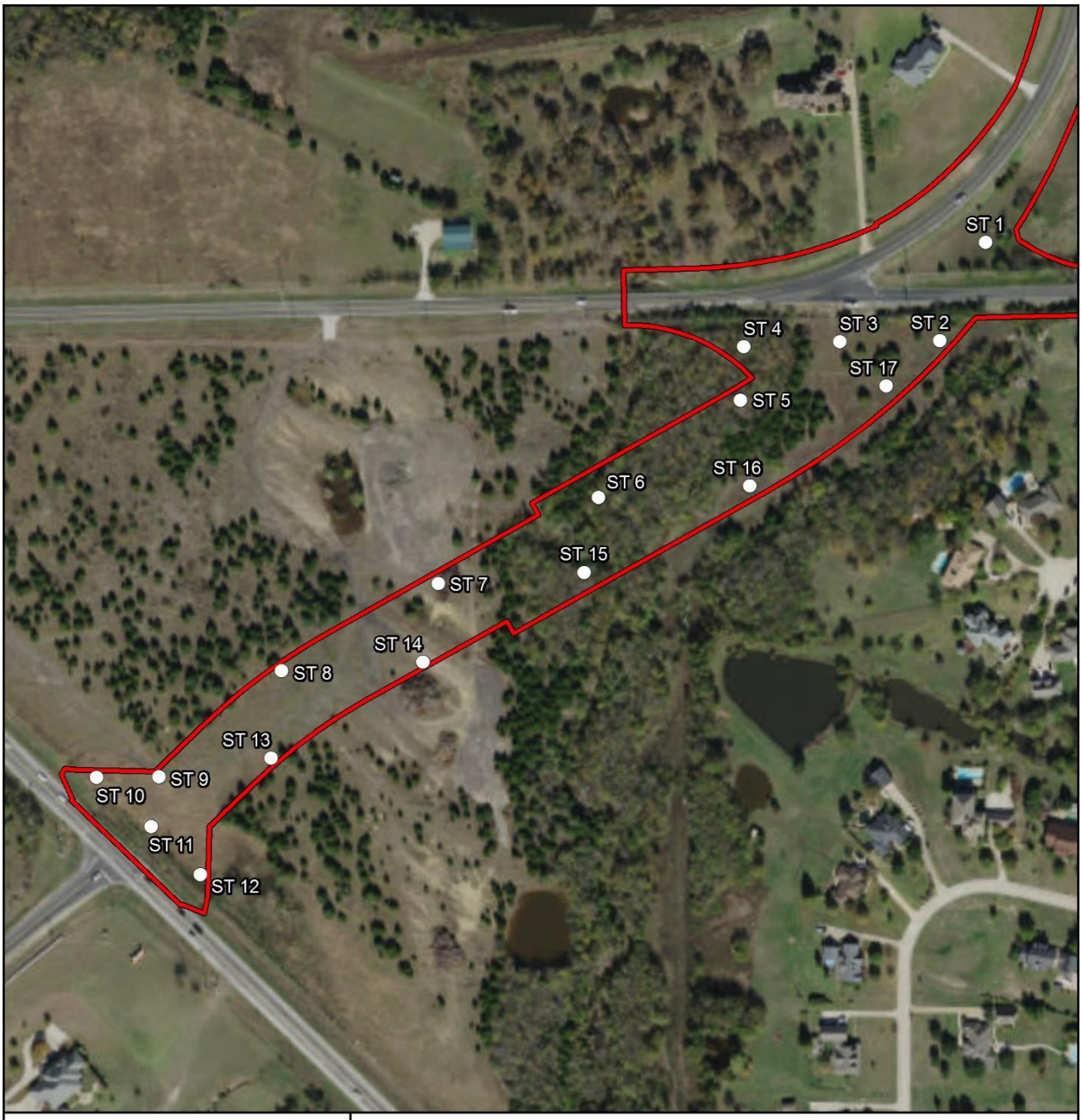

Figure 5.1
Shovel Test Locations

County: Rockwall
State: Texas
Date map created: 1/22/2019
Source: (c) 2009 Microsoft Corporation and its data suppliers; ESRI 10.5 Streetmap
IES Project Ref: 04.182.005

cemetery boundary measures approximately 268 ft north-to-south by 145 ft east-to-west and occupies an interfluvial midslope bench and south-facing shoulder slope along an unnamed tributary of Long Branch.

Although the Lawhorn Cemetery was delimited by a chain link fence at the time of the survey, the historical cemetery boundary may extend outside of the current cemetery fence. As such, monitored mechanical excavation was conducted to determine if unmarked graves were present outside of the current cemetery fence within the immediately adjacent portion of the APE.

The area immediately north of the currently fenced cemetery boundary was not accessible during the mechanical excavation due to an overhead electrical utility pole and associated guy lines located immediately adjacent to the northwestern corner of the cemetery, as well as a barbed wire fence separating the adjacent pasture from the proposed new ROW. Therefore, mechanical excavation efforts focused on the portion of proposed new ROW and existing ROW west of the current cemetery boundary (**Appendix A**, **Photographs 17** and **18**). The existing cemetery fence is approximately 6 m (20 ft) east of the existing FM 549 ROW limits at its closest point, which occurs at the northwestern corner of the cemetery (**Figure 5.2**). A portion of the proposed new ROW will be adjacent to the northwestern cemetery corner and will increase to approximately 30 m (98 ft) as the FM 549 alignment turns to the west approaching the intersection with FM 1139. Within the Lawhorn Cemetery, an uninscribed headstone fragment and socketed pedestal base was observed approximately 1.67 m (5.5 ft) east of the existing cemetery fence and the H. C. Hoskins family monument was observed approximately 1.98 m (6.5 ft) east of the fence (**Appendix A**, **Photograph 19**).

Mechanical scraping was initiated within the existing and proposed new ROW near the northwest cemetery corner to ascertain the presence of unmarked graves. Dense construction fill, comprised of gravel, asphalt, concrete, and other modern refuse, was encountered across all of the 25-ft cemetery buffer area within the APE. Due to the large volume of modern fill present, coupled with the limited area within the APE in which to stockpile the excavated material, mechanical scraping efforts ceased in favor of backhoe trenching. Two backhoe trenches were excavated within the 25-ft cemetery buffer area (see **Figure 5.2**). Backhoe Trench (BHT) 1 was excavated within the proposed new ROW portion of the APE parallel to the western cemetery boundary. BHT 1 was placed in a generally north-to-south orientation approximately 2.5 m (8.2 ft) west of the existing cemetery fence. During excavation, the southern portion of the trench was re-oriented to follow the limits of the APE. BHT 2 was excavated generally parallel to BHT 1 approximately 6.5 m (21.3 ft) west of the cemetery fence and within the existing FM 549 ROW. The presence of a buried fiber optic line paralleling the roadway limited the northern extent of BHT 2.

In total, 50.5 m (165.7 ft) of trenches were mechanically excavated within the portion of the APE adjacent to the Lawhorn Cemetery. The upper 50 cm of each trench exhibited the dense construction fill initially encountered during the mechanical scraping effort (**Table 5.1**). The construction fill was comprised of sand, gravel, asphalt fragments, and modern refuse including plastic bottles, modern tires, and modern lumber. Within the northern portion of BHT 1, light yellowish brown (10YR 6/4) roadway cushion sand was encountered at a depth of 38 to 50 cm below surface (cmbs) and a 4-in-diameter brass TxDOT survey monument set in concrete was encountered at 45 cmbs (**Appendix A, Photographs 20** and **21**). By a depth of 50 cmbs, the soil profiles exposed within both trenches transitioned to relatively undisturbed very dark gray to dark gray (10YR 3/1 to 4/1) clay that gradually transitioned to grayish brown (10YR 5/2) silty clay between 80 and 100 cmbs. Within BHT 1, a 2-in-diameter steel pipe related to a decommissioned rural water supply line was encountered at a depth of 110 cmbs (**Appendix A, Photographs 22** and **23**). The steel pipe occupied a 16-in-wide trench and extended for approximately 29 ft (8.8 m) generally paralleling BHT 1. In addition, a 2-in-diameter polyvinyl chloride (PVC) decommissioned water supply line pipe was encountered within BHT 1 at a depth of 130 cmbs. The PVC pipe occupied a 4-in-wide trench and extended for approximately 34 ft (10.4 m) along BHT 1, generally paralleling the steel pipe (**Appendix A, Photographs 24** and **25**). Grayish brown (10YR 5/2) massive clay or silty clay subsoil was encountered within both trenches by depths of 100 to 120 cmbs. Within BHT 1, white chalky limestone regolith was encountered in southern portion of trench at a depth of 220

Figure 5.2
Lawhorn Cemetery
Investigation Results

County: Rockwall
State: Texas
Date map created: 2/7/2019
Source: TNRIS Stratmap 2015
aerial imagery
IES Project Ref: 04.182.005

Area of Potential Effects
Lawhorn Cemetery
Cemetery 25-ft Buffer
No Rights-of-Entry
Mechanical Scrape Area
Backhoe Trench
Buried Fiber-optic Line

N

0 10 20 30 m
0 50 100 ft

Table 5.1: Summary of Backhoe Trench Results

Trench No.	Landform	Location	Soil Profile
1	Midslope bench	2.5 m west of cemetery fence	0–38 cm: construction fill comprised of sand, gravel, and asphalt fragments; clear, wavy lower boundary 38–50 cm: light yellowish brown (10YR 6/4) sand; granular structure; 4-in brass TxDOT ROW survey monument encountered at 45 cmbs; clear, wavy lower boundary 50–80 cm: dark gray (10YR 4/1) clay; medium subangular blocky structure; diffuse, smooth lower boundary 80–120 cm: grayish brown (10YR 5/2) silty clay; medium subangular blocky structure; few medium calcium carbonate ($CaCO_3$) nodules; 2-in steel rural water supply pipe encountered at 110 cmbs; 2-in PVC rural water supply pipe encountered at 130 cmbs; diffuse, smooth lower boundary 120–220 cm: grayish brown (10YR 5/2) clay with brownish yellow (10YR 6/8) and very pale brown (10YR 8/2) mottles; massive structure; clear, wavy lower boundary 220+ cm: white chalky limestone regolith encountered in southern portion of trench
2	Midslope bench	6.5 m west of cemetery fence	0–50 cm: construction fill comprised of sand, gravel, and asphalt fragments; clear, wavy lower boundary 50–100 cm: very dark gray (10YR 3/1) clay; medium subangular blocky structure; diffuse, smooth lower boundary 100–200 cm: grayish brown (10YR 5/2) silty clay; medium subangular blocky structure; few medium $CaCO_3$ nodules; diffuse, smooth lower boundary 200+ cm: light gray (10YR 7/2) clay with yellow (10YR 7/8) mottles; massive structure

cmbs. BHT 2 was terminated at a depth of 200 cmbs when light gray (10YR 7/2) massive clay was encountered (see **Table 5.1**).

The current boundary of the Lawhorn Cemetery does not appear to have changed since the early 1940s, based on a review of historical aerial photography. The uppermost 50 cm of the area investigated adjacent to the cemetery contained recent construction fill as a result of the use of the area for construction staging during the 2017 roadway maintenance and culvert replacement project. In addition, two rural water supply pipelines were previously placed parallel to the western cemetery boundary. No human remains, evidence of grave shafts, grave monuments, or coffin-related hardware were encountered within the portion of the APE investigated adjacent to the Lawhorn Cemetery.

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CHAPTER 6: SUMMARY AND RECOMMENDATIONS

During this archeological survey, the 35.28-ac APE was investigated through pedestrian reconnaissance with selective intensive survey within HPA. Seventeen negative shovel tests were excavated within the 6.93-ac HPA. No archeological sites were identified during either the pedestrian reconnaissance survey of the APE or intensive survey of the designated HPA. In addition, the portion of the APE within 25 ft of the Lawhorn Cemetery was investigated by monitored mechanical scraping and backhoe trenching. No human remains, evidence of grave shafts, grave monuments, or coffin-related hardware were encountered within the portion of the APE investigated adjacent to the Lawhorn Cemetery.

No archeological resources eligible for inclusion in the NRHP (as defined in 36 CFR 800.16[1]) or designation as SALs (as per 13 TAC 26.12) are present within the APE examined during this survey. Therefore, it is the recommendation of IES that the FM 549 Improvements Project (CSJ 1015-01-024) be permitted to continue without the need for further cultural resources investigations. However, if any cultural resources are encountered during construction, the operators should immediately cease construction activities in those areas. The project cultural resources consultant should then be contacted to initiate further consultation with the THC and TxDOT prior to resuming construction activities. In addition, if project designs change, and areas outside the APE detailed within this report are to be impacted, additional field investigations may be required.

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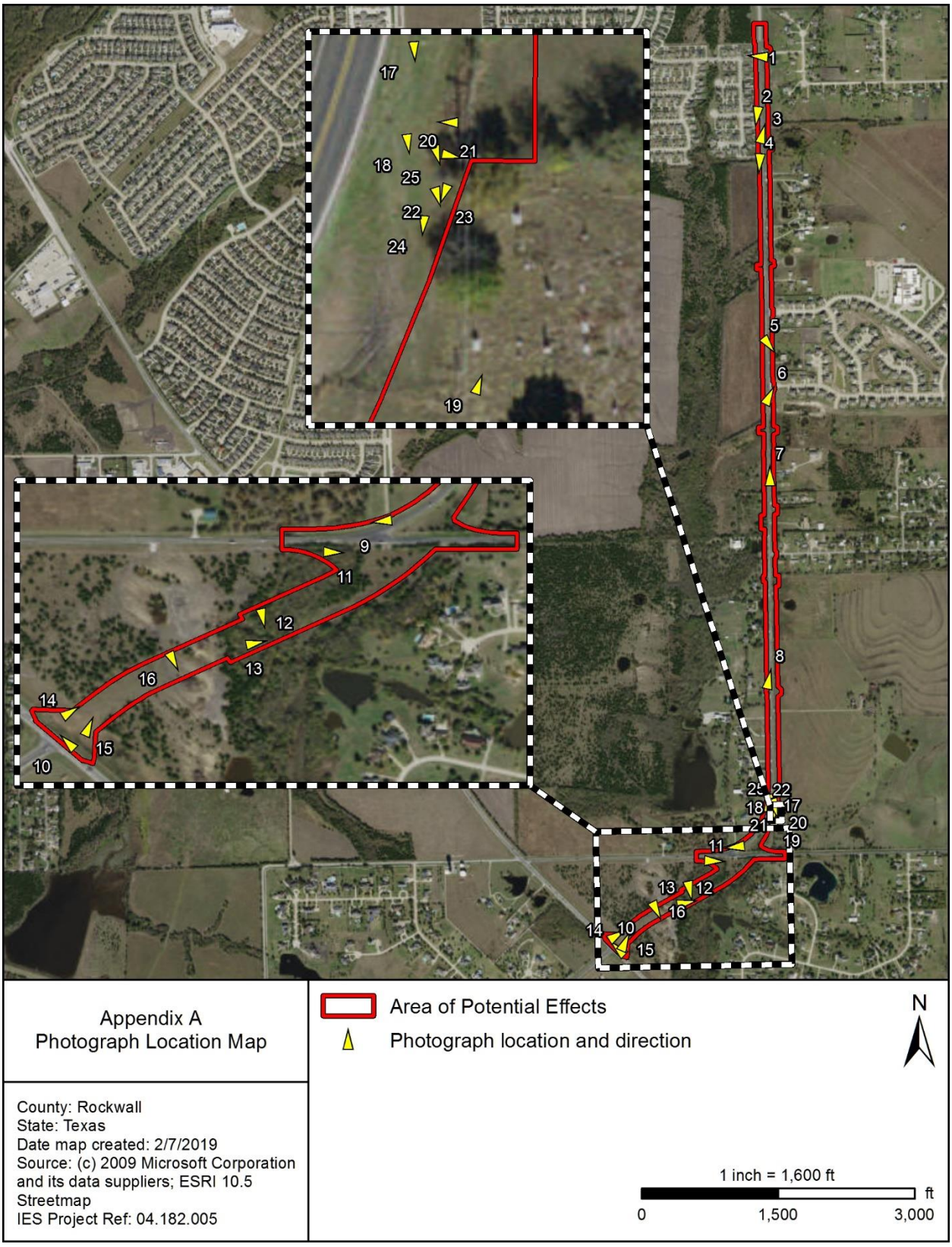
APPENDIX A
Photograph Location Map and Photographs



Photograph 1 - General APE near northern terminus, view to the north.

Photograph 2 - General APE, view to the south

Photograph 3 - General APE, view to the north.

Photograph 4 - General APE, view to the south.

Photograph 5 – General APE, view to the southeast.

Photograph 6 - General APE, view to the north.

Photograph 7 - General APE, view to the north.

Photograph 8 – General APE, view to the north.

Photograph 9 – General APE, view to southwest.

Photograph 10 – General APE, view to the northwest.

Photograph 11 – General APE within Long Branch riparian corridor, view to the east.

Photograph 12 - General APE within Long Branch riparian corridor, view to the south.

Photograph 13 – General APE within Long Branch riparian corridor, view to the east.

Photograph 14 - General APE adjacent to Long Branch riparian corridor, view to the northeast.

Photograph 15 - General APE adjacent to Long Branch riparian corridor, view to the northeast.

Photograph 16 - General APE adjacent to Long Branch riparian corridor, view to the southeast.

Photograph 17 – Mechanical scraping area adjacent to APE, view to the south.

Photograph 18 - Mechanical scraping area adjacent to APE, view to the south.

Photograph 19 - Mechanical scraping area adjacent to APE, view to the north.

Photograph 20 – BHT 1 soil profile, view to the west.

Photograph 21 – TxDOT survey monument encountered at 45 cmbs within BHT 1.


Photograph 22 – Two-inch steel rural water supply line encountered at 110 cmbs in BHT 1, view to the south.

Photograph 23 - Two-inch steel rural water supply line encountered at 110 cmbs in BHT 1, view to the south.

Photograph 24 - Two-inch PVC rural water supply line encountered at 130 cmbs in BHT 1, view to the south.

Photograph 25 – Parallel steel and PVC rural water supply lines within BHT 1, view to the south.

APPENDIX B
Design Plans

ROCKWALL COUNTY

PRELIMINARY DESIGN SCHEMATIC

Texas Department of Transportation

APPLY TO: Rockwall County, City of Fate, City of Heath, City of Rowlett, City of Royse City

FM 549

FROM: FM 3097 TO: SH 276

CSJ NO.: 0918-47-XXX

NUMBER OF TRAFFIC LANES: 2 LANE UNDIVIDED

NUMBER OF EXISTING TRAFFIC LANES: 2 LANE UNDIVIDED

PLAN

EXISTING ROW: VARIES

PROPOSED ROW: VARIES

PROJECT LENGTH: 3.0 MILES

PROJECT AREA: 18.5 ACRES

TRAFFIC VOLUMES: TODAY: 2020 AADT: 10,000 VPD; FUTURE: 2040 AADT: 20,000 VPD

FUNCTIONAL CLASS: MINOR ARTERIAL

TERRAIN: RURAL

DESIGN SPEED: 45 MPH

INTERNATIONAL WIRELESS COMMUNICATIONS EXPO

FUTURE

VOLUME: 20,000 VPD

DESIGN SPEED: 50 MPH

NUMBER OF LANES: 4 LANE DIVIDED

FACILITY TYPE: MINOR ARTERIAL

TERRAIN: RURAL

DANNENBAUM

ENGINEERING COMPANY - DALLAS LLC

TBPE FIRM REGISTRATION #F-3257

400 N. OLIVE STREET, LB 103, DALLAS, TEXAS 75201

PRELIMINARY

SUBJECT TO CHANGE

ROLL 1 OF 1

COMPONENT CROSSING

SH 276 — FM 549

FM 3097 — FM 3036

LEGEND

EXISTING

PROPOSED

SEE DRAWING SHEET 2, ETC.

TRAFFIC DIAGRAMS

SCALE: 1" = 50'

FM 549 EXISTING TYPICAL SECTION

STA 99+00.00 TO STA 113+00.00

PROPOSED FM 1139/OLD FM 549 CONNECTION TYPICAL SECTION

N.T.S.

FM 549 PROPOSED TYPICAL SECTION

STA 99+00.00 TO STA 99+75.00

FM 549 PROPOSED TYPICAL SECTION

STA 99+75.00 TO STA 100+50.00 AND STA 101+50.00 TO STA 102+25.00

STA 100+50.00 TO STA 101+50.00 AND STA 102+25.00 TO STA 103+00.00

SEE DETAIL A

FM 549 PROPOSED TYPICAL SECTION

STA 103+00.00 TO STA 104+00.00

FM 549 PROPOSED TYPICAL SECTION

STA 104+00.00 TO STA 105+00.00

FM 549 PROPOSED TYPICAL SECTION

STA 105+00.00 TO STA 106+00.00

FM 549 PROPOSED TYPICAL SECTION

STA 106+00.00 TO STA 107+00.00

FM 549 PROPOSED TYPICAL SECTION

STA 107+00.00 TO STA 108+00.00

FM 549 PROPOSED BRIDGE TYPICAL SECTION

N.T.S.

FM 549 PROPOSED TYPICAL SECTION

STA 108+00.00 TO STA 109+00.00

STA 109+00.00 TO STA 110+00.00

STA 110+00.00 TO STA 111+00.00

STA 111+00.00 TO STA 112+00.00

STA 112+00.00 TO STA 113+00.00

FM 549 PROPOSED DETAILING WALL LOCATIONS

RETAINING WALL #1
STA 99+00.00 TO STA 99+75.00
STA 100+50.00 TO STA 101+50.00
STA 102+25.00 TO STA 103+00.00

RETAINING WALL #2
STA 99+00.00 TO STA 99+75.00
STA 100+50.00 TO STA 101+50.00
STA 102+25.00 TO STA 103+00.00

DETAIL A

FINAL PAVEMENT SECTION PENDING

FM 549 PROPOSED LEFT TURN BAY TYPICAL DETAILS

FEMA ZONE A

FEMA ZONE AE

ROCKWALL COUNTY

PRELIMINARY DESIGN SCHEMATIC

Texas Department of Transportation

APPLY TO: Rockwall County, City of Fate, City of Heath, City of Rowlett, City of Royse City

FM 549

FROM: FM 3097 TO: SH 276

CSJ NO.: 0918-47-XXX

NUMBER OF TRAFFIC LANES: 2 LANE UNDIVIDED

NUMBER OF EXISTING TRAFFIC LANES: 2 LANE UNDIVIDED

PLAN

EXISTING ROW: VARIES

PROPOSED ROW: VARIES

PROJECT LENGTH: 3.0 MILES

PROJECT AREA: 18.5 ACRES

TRAFFIC VOLUMES: TODAY: 2020 AADT: 10,000 VPD; FUTURE: 2040 AADT: 20,000 VPD

FUNCTIONAL CLASS: MINOR ARTERIAL

TERRAIN: RURAL

DESIGN SPEED: 45 MPH

INTERNATIONAL WIRELESS COMMUNICATIONS EXPO

FUTURE

VOLUME: 20,000 VPD

DESIGN SPEED: 50 MPH

NUMBER OF LANES: 4 LANE DIVIDED

FACILITY TYPE: MINOR ARTERIAL

TERRAIN: RURAL

SCALE:
1" = 200'

DANNENBAUM

ENGINEERING COMPANY - DALLAS LLC

TBPE FIRM REGISTRATION #F-3257

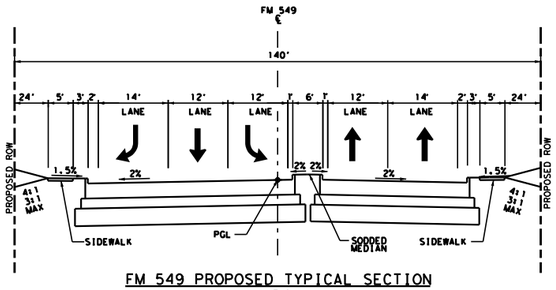
400 N. OLIVE STREET, LB 103, DALLAS, TEXAS 75201

PRELIMINARY

SUBJECT TO CHANGE

THE ENGINEER IDENTIFIED IMMEDIATELY BELOW IS PRESENTING THESE PRELIMINARY PLANS FOR REVIEW AND COORDINATION PURPOSES ONLY. THEY ARE NOT INTENDED FOR CONSTRUCTION, BIDDING OR PERMIT PURPOSES. THE ENGINEER IS RELEASING THE PRELIMINARY PLANS UNDER THE AUTHORITY OF TEXAS ADMINISTRATIVE CODE, TITLE 22, PART 6, CHAPTER 137, RULE 137.33 (2)(B)(ii).

ROLL 1 OF 1



FM 549 PROPOSED TYPICAL SECTION

N.T.S.

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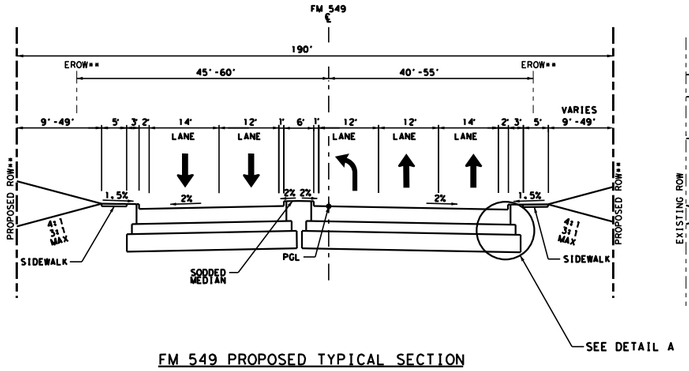
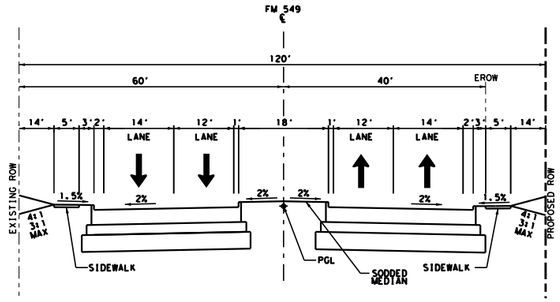


FM 549 PROPOSED TYPICAL SECTION

N.T.S.

STA 32+34.86 - STA 35+97.44 **PROPOSED ROW ONLY LT/RT
STA 67+24.44 TO 72+29.37 **EXISTING ROW ON LT
STA 85+62.10 TO STA 90+72.85 **EXISTING ROW ON RT STA 88+02.14 TO STA 90+72.85
STA 95+83.07 TO STA 98+82.60 **EXISTING ROW ON RT
STA 103+82.08 TO STA 115+57.85 **EXISTING ROW ON RT
STA 115+57.85 TO STA 127+24.65 **EXISTING ROW ON LT/RT-NO PROPOSED ROW



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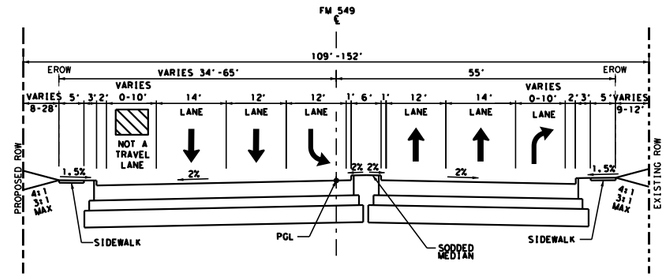

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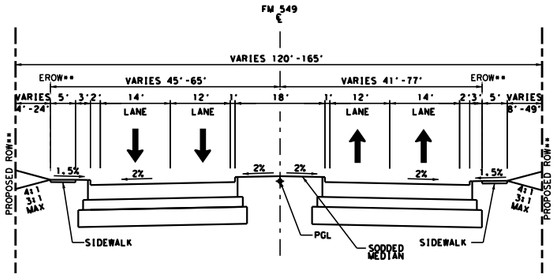

FM 549 PROPOSED TYPICAL SECTION

N.T.S.

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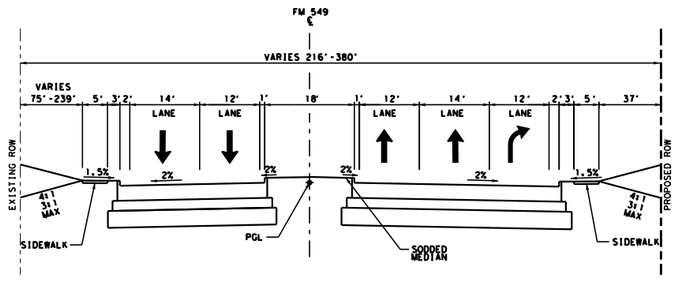
STA 44+76.62 TO STA 46+99.02
STA 77+24.44 TO STA 77+84.93
STA 82+73.50 TO STA 85+62.10
STA 120+51.74 TO STA 127+24.65 **EXISTING ROW LT/RT-NO PROPOSED ROW



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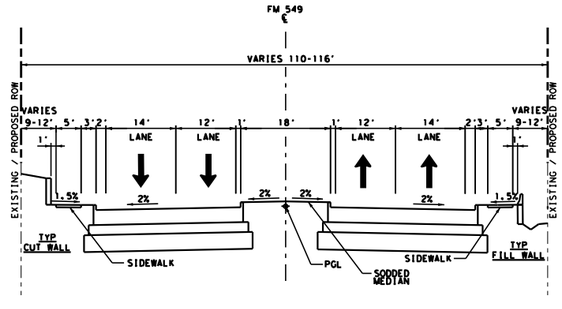
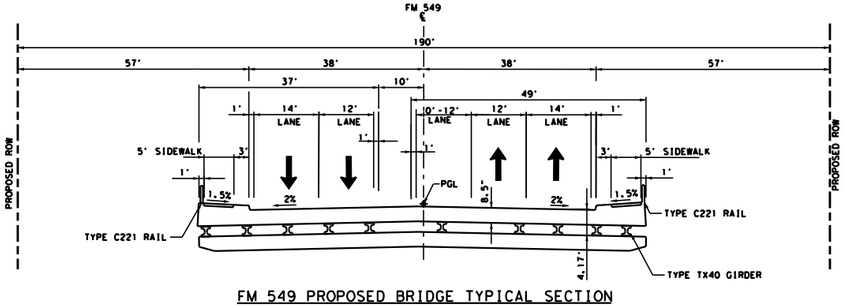


FM 549 PROPOSED RETAINING WALL LOCATIONS

N.T.S.

SOUTHBOUND LANE WALL	NORTHBOUND LANE WALL
STA 55+86.31 - STA 57+80.61	STA 75+75.87 - STA 77+64.95
STA 65+24.54 - STA 67+61.74	STA 88+50.00 - STA 90+14.10
STA 69+40.00 - STA 70+70.00	STA 99+33.08 - STA 100+00.00
STA 71+30.00 - STA 77+40.00	
STA 82+60.00 - STA 86+79.99	



FM 549 PROPOSED BRIDGE TYPICAL SECTION

N.T.S.

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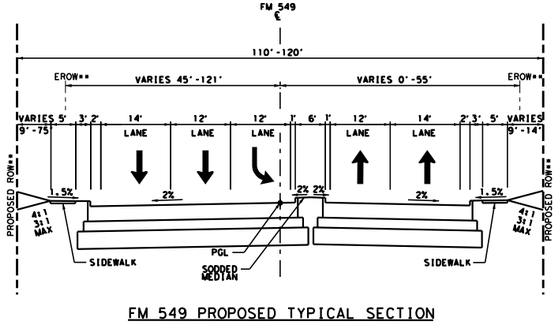
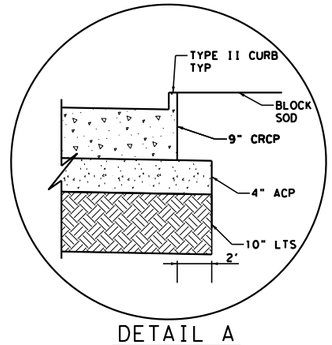
3 SPANS AT 200'



FM 549 PROPOSED TYPICAL SECTION

N.T.S.

STA 39+89.87 - STA 44+76.62 **EXISTING ROW LT-STA 39+89.87 TO STA 42+69.39
STA 72+29.37 TO STA 77+24.44 **EXISTING ROW LT-STA 72+29.37 TO STA 74+35.92
STA 77+84.93 TO STA 82+73.50
STA 90+72.85 TO STA 95+83.07 **EXISTING ROW RT-STA 90+72.85 TO STA 92+39.63/STA 95+37.36 TO STA 95+83.07
STA 98+82.60 TO STA 103+82.08 **EXISTING ROW ON RT



DETAIL A

FINAL PAVEMENT DESIGN PENDING

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