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Proposed Lewisville Canoe and Kayak Launch, Denton County, Texas

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Proposed Lewisville Canoe and Kayak Launch, Denton County, Texas

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**Proposed Lewisville Canoe and Kayak Launch, Denton
County, Texas:
Archeological Survey Report**

Project No. F7X76000

Texas Antiquities Permit No. 8173

Prepared for:

City of Lewisville

U.S. Army Corps of Engineers

Michael L. Mudd, RPA

November 2017



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Abstract

The City of Lewisville is proposing the construction of two canoe and kayak launch areas (North and South) along the Elm Fork Trinity River in Lewisville, Denton County, Texas. The proposed project consists of constructing water craft launch areas, vehicle parking areas, restroom facilities, and access roadways at each launch location. The North launch is located on property owned by U.S. Army Corps of Engineers (USACE) and managed by City of Lewisville. The 4.6-acre North launch is located approximately 300 feet (91.4 meters) downstream of the water discharge at Lewisville Lake Dam. The 4.1-acre South launch is on City of Lewisville property, about 6 river miles (9.7 kilometers) downstream of the North launch. Both proposed launch areas would be constructed on the west banks of the Elm Fork Trinity River.

Jacobs conducted an intensive archeological survey to determine if any cultural resources sites are located within the project area and, if so, evaluate their eligibility for the National Register of Historic Places and/or designation as a State Antiquities Landmark. The investigations at the South launch were conducted under the Texas Antiquities Code (Permit No. 8173); work at the North launch was coordinated with USACE. The Principal Investigator for the project was Michael Mudd. The field survey was conducted 3-5 October 2017 and a total of 80 person-hours were invested for the project.

The intensive archeological survey of the North and South launch areas resulted in the documentation of no prehistoric- or historic-age sites. Based on the findings, it is Jacobs' opinion that no further archeological work is warranted for the project. However, in the unlikely event that any human remains or grave goods are inadvertently discovered at any point during construction, use, or ongoing maintenance of the property, even in previously surveyed areas, all work should cease immediately and the Texas Historical Commission should be notified of the discovery.

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1. Introduction

The City of Lewisville is proposing the construction of two canoe and kayak launch areas (North and South) along the Elm Fork Trinity River in Lewisville, Denton County, Texas. The 4.6-acre North launch is located on property owned by U.S. Army Corps of Engineers (USACE) and managed by the City of Lewisville (City). The North launch is located approximately 300 feet (ft) (91.4 meters [m]) downstream of the water discharge at Lewisville Lake Dam. The 4.1-acre South launch is located on City of Lewisville property, about 6 river miles (9.7 kilometers [km]) downstream of the North launch. Both proposed launch areas would be constructed on the west banks of the Elm Fork Trinity River (Figures 1 and 2).

The intensive archeological survey of the South launch area was conducted under purview of the Texas Antiquities Code (TAC), which requires the consideration of archeological resources prior to construction on any land under the jurisdiction of the State or a subdivision thereof. The investigations at the North launch were coordinated with USACE. The purpose of the investigations were to determine if any cultural resources are located within the project area, and, if so, evaluate their eligibility for the National Register of Historic Places (NRHP) and/or designation as a State Antiquities Landmark (SAL). This document presents the results of archeological investigations at the North and South project areas, which are preceded by descriptions of the project and background research conducted for the project.

1.1 Project Description

The North and South launch areas lie on the west banks of the Elm Fork Trinity River. The proposed project consists of constructing water craft launch areas, vehicle parking areas, restroom facilities, and access roadways at each of the launch areas. Utilities for lighting would not be constructed, and the restrooms would be self-contained and have no utility connections. The deepest subsurface impacts would occur at the launches themselves and would be approximately 3-ft (1 m) deep. The Area of Potential Effect (APE) for cultural resources consists of the North and South launch boundaries at a depth no greater than 1 m. As such, backhoe trenching was not performed during the survey.

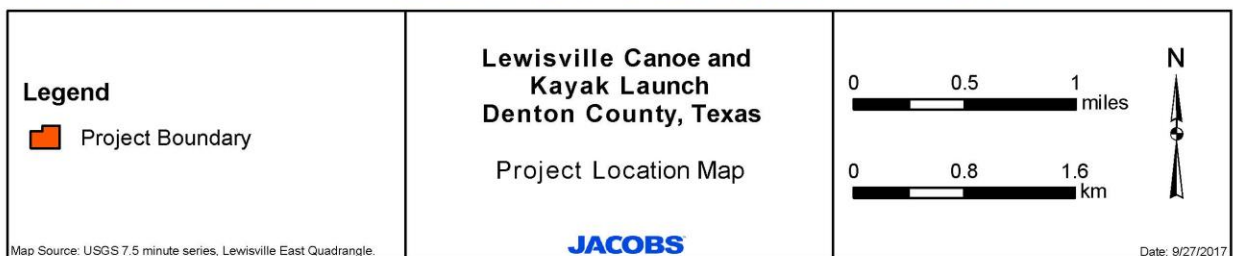
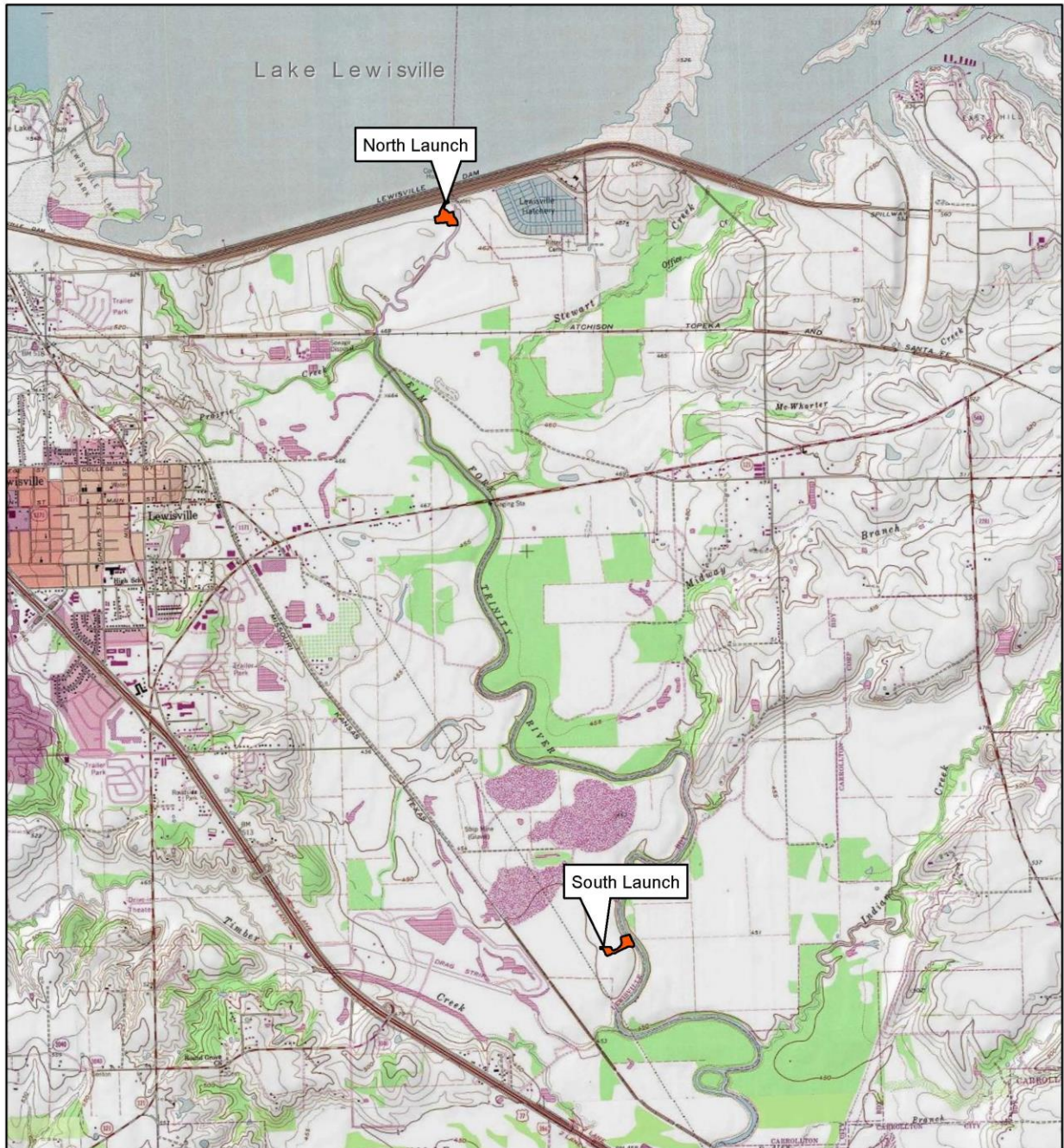


Figure 1: Topographic map of the North and South launch areas (Lewisville East Quadrangle).

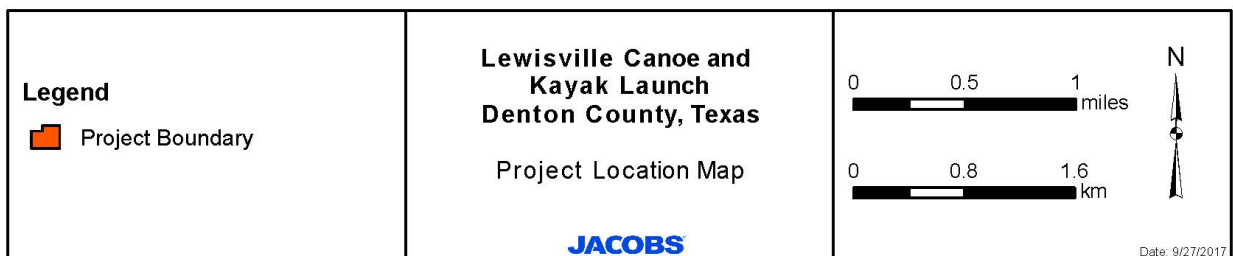


Figure 2: Aerial photograph of the North and South launch areas.

2. Environmental Setting

The proposed North and South launch areas are located on the eastern outskirts of the city of Lewisville, Texas. The project lies in the Upper Trinity River basin in a region known as the Blackland Prairie of north-central Texas. The Blackland Prairie contains nearly flat to gently rolling topography and covers a region that stretches from northeast Texas to the south-central portion of the state. Blackland calcareous clay soils are common and interspersed with gray acidic sandy loam. Historically, the fertile region was widely used for agriculture although ranching has become the mainstay, especially in the Fort Worth Prairie sub-region. The Fort Worth Prairie is a vegetative sub-region of the Blackland Prairie located between the east and west boundaries of the Cross Timbers ecological region (TPWD 2011). The name “Cross Timbers” was coined by early travelers who marked the stark contrast between the timbered areas and the open prairies that frame them to the east and west. Since then, the aggregation of people into towns and cities has fragmented the once continuous forest habitat.

2.1 North Launch

The proposed North launch is located near the water discharge at Lewisville Lake Dam on property known as the Lake Lewisville Environmental Learning Area (LLELA). The LLELA is a nature preserve created by USACE in the early 1990’s and managed by a consortium that includes the University of North Texas, City of Lewisville, Lewisville ISD, University of Texas at Arlington, and Texas A&M University. Native habitats at the LLELA include prairies, wetlands, cross timber forests and bottomland hardwood forests that support a variety of mammal, waterfowl and amphibian species (LLELA 2017). The LLELA provides hiking trails, camping and fishing, birding opportunities, and paddle boat launch areas to the public.

The North launch area currently provides river access for paddle boats and fishing, and access to hiking trails that lead off to camping areas located downstream (south) of the project area. Previous ground disturbing activities at the North launch consist of land clearing, installation of erosion controls along the river bank, and construction/grading of hiking trails, gravel roads and vehicle parking areas (Figures 3 and 4). The topography in this area is flat to gently rolling.

2.2 South Launch

The proposed South launch is located at the southwest corner of Hebron Parkway and the Elm Fork Trinity River (Elm Fork). The property is owned by the City and currently not in use. Previous ground disturbing activities in this area consist of landscaping/terracing, river bank stabilization (Figure 5) and the construction of a large pond immediately south of the project area (Figure 6). Prior to construction of the pond around a decade ago, the area was used as a tree farm beginning around the 1930’s (Largent 2004).

The topography at the South launch consists of a levee-like landform that encompasses the majority of the project area and adjoins the lower lying Elm Fork floodplain to the north (Figure 7). The northeast corner of the South launch contains the mouth of an unnamed drainage to the Elm Fork. This drainage may be an abandoned Elm Fork river channel and/or a borrow area as postulated during previous archeological investigations in the area (Largent 2004). The drainage channel is within the Elm Fork floodplain and frequently floods. The proposed watercraft entry/exit point is located along the south bank of the drainage near its mouth.



Figure 3: Landscaping and trail/road cuts common at the North launch; facing southeast.



Figure 4: Gravel road and parking areas common at the North launch area; facing east.



Figure 5: Bank stabilization along the Elm Fork at the South launch; facing south.



Figure 6: Overview of South launch and pond to the south; facing southeast.



Figure 7: Overview of topography at the South launch; facing southeast.

3. Research Design

The cultural resource investigations for the project consisted of background research, an intensive archeological survey, and the production of a report suitable for review by the City, THC and USACE in accordance with the *Rules of Practice and Procedure*, (Texas Administrative Code, Title 13, Chapter 26) and the Council of Texas Archeologists (CTA) *Guidelines for Cultural Resource Management Reports*.

3.1 Background Research

The archeological survey was preceded by background research to determine if any cemeteries and/or archeological sites, including those listed on or eligible for the NRHP or designation as an SAL, have been documented within or in the immediate vicinity of the project area. In addition, the local physiographic conditions were evaluated in terms of the likelihood for preservation of archeological materials. The background research included a review of previous cultural resource investigations in north central Texas, as well as online databases including the Texas Archeological Sites Atlas (Atlas) maintained by the THC and Texas Archeological Research Laboratory (TARL), the National Resource Conservation Service (NRCS) Web Soil Survey, and the U.S. Geological Survey (USGS) Texas Geology Map Viewer. These data were used to develop an archeological context for the project, evaluate the physiographic setting of the APE and inform the intensive field survey.

3.1.1 Soils and Geology

According to the Web Soil Survey (NRCS 2017), the soils at the North launch consist of Ovan clay, occasionally flooded (63) and Ovan clay, frequently flooded (64). These soils occur on floodplains and consist of Quaternary-age clayey alluvium. On the South launch, the soil is defined as Frio silty clay, 0 to 1 percent slopes, occasionally flooded (33). This unit occurs along floodplains and is characterized as calcareous loamy and/or clayey alluvium derived from limestone and shale (NRCS 2017). According to the Texas Geology Map Viewer (USGS 2017), the underlying geology at both launch areas consists of Holocene-age alluvium. Soil and geologic deposits of Holocene-age are considered to have potential for containing buried archeological materials, depending on the degree of stratigraphic integrity and local preservation conditions.

3.1.2 Archeological Context

The review of the Atlas indicated a total of 8 archeological sites and 1 cemetery documented within 1-mile (1.6 km) of the proposed launch areas (Figure 8). The prevailing temporal period among this sample is prehistoric, with site types consisting mainly of campsites and shell middens (Table 1). No cemeteries or previously documented archeological sites listed on or eligible for the NRHP or SAL designation have been documented within or in close proximity of the North and South launch areas. However, one site with an undetermined eligibility status, 41DN488, is located within the boundaries of the South launch. It consists of a shell lens buried with burned rock, burned earth, ash and charcoal along the west bank of the Elm Fork. The site was initially recorded by Alan Skinner in 1992 and revisited in 2004 by Floyd Largent. Based on the sketch maps and site descriptions provided in the site records, 41DN488 was misplotted on the Atlas map. The site forms indicate the site is located on the southwest corner of the intersection at the Elm Fork and Hebron Parkway and on the south bank of the unnamed drainage, which places 41DN488 in the eastern portion of the South launch (see Figure 8).

Site locations redacted from document.

Figure 8: Archeological sites and cemeteries found within 1-mile of the project area (USGS Lewisville East Quadrangle).

Table 1: Cultural resources sites within 1-mile (1.6 km) of the North and South launch areas (Atlas 2017).

Site No./Cemetery Name	Time Period	Site Type	Eligibility Status	Launch Area	Approx. Distance from APE
41DN69	Prehistoric	Shell Midden	Ineligible	South	1.3 km southwest
41DN334 (no site record)	Unknown	Unknown	Unknown	South	1.5 km northeast
41DN418	Historic	Farmstead	Undetermined	North	1.4 km northeast
41DN488	Prehistoric	Shell Midden	Undetermined	South	within South launch
41DN490	Prehistoric	Campsite	Ineligible	South	550 m south
41DN500	Prehistoric	Campsite	Ineligible	South	500 m south
41DN530	Historic	Bridge Piers	Undetermined	North	1.2 km southwest
41DN539	Prehistoric	Campsite	Potentially eligible	South	1 km south
Ritter Cemetery	Historic	Cemetery	Historic Texas Cemetery	North	900 m east

In 1992, Skinner observed a shell lens or midden at 41DN488 located around 100 centimeters below the modern ground surface (cmbs). Largent described a similar feature at a depth of 200-205 cmbs and attributed the discrepancy in depth to possible multiple components or more likely, additional burial of the site during subsequent construction activities nearby. The 5- to 10-cm thick shell deposit measured 107 cm in length and was found in close association with burned earth and charcoal interpreted as part of a prehistoric hearth feature.

During previous site investigations, 41DN488 was discovered during backhoe trenching, but due to the site's extensive depth, soil conditions, and limited research potential (Largent 2004), it did not undergo detailed analyses or NRHP/SAL eligibility testing. Following the 2004 investigations, it was determined that the site would not be impacted and no further study was warranted. Backhoe trenching at 41DN488 was beyond the scope of the current survey given that the proposed 1-m construction depths are not likely to encroach upon the site.

3.1.3 Chronological Framework

Hunter-gatherer encampments containing concentrations of burned rock/earth and charcoal found in association with dense shell deposits such as those observed at 41DN488 are common along the Upper Trinity River basin. Sites of this type typically date to the Late Archaic period, which in north-central Texas dates between 1550 B.C. and A.D. 700 (Peter and McGregor 1988; Prikryl 1990). The underrepresentation of Early Archaic (6550-4050 B.C.) and Middle Archaic (4050-1550 B.C.) period sites on the Upper Trinity basin has been attributed to a

substantial occupation of the region during the Late Archaic perhaps due to improved environmental conditions. In general, the Late Archaic in north-central Texas is marked by peak population density and evidence of decreased mobility, which may reflect increasing use of locally available faunal and floral resources, and/or the development of group territories (Prikryl 1990). Investigations at Joe Pool Lake (Peter and McGregor 1988) and Lake Ray Roberts (Ferring and Yates 1997) indicate that Late Archaic site assemblages were apparently left by small bands of foraging hunters and gatherers who occupied different localities on a seasonal basis.

Late Archaic period settlement and subsistence patterns are manifested in the occurrence of discrete burned rock concentrations (e.g. rock-lined hearths), local tool stone, and faunal assemblages that suggest deer, rabbit, turtle and freshwater mussel shells were primary food resources (Ferring and Yates 1997:6). Late Archaic site sizes are typically small, reflecting ephemeral occupations, and are commonly found shallow buried below floodplains along the Trinity River basin. Stratigraphic preservation of features and biotic remains is common in this area along with anthropogenic deposits (e.g., shell lenses) occasionally exposed along stream cutbanks.

3.2 Intensive Archeological Survey

The purpose of the intensive survey was to determine whether any prehistoric- or historic-age cultural resources potentially eligible for the NRHP or SAL designation would be impacted by proposed construction at the North and South launch areas. The survey entailed surface and river bank inspection where permitted by vegetative cover, and subsurface shovel testing in the APE. Per the THC/CTA Survey Standards, the minimum number of shovel tests consisted of 10 for the North launch (4.6 acres) and 8 for the South launch (4.1 acres). Given the presence of site 41DN488 at the South launch, investigations were concentrated in this area but limited to the project's vertical APE of 1 m. In addition to the site 41DN488 records, the physiographic information gathered during background research was referenced in the evaluation of existing ground conditions and stratigraphic integrity.

Shovel tests were conducted in settings that exhibited potential for cultural materials in intact buried context. All matrices were excavated at 20-cm thick intervals and screened through 0.25-inch (0.635-cm) hardware cloth or sorted by hand and shovel when soil moisture and clay content required. Excavated matrices were described using standard texture classifications and color designations from the Munsell Soil Color Charts, 1998 Revised Edition. Shovel test depths were recorded in cmbs and excavation was terminated upon reaching 100 cmbs, bedrock or culturally sterile soils such as dense homogenous clay. Given that the depths of construction would not exceed 1 m, backhoe trenching was not performed during the survey.

Written documentation was made in terms of the terrain, vegetation, soils, landforms and degree of previous ground disturbance in and around the project area. Standardized forms were used to record shovel test data and log digital photographs. The location of each shovel test was recorded with a Global Positioning System (GPS) unit using the Universal Transverse Mercator (UTM) coordinate system and North American Datum (NAD) 83. Maps showing shovel test locations are provided in the Results of Investigations section.

The survey employed a non-collection policy for non-diagnostic cultural materials (e.g., lithic debitage, shell, burned rock, and non-descript historic glass and metal scrap). These materials were to be described, sketched and/or photo-documented in the field and replaced where they were found. In the event diagnostic cultural materials (e.g., projectile points, ceramics and historic items with maker's marks) were encountered, they were to be collected and placed in re-sealable plastic bags labeled with relevant provenience and project information. In addition, site locations were to be GPS-recorded using UTM NAD 83 and assigned a project-specific temporary identification number in the field.

Final submittal of this report to the THC includes a cover letter, abstract form, project area shapefile, and tagged PDF files of the report in both restricted (with site locations) and public (without site locations) versions. Jacobs also provides paper copies of the public version to the THC's distribution list as required by state guidelines. Curation of the project materials has been coordinated with the Center for Archaeological Studies (CAS) at Texas State University.

4. Results of Investigations

The intensive archeological survey resulted in the documentation of no prehistoric- or historic-age archeological sites within the APE. Based on the findings, it is Jacobs' opinion that no further archeological work is warranted for the project. A total of 11 shovel tests were conducted at the North launch and 9 were excavated at the South launch. Maps of the shovel test locations at the North and South launch areas are provided in Figures 9 and 13, respectively; the shovel test data are included in Appendix A. The intensive archeological survey provided information in terms of the existing ground conditions at the proposed North and South launch areas with respect to the potential presence and preservation of archeological materials. This section discusses these and other pertinent findings during the intensive survey.

4.1 North Launch

The North launch contains the lower and upper terraces of the Elm Fork Trinity River. The lower terrace encompasses the eastern half of the project area, sloping gently eastward toward the Elm Fork. The surrounding timberland indicates that the project area was once densely wooded, having since been cleared of native timber to accommodate recreational activities at the LLELA. In addition to mechanized land clearing, vehicle and foot traffic has removed vegetation in some areas, exposing loose sandy sediment that is actively eroding (see Figure 3). A dense layer of gravel has been installed on much of the lower terrace surface and river banks, which along with grading has removed a cutbank profile. Located at the lower terrace's break in slope, the upper terrace is mostly flat to gently rolling and is comprised almost entirely of cleared and landscaped areas dissected by gravel roads. Dense gravelly fill and grassy areas hinder visibility of the native ground surface, which has been improved to accommodate vehicle and pedestrian traffic.

There is a degree of variability between the different soil types encountered at the North launch. For example, four of the six shovel tests excavated on the North launch lower terrace (Shovel Tests N-1, N-2, N-3, and N-11) contained deep (i.e., in excess of 1 m) sandy sediment (Figure 10) with discrete lenses of river gravels, suggesting episodic flooding; however, further geomorphological assessments are required to determine the precise origin and stratigraphic sequence in this area. The remaining two shovel tests on the lower terrace exhibited dense clay loam with heavy disturbance in the form of road gravels, modern glass and plastic debris; below the fill, the soil was mixed and indurated sandy clay.

Similar compact and disturbed soils were encountered on the North launch upper terrace. Stratigraphy in this area was typically mixed loamy clay with road gravels and asphalt debris atop indurated sandy clay (Figure 11). Soils resembling the NRCS description of Ovan clay were occasionally encountered below the fill material at shallow depths. This soil was dense and indurated, which is likely the product of mechanized grading of the gravel road and lack of available moisture due to dense upper layers of gravelly fill. No underlying geologic deposits were encountered in any of the shovel tests or visible along exposed creek banks. These deposits are likely beyond 1 m given that the lower terrace is part of a point bar that frequently floods. Figure 12 illustrates the difference in elevation between the South launch point bar terrace and the opposing natural levee bank deposits.

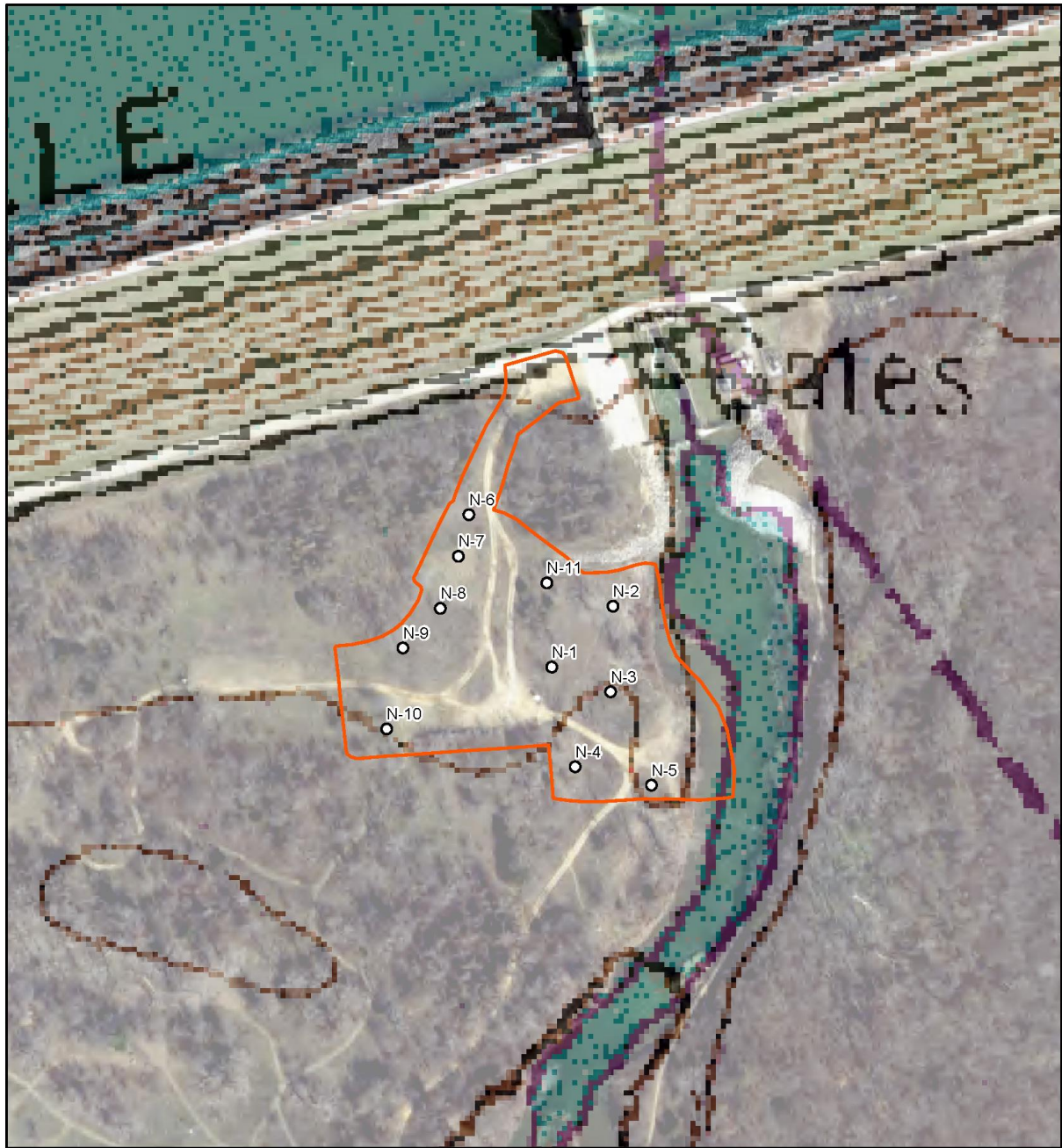


Figure 9: Shovel test locations on the proposed North launch (aerial photography superimposed to show existing conditions).



Figure 10: Shovel test conducted at the North launch lower terrace with deep sandy sediment; facing down.



Figure 11: Shovel test at the North launch containing indurated mixed clay at shallow depth; facing down.



Figure 12: Elm Fork Trinity River from North Launch, showing the opposing natural levee deposits; facing southeast.

4.2 South Launch

The proposed boundaries for the South launch follow an elevated landform that separates a large pond to the south and the Elm Fork floodplain to the north. The landform contains a two-track dirt road that circumscribes the pond and encompasses a large portion of the project area. The difference in elevation between the project area and the lower-lying terrain to the north is some 8 to 10 ft; however, the USGS topographic map, Lewisville East Quadrangle, depicts this area as relatively flat. This suggests that most of the project area has been built up artificially, perhaps to maintain overbank flooding of the Elm Fork and support containment of the neighboring pond waters. Vegetation at the South launch consists of dense hardwoods concentrated along stream banks with overgrown grasses and scrub brush throughout the remainder of the project area, both of which hinder visibility of the modern ground surface.

The majority of shovel tests were placed along the artificial levee (Figure 13), which is composed of dense and blocky homogenous clay along the edge of the Elm Fork terrace and further to the west along the landform (Figure 14). This soil composition does not resemble the Frio silty clay alluvium described on the Web Soil Survey or site 41DN488 records. In addition, neither of the site records (Largent 2004; Skinner 1992) describes an elevated landform dissecting an open floodplain (see Figure 7). The field observations suggest that fill material was used to elevate and stabilize the western river banks perhaps in lieu of the active Elm Fork floodplain and the previous tree farm operations to the south. The origin of the fill material is unknown, but the borrow source could be dredge from the channel and/or pond.

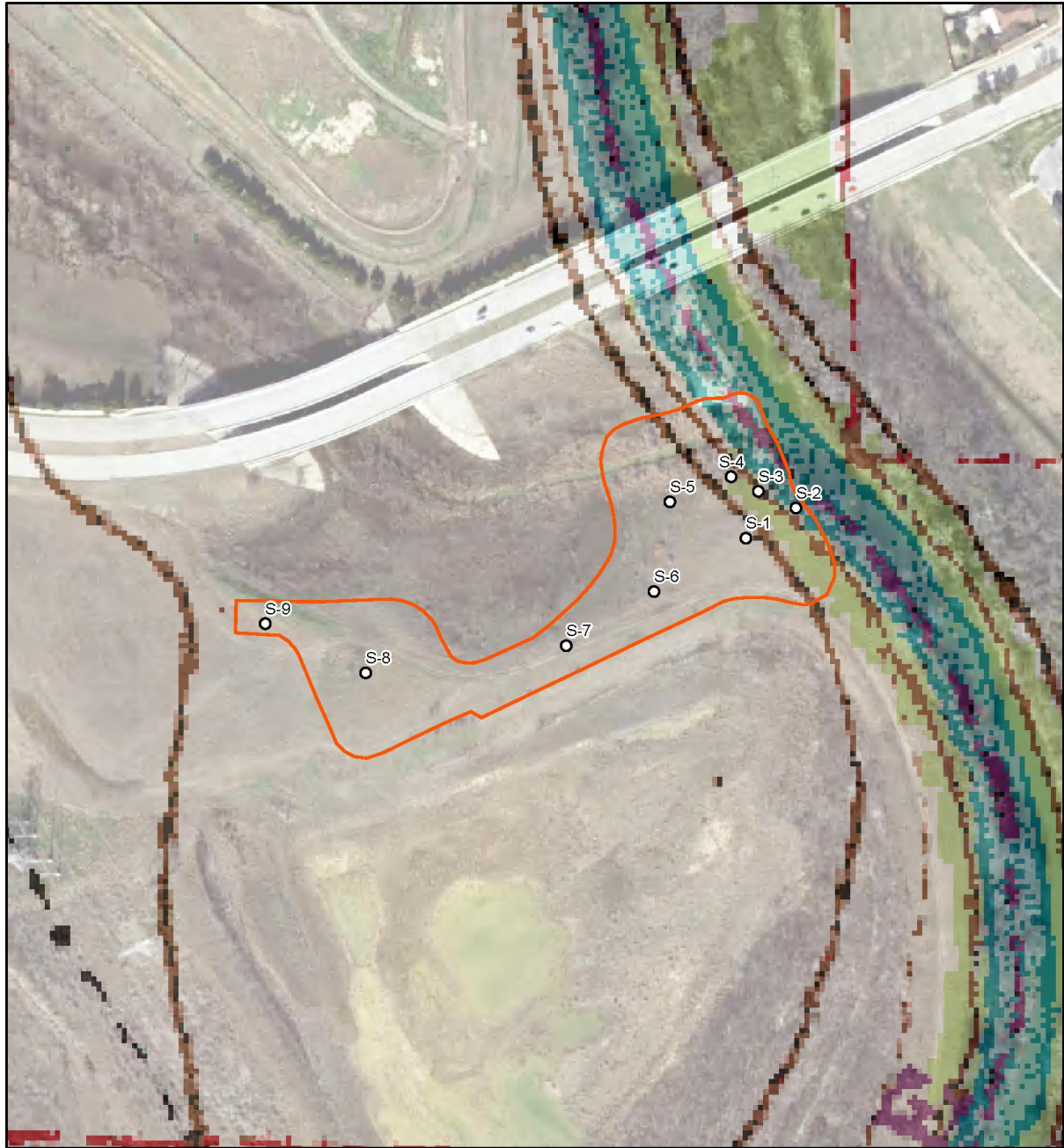


Figure 13: Shovel test locations on the proposed South launch area (aerial photography superimposed to show existing conditions).



Figure 14: Shovel test at the South launch showing typical dense and blocky clay; facing down.

Of the nine shovel tests dug at the South launch, only one (S-4) contained deep sediment, which consisted of fine sandy loam down to 1 m (Figure 15). The location of this shovel test at the mouth of the drainage, along with its depth and loose structure, suggests that it is recent alluvium that has not been removed or capped from river bank improvements, which are common along this portion of the Elm Fork (Figure 16). Given the amount of fill and in light of the project's vertical APE, no geologic deposits were encountered during the survey of the South launch.

Four shovel tests (S-1, S-2, S-3, and S-4) were excavated in the vicinity of site 41DN488. With exception to the deep sandy deposits discussed above, the shovel tests near the site contained dense blocky clay similar to the soil depicted above in Figure 14. The homogenous clay extends to a depth of at least 60 cmbs where it hardens from lack of moisture. In addition to the sterile nature of the soil, no remnants of site 41DN488 (e.g., burned rock or shell debris) were encountered in any of the shovel tests or observed in the adjacent cutbank profile. If the site was last encountered at a depth some 2 m below the surface, it is beyond the vertical APE for this project. The available evidence suggests that 41DN488 has since been removed or further buried by the improvements along the Elm Fork banks. Therefore, it is unlikely that site 41DN488 or any undocumented archeological deposits will undergo any adverse effects resulting from construction at the proposed South launch area.



Figure 15: Shovel test S-4 containing deep sandy sediment on the South launch; facing down.



Figure 16: Elm Fork Trinity River and unnamed drainage confluence at the South launch, showing artificial bank stabilization; facing southwest (project area is in the background on far side of drainage).

5. Summary and Recommendation

The City is proposing the construction of the North and South canoe and kayak launch areas along the Elm Fork Trinity River in Lewisville, Denton County, Texas. The 4.6-acre North launch is located on property owned by USACE and managed by the City. The North launch is located approximately 300 ft (91.4 m) downstream of the water discharge at Lewisville Lake Dam. The 4.1-acre South launch is located on City property, about 6 river miles (9.7 km) downstream of the North launch.

The North and South launch areas underwent an intensive archeological survey. The South launch survey was conducted under purview of Texas Antiquities Code (TAC permit no. 8173), which requires the consideration of archeological resources prior to construction on any land under the jurisdiction of the State or a subdivision thereof. The survey of the North launch was coordinated with USACE. The purpose of the investigations were to determine if any cultural resources are located within the project area, and, if so, evaluate their eligibility for the NRHP and/or SAL designation. Per the THC/CTA Survey Standards, the minimum number of shovel tests consisted of 10 for the North launch (4.6 acres) and 8 for the South launch (4.1 acres). Jacobs exceeded this minimum by excavating a total of 11 shovel test at the North launch and 9 shovel tests at the South launch.

The intensive archeological survey resulted in the documentation of no prehistoric- or historic-age cultural resources sites within the project's APE. Based on the findings, it is Jacobs' opinion that no further archeological work is warranted for the Lewisville Canoe and Kayak Launch project. However, in the unlikely event that any human remains or grave goods are inadvertently discovered at any point during construction, use, or ongoing maintenance of the property, even in previously surveyed areas, all work should cease immediately and the THC should be notified of the discovery.

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Appendix A: Shovel Test Data

Waypoint No.	Shovel Test No.	Easting	Northing	Depth (cmbs)	Soil Color	Soil Texture	Cultural Materials	Comments
N-1	1	689987	3660570	0-20	10YR 5/6	gravelly sandy loam	None	common river gravels
				20-40	10YR 5/6	gravelly sandy loam	None	moderate river gravels
				40-60	10YR 5/6; 10YR 6/2	mixed sandy loam	None	few river gravels
					10YR 6/3	gravelly clay		
				60-80	10YR 5/6; 10YR 6/2	mixed sandy loam	None	
					10YR 6/3	clay	None	
				80-100	10YR 5/6	very gravelly sandy loam with oxidation	None	dense river gravels; old flood deposit(?)
N-2	2	690016	3660590	0-10	10YR 5/4	gravelly fine sandy loam	None	moderate river gravels; modern glass
				10-20	10YR 5/6	gravelly fine sandy loam	None	
				20-40	10YR 5/6	sandy loam	None	few river gravels; modern glass
				40-60	10YR 5/6	sandy loam	None	
				60-80	10YR 6/2	fine sand	None	
				80-100	10YR 6/2	compact sand	None	indurated soil

Waypoint No.	Shovel Test No.	Easting	Northing	Depth (cmbs)	Soil Color	Soil Texture	Cultural Materials	Comments
N-3	3	690015	3660550	0-20	10YR 5/4; 10YR 5/2; 10YR 5/6	mixed sandy loam	None	river pebbles common
				20-40	10YR 5/4	sandy loam	None	common river gravels
				40-60	10YR 5/3	very gravelly sand	None	abundant river gravels
				60-70	10YR 5/3	very gravelly sand	None	abundant river gravels
				70-75	10YR 6/1	gravelly sand	None	moderate river gravels
				75-80	10YR 2/1	clay	None	basal
N-4	4	689998	3660520	0-10	10YR 5/4	dense sandy clay loam		
				10-20	10YR 5/4; 10YR 7/1	very compact mixed clay loam	None	indurated soil
N-5	5	690035	3660510	0-20	10YR 5/4	sandy loam	None	modern glass/plastic; disturbed fill
					10YR 4/2	clay loam		
				20-40	10YR 3/2	gravelly clay sand	None	common gravels; disturbed fill from nearby road
					10YR 5/8	gravelly sandy clay loam		

Waypoint No.	Shovel Test No.	Easting	Northing	Depth (cmbs)	Soil Color	Soil Texture	Cultural Materials	Comments
				40-60	10YR 3/2; 10YR 5/8; 10YR 6/1	dense sandy clay loam	None	disturbed and very compact
N-6	6	689947	3660640	0-20	10YR 4/2	silty clay loam	None	upper terrace
				20-40	10YR 5/6	clay	None	basal
N-7	7	689942	3660620	0-20	10YR 4/2	gravelly silty clay	None	disturbed fill with gravels and asphalt fragments
				20-40	10YR 5/2	gravelly clay loam	None	moderate gravels
				40-60	10YR 3/2	dense clay	None	basal
N-8	8	689933	3660590	0-20	10YR 4/2	clay loam	None	disturbed fill with gravels and asphalt fragments
				20-40	10YR 4/2	clay loam	None	disturbed fill with gravels and asphalt fragments
				40-60	10YR 5/6	dense clay	None	basal
N-9	9	689915	3660570	0-20	10YR 3/2	clay loam	None	heavy organic debris
				20-40	10YR 5/8	sandy clay	None	inclusions
					10YR 8/3	sand		
				40-60	10YR 5/8	dense clay sand	None	indurated soil

Waypoint No.	Shovel Test No.	Easting	Northing	Depth (cmbs)	Soil Color	Soil Texture	Cultural Materials	Comments
					10YR 8/3	sand		
N-10	10	689908	3660540	0-20	10YR 3/2	clay loam	None	moderate road gravels
				20-40	10YR 3/2	clay loam	None	
					7.5YR 5/6; 7.5YR 7/3	mixed sand	None	
				40-60	10YR 3/2	clay loam	None	compact road fill
					7.5YR 5/6; 7.5YR 7/3	mixed sand	None	
N-11	11	689984	3660610	0-20	10YR 5/4	fine sandy loam	None	lower terrace sandy alluvium
				20-40	10YR 5/6	fine sandy loam	None	
				40-60	10YR 5/6	fine sandy loam	None	
				60-80	10YR 6/2; 10YR 5/6	mixed fine sand	None	
				80-100	10YR 5/2	fine sand	None	
S-1	1	691452	3654460	0-20	10YR 3/2	blocky clay	None	homogenous clay; likely levee fill
				20-40	10YR 3/2	blocky clay	None	homogenous clay; likely levee fill
				40-60	10YR 3/2	blocky clay	None	homogenous clay; likely levee fill

Waypoint No.	Shovel Test No.	Easting	Northing	Depth (cmbs)	Soil Color	Soil Texture	Cultural Materials	Comments
S-2	2	691469	3654490	0-20	10YR 3/2	clay sand	None	near site 41DN488
				20-40	10YR 4/2	blocky clay	None	non-native soils
				40-60	10YR 4/2	blocky clay	None	
S-3	3	691451	3654500	0-20	10YR 4/3	sandy clay	None	disturbed and compact fill all the way down
					10YR 3/1	blocky clay	None	
				20-40	10YR 4/3	sandy clay	None	
					10YR 3/1	blocky clay	None	
				40-60	10YR 4/3	sandy clay	None	
					10YR 3/1	blocky clay	None	
				60-80	10YR 3/1	dense blocky clay	None	
S-4	4	691438	3654500	0-20	10YR 5/3	fine sandy loam	None	at drainage and river
				20-40	10YR 5/3	fine sandy loam	None	native sandy alluvium all the way down
				40-60	10YR 6/2	fine sandy loam	None	
				60-80	10YR 6/2	fine sandy loam	None	
				80-100	10YR 6/2	fine sandy loam	None	
S-5	5	691432	3654490	0-20	10YR 3/2	dense clay	None	levee/berm fill

Waypoint No.	Shovel Test No.	Easting	Northing	Depth (cmbs)	Soil Color	Soil Texture	Cultural Materials	Comments
				20-40	10YR 3/2	dense clay	None	levee/berm fill
S-6	6	691401	3654450	0-20	10YR 3/2	dense clay	None	fill; along elevated two-track
				20-40	10YR 3/2	dense clay	None	fill; along elevated two-track
S-7	7	691359	3654420	0-20	10YR 3/2	dense clay	None	fill; along elevated two-track
				20-40	10YR 3/2	dense clay	None	fill; along elevated two-track
S-8	8	691263	3654410	0-20	10YR 3/1	dense clay	None	levee/berm fill
				20-40	10YR 3/1	dense clay	None	levee/berm fill
S-9	9	691215	3654430	0-20	10YR 4/3	sandy clay	None	levee/berm fill
					10YR 3/2	clay	None	levee/berm fill
				20-40	10YR 3/1	dense clay	None	levee/berm fill
				40-60	10YR 3/1	dense clay	None	levee/berm fill