ENVIRONMENTAL ASSESSMENT
REEVALUATION
SH 99 IMPROVEMENTS

SEGMENT D
FRANZ ROAD TO US 59

HARRIS AND FORT BEND COUNTIES, TEXAS

CSJs 3510-04-901, 3510-04-004, 3510-04-006, and 3510-05-010

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ACRONYMS AND ABBREVIATIONS

Acronym	Definition
ADT	Average Daily Traffic
APE	Area of Potential Effect
AST	Aboveground Storage Tanks
ASTM	American Standards for Testing and Materials
CAA	Clean Air Act
CALINE	The EPA's current regulatory models, CALINE3 and CAL3QHC, that were developed and validated to predict episodic concentrations of carbon monoxide to determine compliance with the NAAQS.
CEQ	Council of Environmental Quality
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Information Service Act
CERCLIS	Comprehensive Environmental Response, Compensation, and Liability Information Service
CFR	Code of Federal Regulations
CGP	Construction General Permit
CMS	Congestion Management System
CMSA	Construction Mobile Source Air
CSJ	Control Section Job
DE	Diesel exhaust
DOT	Department of Transportation
EA	Environmental Assessment
EPA	US Environmental Protection Agency
ERNS	Emergency Response Notification System
ETC	Electronic Toll Collection
FHWA	Federal Highway Administration
FM	Farm-to-Market
FONSI	Finding of No Significant Impact
FR	Federal Register
GAC	Galveston Area Council
HB	House Bill
HGAC	Houston Galveston Area Council
IH	Interstate Highway
IP	Individual Permit
IRIS	Integrated Risk Information System
LEP	Limited English Proficiency
LI	Linguistically Isolated
LUST	Leaking Underground Storage Tank
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MPO	Metropolitan Planning Organization
MSAT	Mobile Source Air Toxics
MSW	Municipal Solid Waste
NAAQS	National Ambient Air Quality Standards
NAD	North American Datum
NATA	National Air Toxics Assessment

Acronym	Definition
NCHRP	National Cooperative Highway Research Program
NEPA	National Environmental Policy Act
NFIP	National Flood Insurance Program
NFRAP	No Further Remedial Action Planned
NMHC	Non-methane hydrocarbon
NOI	Notice of Intent
NOT	Notice of Termination
NPL	National Priority List
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NWI	National Wetlands Inventory
PA	First Amended Statewide Programmatic Agreement for Cultural Resources
PALM	Potential Archeological Liability Map
PDR	Purchase of Development Rights Programs
PM	Particulate Matter
QHC	Qualified Historical Consultant
RCRA	Resource Conservation and Recovery Act
RCRIS	Resource Conservation and Recovery Information System
ROW	Right of Way
RSA	Resource Study Area
RTHL	Recorded Texas Historic Landmarks
RTP	Regional Transportation Plans
SAL	State Archeological Landmarks
SFND	Superfund
SH	State Highway
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SPIL	Spill State of Texas Incident List
STFS	State Superfund Sites
SWP3	Storm Water Pollution Prevention Plan
TAQA	Traffic Air Quality Analysis
TAZ	Traffic Analysis Zone
TCEQ	Texas Commission on Environmental Quality
TCM	Transportation Control Measure
TDC	Texas Department of Corrections
THC	Texas Historical Commission
TIP	Transportation Improvement Program
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks & Wildlife Department
TSD	transport, storage, or disposal
TSM	Transportation System Management
TWDB	Texas Water Development Board
US	United States Highway
USACE	United States Army Corps of Engineers
USC	United States Code
USCG	United States Coast Guard
USDA	United States Department of Agriculture

Acronym	Definition
USGS	United States Geological Survey
UST	Underground Storage Tank
UTM	Universal Transverse Mercator
VMT	Vehicle Miles Traveled

I. INTRODUCTION

This environmental assessment (EA) reevaluation studies the socioeconomic, physical, and biological environmental impacts resulting from the proposed Texas Department of Transportation (TxDOT) project to construct and toll 12 previously approved overpasses, approaches to those overpasses, and main lanes located between the proposed overpasses along Segment D of Grand Parkway, also known as State Highway (SH) 99. This document will reevaluate the EA that was completed for Segment D (*Environmental Assessment for Grand Parkway [SH 99] from Franz Road to US 59*) in October 1987 and evaluate tolling the portions of Segment D that have not been constructed, because of funding has not been available. Additonally, the proposed West Airport Boulevard intersection and overpass has moved 230 feet north within the ROW. This change has occurred to align the overpass with the future West Airport Boulevard because the future road's alignment has shifted slightly (*Exhibt 2D*). The 1987 EA did not address tolling but included the construction of the 12 overpasses, the associated approaches, and main lanes listed below (*Figures 1* and *2A – 2L*):

- West Riverpark Drive (*Figure2A*)
- New Territory Boulevard (*Figure 2B*)
- FM 1464, US Highway 90 A, and Sandhill Drive (one structure will span all three roadways) [*Figure 2B*]
- West Airport (*Figure 2D*) [shifted 230 feet north from original alignment]
- Harlem Road (*Figure 2E*)
- Mason Road (*Figure 2F*)
- Morton Road (*Figure 2F*)
- Peek Road (*Figure 2G*)
- Bellaire Boulevard (*Figure 2G*)
- Farm-to-Market (FM) 1093 (*Figure 2H*)
- Interstate Highway (IH) 10 and Merchantile Parkway (one structure will span both roadways) [*Figure 2L*]
- Colonial Parkway (*Figure 2L*)

No design changes have occurred since the 1987 EA, other than the movement of the West Airport intersection, only an operation change of tolling the remaining 12 overpasses that have not been constructed. No ROW changes have occurred since the 1987 EA. Segment D of the Grand Parkway extends 20.2 miles from U.S. Highway (US) 59 in Fort Bend County, Texas, to Franz Road in Harris County, Texas. Construction of the overpasses would also include the approaches, and in some areas, the main lanes at each of the 12 locations. The proposed main lanes would connect existing sections of main lanes that have been constructed. The proposed main lanes addressed in this

reevaluation were not constructed since they are associated with the 12 overpasses that have not been constructed. All construction would occur within the existing right-of-way (ROW). Construction costs total approximately $224.9 million. The proposed project (CSJs 3510-04-901, 3510-04-004, 3510-04-006, and 3510-05-010) is listed in the *2006-2008* and *The 2008-2011 Transportation Improvement Program for the Houston-Galveston Transportation Management Area.* The overpasses, approaches, and main lanes are listed as projects undergoing Environmental Assessment with possible toll components. There are no TxDOT funds identified for the construction of the 12 overpasses, approaches, or main lanes.

The original document (1987 EA) was approved for a six-lane limited access freeway. This document will reevaluate an interim design of the previously approved document. The interim design includes construction of all the previously approved overpasses, associated approaches, and main lanes (four-lanes) located between the 12 overpasses. This interim design would provide and complete a four-lane limited access freeway with continuous main lanes from Franz Road to US 59. This interim design does not include two main lanes (one in each direction) and a direct connector from FM 1093/Westpark that are part of the ultimate roadway design. The ultimate design of a six-lane limited access freeway with a northbound direct connector from FM 1093/Westpark would be reevaluated in another document. Additionally, an overpass at US 59 is part of the proposed Grand Parkway Segment C project.

History of Segment D

Segment D had been on county planning documents since the early 1960s. An EA was completed for Segment D (*Environmental Assessment for Grand Parkway [SH 99] From Franz Road to US 59*) in October 1987. A Finding of No Significant Impact (FONSI) was issued by TxDOT on December 3, 1987; however, the 1987 EA was not reviewed by the Federal Highway Administration (FHWA), since the construction of Segment D did not involve federal funding at that time. Since 1987, the required ROW for Segment D has been acquired by TxDOT. Grand Parkway was planned as a six-lane limited-access freeway, with frontage roads planned only in areas where existing access would be severed by the Grand Parkway. All of the frontage roads and some of the main lanes have been constructed within a typical 300-foot-wide existing ROW, except at intersections where the ROW expands to 400 feet wide to provide a continuous road from US 59 to Franz Road. Frontage roads were constructed in areas where there were existing or planned intersections, to maintain access to adjacent areas. Segment D has been open to the traveling public since August 31, 1994. An additional EA was completed in January 2004. The January 2004 document evaluated the construction of previously approved grade separations (overpasses) at Highland Knolls Boulevard and Kingsland Boulevard and the approaching main lanes, within existing ROW. The project limits were defined as beginning 0.24 mile south of Highland Knolls Boulevard and ending 0.75 mile north of Kingsland Boulevard near IH 10. The EA for the overpasses was prepared for FHWA approval since federal funds were to be used to construct the two overpasses. FHWA issued a FONSI on March 11, 2004. Numerous other activities have occurred in conjunction with these two environmental documents and constructions projects. Below is a list of activities that have occurred along SH 99 Segment D:

Date	Activity
12/17/86	Public hearing showing proposed location of IH 10/Grand Parkway interchange (done as a separate document)

04/29/87 Public hearing for segment D-1 (Franz Road to FM 1093)

12/07/88 Supplemental hearing for D-1, Public hearing for D-2 (FM 1093 to US 59)

04/01/88 State EA approved, FONSI issued

02/21/91 USACE Individual Permit (IP) for 18.12 acres of impact

08/31/94 Segment D opens for public travel. Ultimate facility as described in the State EA not constructed at this time. Grade separations were not constructed, and roadway alternates from frontage road to main lanes for the length of the project.

01/22/97 Reevaluation approved to bring frontage roads on SH 99 from south of IH 10 to Peek Road to the ultimate design configuration. (CSJ 3510-05-006)

09/11/98 Preliminary construction engineering for the overpass at Highland Knolls Boulevard approved. (CSJ 3510-04-014)

01/03/00 USACE IP issued for creation of 52-acre off-site mitigation. Monitoring period ended 11/05.

06/17/03 First noise workshop with Governor's Place subdivision.

03/11/04 Federal FONSI issued for EA for Highland Knolls and Kingsland Boulevard overpasses. New EA needed to allow Federal funding for overpasses. Document described existing facility and focused on constructing the overpasses at Kingsland and Highland Knolls Boulevards. Notice of Availability for Opportunity for a Public Hearing published 02/02/04 and 02/21/04 with no requests.

03/16/04 Second noise workshop with Governor's Place subdivision.

05/04/05 Public meeting which would show the proposal to toll the new overpasses listed above (approximately 2 mile stretch of SH 99) was cancelled after the Texas Transportation Commission decision to not toll this short stretch of SH 99 at this time.

05/22/07 Public meeting for the tolling of the 12 previously approved overpasses, associated approaches and main lanes, the public meeting was held in the northern portion of the project area at Cinco Ranch High School.

5/24/07 Public meeting for the tolling of the 12 previously approved overpasses, associated approaches and main lanes, the public meeting was held in the southern portion of the project area at Sartaria Middle School.

Public Involvement

The meeting format consisted of an open house Public Meeting with a PowerPoint presentation and handout. Exhibit boards describing the proposed improvements and the environmental process were displayed on easels. Representatives from TxDOT answered questions from meeting attendees. A

written comment area was furnished with tables, chairs, comment forms, pens, and boxes for depositing the comments.

Attendees were asked to view the PowerPoint presentation, visit the exhibit area, and discuss the project with the study team. An informational handout describing the proposed project and meeting format was available as attendees registered. Representatives from TxDOT and its consulting firms answered questions from the public. Comment forms were available to the meeting attendees. The public had the option of turning in their comment form the night of the public meeting, submitting them by email or mailing the forms to TxDOT by June 8, 2007. Twenty-three written comments were received at the public meetings – 17 at Cinco Ranch High School and six at Sartartia Middle School. 119 comments were received by mail or email by June 8, 2007. The total number of written comments received was 142.

II. NEED AND PURPOSE

The original purpose of the Grand Parkway, as documented in the 1987 EA, was to complete the City of Houston's primary freeway system. The need for the Grand Parkway was:

- To provide access and mobility to areas which presently do not have continuous freeway capacity
- To provide necessary access to major freeways and other locations from growing residential areas in all parts of the Grand Parkway service corridor
- To help complete or expedite the implementation of several major thoroughfare plans in various areas where business and residential growth has surpassed all expectations
- To provide critically needed freeway capacity in those areas which require additional emergency evacuation routes during hurricanes
- To provide alternative routes to drivers desiring to bypass the central city, thereby relieving existing congestion

The previously approved 12 overpasses that are the subject of this Reevaluation have not been constructed because funding has not been and is not available. At these intersections, the at-grade frontage roads at the fifteen intersections (12 overpasses) were constructed and have been open to the traveling public since 1994. The 12 overpasses were evaluated and approved as part of the 1987 EA and were to be constructed in the future when funding became available and traffic warranted construction. Segment D was originally planned as a 6-main-lane freeway. Within the limits of Segment D, all of the necessary frontage roads and some of the main lanes were constructed with the intention that additional main lanes and overpasses would be added as traffic increased and funding was available. Since the completion of the previous EA in 1987, there has been an increase in traffic (discussed below in *Section IV*) on SH 99 due to population growth and residential and commercial development in the area. Since Segment D opened in 1994, the population has significantly increased in western Harris County and northern Fort Bend County.

The purpose of the proposed project is to provide high-speed mobility and a more efficient transportation route for local residents, commuters, and the traveling public. The proposed improvements (12 overpasses) are needed to meet future traffic needs on SH 99. The 12 overpasses

are located at various locations along Segment D in portions of Fort Bend and Harris Counties. The project is located in areas that have experienced considerable growth in recent years. The *H-GAC 2025 Regional Growth Forecast Report* discusses the aggressive growth scenario for 2025 and compares the forecasted 2025 population with 1990 and 2000 population numbers for cities and counties within the region. The forecasted growth rates from 1990 to 2025 for Harris and Fort Bend Counties are expected to exhibit a 2.6 and 3.5 percent annual average increase rate, respectively (*Table 1*). With anticipated population growth and growth that has already occurred, there will continue to be and already is an increase in traffic demand along SH 99.

Table 1
Population Growth

Geographic Area	Population			Percent Change 2000-2025	Percent Annual Growth Rate 1990-2025
	1990[a]	2000[a]	2025[c]		
Houston/Galveston Brazoria CMSA	3,731,131	4,669,571	7,662,000	64.1	2.1
Harris County	2,818,199	3,400,578	5,385,000	58.4	2.6
Fort Bend County	225,421	354,452	749,000	111.3	3.5

Source: H-GAC Regional Forecast Report

Main lanes and overpasses at major intersections exist between FM 1093 and IH 10 and farther south at Owens Road; however, there are no intersection overpasses south of Fry Road, except at Owens Road, or north of Kingsland Boulevard. Forecasted traffic indicates a continued increase in traffic is likely between years 2010 and 2030. Therefore, the project is needed to meet future traffic needs on Segment D.

Tolling

Although traffic presents a need for the construction of the 12 overpasses, no funding is available in the foreseeable future for construction. The purpose of tolling the proposed 12 overpasses is to allow a faster way to finance construction, supplement limited highway funds, and address transportation needs sooner.

The proposed implementation of tolling at the 12 proposed overpasses along Segment D from Franz Road to US 59 would support the original need for and purpose of Segment D by generating revenue for the construction, operation, and maintenance of this segment and possibly other proposed segments of SH 99 that would help complete the area's regional transportation plans. Revenue from tolling this portion of SH 99, Segment D would be used only for the construction, operation, and maintenance of Segment D.

The proposed action addressed by this reevaluation is to operate the main lane section at the 12 proposed overpasses along Segment D as a toll facility. Historically, TxDOT has financed highway projects on a "pay-as-you-go" basis, using motor fuel taxes and other revenue deposited in the State highway fund. However, population increases and traffic demand have outpaced the capacity of this traditional finance mechanism. To help meet critical transportation funding shortfalls, in December 2003 the Texas Transportation Commission approved a policy under House Bill 3588 (HB 3588) instructing TxDOT to evaluate all controlled-access highway projects as

possible candidates for tolling. These projects would include projects that are currently under construction and those in the planning stage involving new lane construction. Under this direction, TxDOT identified the 12 overpasses along Segment D as a candidate toll project. The original EA addressed the proposed construction of a 6-lane, at-grade, controlled-access freeway (except at overpasses), and this reevaluation concerns the construction and tolling of 12 previously approved overpasses; however, tolling was not evaluated in the 1987 EA. At this time, no toll-entity has been identified to implement tolling of the 12 overpasses. Since no toll-entity has been identified, exact locations of toll collection facilities (gantries) are not known at this time and the toll fee is also unknown. The tolls would be collected by the use of electronic toll collection. No new ROW would be needed nor would there be a change in access. According to the Public Hearing Schematics dated 1987 and the 1987 EA, all of the 12 overpasses were shown at the public hearings, so this represents no change to the original design.

III. CONGESTION MANAGEMENT SYSTEM

The Congestion Management System (CMS) is a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion, as well as enhancing mobility of persons and goods to levels that meet state and local needs. The proposed project was developed in accordance with the Houston-Galveston Area Council's (H-GAC) operational CMS Plan, which was adopted on October 10, 1997; updated May 1998 and March 1999; and meets all requirements in 23 Code of Federal Regulations (CFR) 500.109. The proposed project (CSJs 3510-04-901, 3510-04-004, 3510-04-006, and 3510-05-010) is listed in the 2006-2008 TIP and the 2008-2011 as project types Transportation Control Measure (TCM) and Transportation System Management (TSM).

IV. TRAFFIC

SH 99 Segment D carries traffic north-south in western Harris County and northern Fort Bend County connecting to US 59 and IH 10, respectively. Constructing the 12 overpasses would improve the operational efficiency of the roadway and enhance safety for the traveling public. *Table 2* presents base year (2010) and projected (2030) traffic volumes expressed in vehicles per day (vpd).

Table 2
Existing and Projected Traffic Volumes

Section of Roadway	Base Year 2010 (vpd)	Projected Traffic Volume 2030 (vpd)
Franz Road to IH 10	17,590	38,540
IH 10 to FM 1093/Westpark Tollway	52,470	114,965
FM 1093/Westpark Tollway to US 90A	27,000	59,000
US 90A to US 59	33,600	73,700

vpd: vehicles per day.

The traffic numbers are based on current and predicted vehicle movements along SH 99 Segment D and intersecting roadways. The numbers vary per section of roadway due to vehicles entering and exiting at the intersecting roadways.

V. DESIGN

A. Existing

Frontage Roads No Main Lanes (12 Proposed Overpasses)

The existing ROW for Segment D is 400 feet wide at the locations of the proposed overpasses. The existing frontage roads, at locations where main lanes are not present, typically contain two 13-foot northbound lanes and two 13-foot southbound lanes (*Figure 3*). The distance between the frontage roads and existing ROW boundary is typically 15 feet.

Main Lanes with Frontage Roads

The existing Segment D at sections where main lanes and frontage roads are present contains four 12-foot main lanes (two lanes in each direction) with 10-foot outside and inside shoulders and a 52-foot grassy median. The frontage roads consists of two 13-foot northbound and two 13-foot southbound lanes with 15-foot outside shoulders (*Figure 4*). The ROW in these locations is typically 400 feet wide. These sections occur from Kingsland Boulevard to Fry Road.

Main Lane Sections (Controlled Access Locations)

In areas that have controlled access, only the main lanes are present. The main lanes consist of two 12-foot lanes in each direction with 10-foot inside and outside shoulders, and a grassy median with a minimum width of 36 feet (*Figure 4*). The ROW in these sections is typically 300 feet wide.

Existing Structures and Intersections

The existing SH 99 roadway (main lanes and frontage roads) includes a total of 12 grade separations (7 overpasses and 5 bridges) and numerous signalized intersections, as summarized below.

US 59	There is a signalized intersection at the US 59 northbound and southbound frontage roads.
West Riverpark Drive	This intersection is signalized.
Brazos River	The bridge at the Brazos River has four lanes. A barrier separates the northbound and southbound lanes.
New Territory Boulevard	This intersection is signalized.
Sandhill Boulevard	This intersection is signalized.
US 90A	This intersection is signalized.
FM 1464	This intersection is signalized.
Bullhead Bayou	This bridge contains four divided lanes (two in each direction).
Owens Road	Owens Road leads to the Texas Department of Corrections (TDC) facility entrance road. There is an overpass at Owens Road; there are no frontage roads associated with the overpass.

Oyster Creek	This bridge has four undivided lanes (two in each direction).
Harlem Road	This intersection is signalized with flashing red lights.
Mortin Road	This intersection is signalized with flashing red lights.
Bellaire Boulevard	This intersection is not signalized.
FM 1093	This intersection is signalized and FM 1093/Westpark. A tollway is constructed over SH 99.
Fry Road	There is an overpass at Fry Road. The overpass has four divided lanes with 2-lane main lane approaches and frontage roads.
Buffalo Bayou/ Little Prong Creek	This bridge has four divided lanes (two in each direction).
Westheimer Parkway	There is an overpass at Westheimer Parkway. The overpass has four divided lanes with 2-lane main lane approaches and frontage roads.
Cinco Ranch Boulevard	There is an overpass at Cinco Ranch Boulevard. The overpass has four divided lanes with 2-lane main lane approaches and frontage roads.
Highland Knolls Boulevard	There is an overpass at Highland Knolls Boulevard. The overpass has four divided lanes with 2-lane main lane approaches and frontage roads.
Katy Fort Bend Road	This intersection is not signalized.
Kingsland Boulevard	There is an overpass at Kingsland Boulevard. The overpass has four divided lanes with 2-lane main lane approaches and frontage roads.
Peek Road	This intersection is not signalized.
IH 10	There is a signalized intersection, with a left-turn lane, at IH 10.
Park Row	This intersection has a four-way stop with turnarounds.
Mason Creek	This bridge has four divided lanes (two in each direction).
Franz Road	SH 99 Segment D terminates at Franz Road.

B. Proposed

Design for the project as described in the approved EA has not been changed since issuance of the FONSI, except for the intersection of the future West Airport Boulevard has been moved 230 feet north to accommodate an alignment change in the proposed roadway. Since the alignment of West Airport Boulevard has shifted north, the overpass has been adjusted accordingly. No change in ROW will occur has a result of this change. The proposed operational change includes tolling the 12 overpasses, associated approaches, and newly constructed portions of the main lanes of Segment D

from FM 1093 to River Park Drive and from IH 10 to Colonial Parkway. The proposed project also includes the construction of toll collection facilities on the main lane sections of Segment D within the proposed tolling limits. The proposed project would add antennas and other equipment that would be placed on overhead structures for electronic toll collection. The project would be constructed within existing right-of-way (ROW) and would not require any residential, business, or other displacements. No change of access would occur as a result of the project. The proposed project would construct 12 overpasses and approaches that would cross 15 existing intersections within the existing ROW (*Figure 2A-2L*). Additionally, main lanes would be constructed in some locations between the proposed overpasses. Main lanes would be constructed to connect to existing main lane sections and to connect the approaches for the 12 overpasses. The main lanes are depicted on *Exhibits 2A – 2L.*

The 12 overpasses, approaches, and main lanes were previously approved in the 1987 EA. Since funding is not available for the 12 overpasses, TxDOT is proposing to toll the new construction to fund the proposed project. Only new construction would be tolled, all existing lanes would remain as a non-tolled facility. The proposed improvements include constructing 12 overpasses at 15 intersections (see *Section , I Introduction,* for locations) and the main lane approaches from the existing frontage roads. The overpasses would have two 12-foot northbound main lanes and two 12-foot southbound main lanes, with 10-foot inside and outside shoulders. The proposed median width varies but is typically 52 feet (*Figure 3*). The proposed typical sections are shown on *Figure 4*. To fund construction of the 12 overpasses, TxDOT is proposing to toll the new construction using electronic toll collection equipment. Antennas and other equipment would be placed on overhead structures to read electronic vehicle tags. Exact locations of toll gantries and pricing are unknown at this time. Tolls will be collected through electronic toll collection. No coin collectors or full-service tolls booths will be constructed. No new ROW would be needed for construction of the gantries nor would a change of access occur.

C. Alternatives

Original Project (1987 EA)

The 1987 EA evaluated several alternatives. A FONSI was issued in 1987 for the current alignment which included six-lanes of limited access highway. The 12 proposed overpasses were included in the alternative that received a FONSI. Additionally, the chosen alternative included overpasses at Fry Road, Westheimer Parkway, Cinco Ranch Boulevard, Highland Knolls, and Kingsland Boulevard. These overpasses and associated approaches have been constructed and will continue to operate toll-free.

Proposed Project

The original project was approved as a six-lane limited access freeway. Tolling was not evaluated in the 1987 EA. This document introduces a new alternative, Build/Toll that was not evaluated in the 1987 EA. The alternatives for this document would include Build/No-Toll, Build/Toll, or the No-Build. For the Build Alternative without tolling, construction of the overpasses would not occur in the foreseeable future since funds have not been identified for the 12 overpasses. The only other alternative considered for the proposed project is the No-Build alternative. This is not the preferred alternative since it does not address the purpose and need for the proposed project, to reduce traffic congestion on and improve the operational efficiency of SH 99. The Build with tolling alternative was added since funding is not available for the previously approved overpasses and approaches.

Tolling the overpasses and approaches would help generate funding to aid in the completion of the area's regional mobility plans.

VI. RIGHT-OF-WAY/DISPLACEMENTS

The required ROW for Segment D has been acquired, primarily through landowner donations. The proposed project would be constructed within existing ROW and there would be no residential, business, or other displacements.

VII. SOCIOECONOMIC DATA

Population

SH 99 Segment D and the proposed project improvements are located in Harris and Fort Bend Counties, Texas. The proposed project is located within the extraterritorial jurisdiction of the City of Houston, approximately 1 mile east of the incorporated city limits of the City of Katy. The City of Sugar Land touches the southern end of Segment D on US 59. The project is located within or in the vicinity of the Cities of Houston, Katy, and Sugar Land in Fort Bend and Harris Counties, Texas. The 1990 and 2000 population and 2010 and 2020 population projections for the cities and counties are shown in *Table 3*.

The population for the Cities of Katy and Sugar Land from 1990 to 2020 is forecasted to have a 133.0 and 195.6 percent increase, respectively. Continued population growth in the vicinity of the project site has created demand for increased roadway capacity and mobility.

There are civilian labor forces of 1,895,687 and 245,062 in Harris and Fort Bend Counties, with respective unemployment rates of 3.8 and 3.7 percent, as of April 2007, according to the Bureau of Labor Statistics. The 1999 average median household incomes for the 19 Census block groups adjacent to Segment D, City of Katy, and City of Sugar Land were $72,879, $51,111, and $81,767, respectively.

Table 3
Population Statistics for Counties and Cities Within or Adjacent to SH 99 Segment D

Geographic Area	Population			
	1990*	2000*	2010	2020
Harris County	2,818,199	3,400,578	3,951,682	4,502,786
Fort Bend County	225,421	354,452	490,072	630,624
City of Houston	1,630,553	1,953,631	2,240,974	2,520,926
City of Katy	8,005	11,775	15,254	18,654
City of Sugar Land	24,529	63,328	72,500	72,500

Source: TWDB 2006
*U.S. Census 1990 and 2000

Community Cohesion and Community Impacts

Several residential neighborhoods/communities are located adjacent to SH 99 Segment D. Neighborhoods/communities adjacent to the proposed project are included *Appendix A*, and are shown on *Exhibit 1* in *Appendix A*. Single-family and multi-family communities located within approximately 1,500 feet of the proposed project were identified. Overall land use adjacent to SH 99 Segment D primarily consists of residential and undeveloped properties, with some commercial, retail, and public (e.g., schools) facilities. Approximately 30 single-family neighborhoods/communities and 1 multi-family community are located adjacent to the proposed project (*Exhibit 1, Appendix A*). Many of the communities adjacent to the proposed project are master planned communities. For example, Cinco Ranch is a 7,400-acre master planned community, located adjacent to the proposed project. Some single-family neighborhoods/communities such as Cinco Ranch have several sections.

The primary roadway users are discussed in the *Environmental Justice* section. The primary roadway users are generally located in the vicinity of the proposed project and likely live in adjacent communities/neighborhoods (*Exhibit 2, Appendix A*).

Public Concerns

The total number of written comments received at the two public meetings was 142. The public had numerous concerns about the proposed project. Below is a list of the most common concerns that were expressed by the public and how the comments were addressed.

- **23 expressed concern that tolls would be too great a personal expense**: The existing road would remain as a non-tolled option. *Exhibit 1, Appendix A* shows the traveling public would be allowed to travel all lanes from just north of Kingsland Boulevard to just south of Fry Road without paying a toll. All existing controlled-access main lanes, and all existing frontage roads where main lanes and/or overpasses have not been constructed would remain non-tolled. Only new construction would be tolled. A non-tolled lanes would be available the entire length of along SH 99 Segment D.

- **17 expressed concern about negative impact of traffic noise**: The proposed roadway improvements are not on new location, does not substantially alter either the horizontal or vertical alignment from that in the previously approved EA and noise study, and do not add capacity, increase, or substantially alter the volume of through traffic. Therefore, a traffic noise analysis is not required for this Reevaluation by FHWA Regulation 23 CFR 772 or "TxDOT's 1996 Guidelines for Analysis and Abatement of Highway Traffic Noise." Noise contours were developed for use in the planning of future residential developments. Noise impacts to communities are discussed in *Section XXIV*.

- **16 expressed concern that the proposed action would have a negative impact on property values**: The existing road would remain as a non-tolled facility. The proposed overpasses would improve mobility in the area. Neighborhoods would not be isolated or divided as a result of the project. It is not expected that the completion of the SH 99 Segment D facility would adversely affect property values.

- **14 expressed concern that diverted traffic would congest local neighborhood streets**: The commentors who had concerns about this appeared to not understand that the existing

roadway lanes in the vicinity of their neighborhood would not be tolled. If the entire SH 99 facility were tolled, there could be some drivers diverting through neighborhoods to avoid tolls, but since the existing lanes would remain non-tolled it is not expected that increased traffic would travel through neighborhoods (*Exhibit 2, Appendix A*). Therefore, those individuals who consider the toll too high of an expense could continue to use the non-tolled lanes that exist today. It would likely take longer to divert through a neighborhood than it would to wait at a stop sign or traffic signal to pass through an intersection along SH 99 Segment D.

- **13 expressed a desire for more information about the project and any future meetings**: For future public meetings/hearings, TxDOT would mail public meeting notices to adjacent property owners, community associations, past meeting attendees, and public officials. Additionally, TxDOT would publish legal notices in local papers.

Numerous other comments were received; all comments along with responses were documented in the *SH 99 Segment D Public Meeting Summary Report, May 22 and May 24, 2007*. This report is available at TxDOT-Houston District.

The addition of the overpasses would improve mobility and reduce traffic congestion. Quality of life could improve due to better mobility in the project area. As roadway congestion decreases, it is possible that property value could increase due to possible increased mobility in the project area.

The proposed project improvements would not require additional ROW or any residential displacements. The project would not bisect any established neighborhoods or isolate any neighborhoods or communities, nor would it disrupt orderly planned development of the project area. The overall racial/ethnic distribution of the population, or other demographic factors, would not be expected to be affected by the implementation of the project.

As discussed in *Section XXVII*, the local economy would benefit from a temporary increase of jobs and income potential during roadway construction activities. Other short-term impacts include possible increase of construction noise and dust during construction.

VIII. ENVIRONMENTAL JUSTICE

Executive Order 12898, *Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations*, was enacted on February 11, 1994, and mandates that federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority and low-income populations. A minority population is defined as a group of people and/or a community experiencing common conditions of exposure or impact that consists of persons classified by the U.S. Census Bureau as Black; Asian; American Indian or Alaska Native; Hispanic; or other non-white persons, including those persons of two or more races. A low-income population is defined as a group of people and/or a community that, as a whole, lives below the national poverty level. The average poverty level threshold for a family of four people in 2000, as defined by the U.S. Department of Health and Human Services guidelines, was a total annual household income of $17,050, while it is $21,200 in 2008. According to FHWA Order 6640.23 and U.S. Department of Transportation (DOT) Order 5610.2, disproportionately high and adverse effects on minority or low-income populations generally means an adverse effect that is predominantly borne by a minority population and/or low-income population, or would be suffered by the minority population and/or low-income population, and is appreciably more severe or greater in

magnitude than the adverse effect that would be suffered by the non-minority population and/or non-low-income population.

Segment D crosses fifteen 2000 Census tracts, nineteen 2000 Census block groups and sixty-one Census blocks. A Census block group is a collection of Census blocks within a Census tract. Census tracts, averaging approximately 4,000 persons, are small statistical subdivisions of a county. In order to look at minority populations in smaller geographic areas, individual Census blocks were evaluated and analyzed in comparison to the nineteen Census block groups. Individual Census block groups were evaluated and analyzed in comparison with the fifteen Census tracts with respect to low-income populations.

Cumulatively, approximately 31.8, 32.3, and 44.6 percent of the population within the fifteen Census tracts, nineteen Census block groups, and sixty-one Census blocks are classified as minority, respectively. Cumulatively, approximately 3.7 and 2.3 percent of the population within the fifteen Census tracts and nineteen Census block groups are classified as low-income, respectively, according to the 2000 Census. Census income data is only available at the Census block group level and above. The percent of the population classified as minority or low-income within the nineteen Census block groups and sixty-one blocks is comparable or slightly higher than the fifteen Census tracts (*Table 4*).

Census Blocks (6729.00:2, Block 2003; 6737.00:1, Blocks 1001 and 1003; 6738.00:2, Blocks 2000 and 2010; and 6747.00:2, Block 2008) located adjacent to the Segment D have a high (i.e. more than 50 percent) minority population. These block groups are located adjacent to the existing roadway ROW; however, no additional ROW will be required. The project would not require residential, business, or other displacements. The project would not restrict access to any existing public or community services, businesses, or commercial areas. Therefore, adverse direct impacts to the minority population in this area would not be expected.

Table 4
Population and Demographics for Environmental Justice Analysis

Geographic Area	Total Population	Race/Ethnicity by Percent					% Minority	% Low-Income	Median Household Income
		White	Hispanic	African American	Asian	Other			
County and City									
Harris County	3,400,578	42.1	32.9	18.2	5.1	1.7	57.9	14.9	42,598
Fort Bend County	354,452	46.2	21.1	19.6	11.2	1.9	53.8	7.1	63,831
City of Sugar Land	63,328	60.8	8.0	5.1	23.8	2.3	39.2	3.8	81,767
City of Katy	11,775	70.3	23.8	4.1	0.5	1.3	29.7	8.4	51,111
15 Census Tracts Average	80,544	68.2	14.1	7.1	8.8	1.9	31.8	3.7	69,479
19 Census Block Groups Average	55,999	67.7	11.5	8.3	10.5	2.0	32.3	2.3	72,879
61 Census Blocks Average	12,257	55.4	12.4	16.3	13.8	2.2	44.6	--	--
Census Block Groups									
Fort Bend County									
Tract	**Block Group**	**Block**	**Race/Ethnicity by Percent**						**% Minority**	**% Low-Income**	**Median Household Income**
			White	**Hispanic**	**African American**	**Asian**	**Other**	**White**			
6729	--	--	2,145	49.7	17.6	19.2	11.2	2.3	**50.3**	0.9	73,594
	1	--	1,922	47.8	17.1	20.2	12.4	2.5	**52.2**	1.0	74,453
		1019	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1020	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1022	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1033	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1034	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1035	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1999	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
	2	--	233	66.8	22.0	9.9	0.4	0.9	33.2	0.0	59,750
		2002	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		2003	70	38.6	38.6	22.9	0.0	0.0	**61.4**	--	--
		2006	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
6730	--	--	13,263	80.0	7.6	3.1	7.6	1.7	20.0	1.4	106,347

Table 4 cont.

Tract	Block Group	Block	Total Population	Race/Ethnicity by Percent					% Minority	% Low-Income	Median Household Income
				White	Hispanic	African American	Asian	Other			
	1	--	7,418	84.1	5.6	2.3	6.4	1.6	15.9	0.4	117,504
		1015	366	91.5	3.8	3.3	0.5	0.8	8.5	--	--
		1016	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
	2	--	3,196	75.3	10.5	2.4	9.9	1.9	24.7	2.7	95,017
		2033	15	86.7	13.3	0.0	0.0	0.0	13.3	--	--
6731	--	--	5,613	80.6	9.8	5.9	2.1	1.6	19.4	5.0	71,797
	2	--	3,479	87.3	6.2	2.3	2.6	1.6	12.7	2.2	94,562
		2000	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		2033	607	91.6	5.6	0.5	1.8	0.5	8.4	--	--
		2041	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
	3	--	1,285	76.3	13.4	6.5	1.6	2.2	23.7	0.6	63,917
		3000	7	100.0	0.0	0.0	0.0	0.0	0.0	--	--
		3012	180	78.3	11.1	7.8	1.7	1.1	21.7	--	--
6734	--	--	4,047	69.2	25.0	4.0	0.8	1.0	30.8	6.8	77,534
	1	--	2,430	81.3	10.6	5.9	0.9	1.3	18.7	2.4	84,941
		1009	452	78.5	9.3	7.7	1.8	2.7	21.5	--	--
		1022	45	86.7	4.4	0.0	2.2	6.7	13.3	--	--
		1024	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1026	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1027	3	100.0	0.0	0.0	0.0	0.0	0.0	--	--
		1055	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1057	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1058	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
6735	--	--	5,767	86.2	7.5	3.4	1.5	1.4	13.8	1.4	83,068
	1	--	1,180	82.7	9.2	5.5	0.8	1.8	17.3	0.0	85,870
		1000	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
	3	--	35	51.4	8.6	40.0	0.0	0.0	**48.6**	0.0	**29,464**
		3000	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--

Table 4 cont.

Tract	Block Group	Block	Total Population	Race/Ethnicity by Percent					% Minority	% Low-Income	Median Household Income
				White	Hispanic	African American	Asian	Other			
6737	--	--	2,222	35.4	19.7	43.1	0.5	1.3	**64.6**	0.0	51,429
	1	--	2,222	35.4	19.7	43.1	0.5	1.3	**64.6**	0.0	51,429
		1000	2	100.0	0.0	0.0	0.0	0.0	0.0	--	--
		1001	2,173	35.1	19.5	43.6	0.5	1.3	**64.9**	--	--
		1003	34	29.4	38.2	29.4	0.0	2.9	**70.6**	--	--
6738	--	--	6,640	46.7	19.2	8.6	22.6	2.8	**53.3**	7.5	76,755
	2	--	5,306	49.6	8.6	10.5	28.0	3.3	**50.4**	3.0	85,048
		2000	378	49.2	9.3	14.3	22.5	4.8	**50.8**	--	--
		2010	2,506	48.5	7.7	12.1	27.5	4.1	**51.5**	--	--
		2999	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
6739	--	--	11,449	54.3	7.3	8.8	27.0	2.6	45.7	2.1	108,351
	1	--	10,301	55.9	7.4	9.2	25.1	2.4	44.1	1.8	108,030
		1013	949	60.1	3.4	5.0	29.9	1.7	39.9	--	--
		1025	212	64.2	3.3	2.8	28.8	0.9	35.8	--	--
		1030	140	67.1	5.7	1.4	20.7	5.0	32.9	--	--
		1031	28	89.3	3.6	0.0	7.1	0.0	10.7	--	--
		1039	1,235	64.9	2.8	7.9	21.7	2.7	35.1	--	--
		1999	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
6747	--	--	4,069	45.4	29.8	17.5	5.9	1.3	**54.6**	8.6	55,000
	2	--	3,120	49.3	23.8	17.8	7.6	1.5	**50.7**	3.7	65,556
		2000	492	38.8	12.8	15.7	29.5	3.3	**61.2**	--	--
		2006	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		2007	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		2008	991	29.0	38.8	30.8	0.9	0.5	**71.0**	--	--
		2997	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		2999	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
Harris County											
4551	--	--	10,312	77.1	13.4	3.4	4.3	1.9	22.9	3.1	67,925

Table 4 cont.

Tract	Block Group	Block	Total Population	Race/Ethnicity by Percent					% Minority	% Low-Income	Median Household Income
				White	Hispanic	African American	Asian	Other			
	1	--	3,697	80.2	10.3	3.1	4.8	1.6	19.8	0.5	77,805
		1016	412	77.2	10.7	4.4	6.3	1.5	22.8	--	--
		1022	215	69.3	10.7	0.0	15.3	4.7	30.7	--	--
4552	--	--	4,783	78.0	15.5	2.7	2.0	1.8	22.0	5.1	70,187
	3	--	1,317	79.9	11.3	3.1	4.3	1.4	20.1	7.5	87,668
		3000	136	70.6	14.7	6.6	8.1	0.0	29.4	--	--
		3005	150	84.7	8.7	3.3	3.3	0.0	15.3	--	--
4553	--	--	53	79.2	20.8	0.0	0.0	0.0	20.8	0.0	0
	1	--	53	79.2	20.8	0.0	0.0	0.0	20.8	0.0	0
		1000	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1001	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
5425	--	--	2,387	88.9	6.0	1.9	2.0	1.1	11.1	4.6	91,361
	1	--	2,387	88.9	6.0	1.9	2.0	1.2	11.1	4.6	91,361
		1004	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1005	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1006	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
5426	--	--	1,579	57.1	34.5	5.4	1.7	1.2	42.9	**13.7**	50,341
	1	--	1,579	57.1	34.5	5.4	1.7	1.5	43.1	**13.7**	50,341
		1000	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1001	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1008	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1014	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
		1015	0	0.0	0.0	0.0	0.0	0.0	0.0	--	--
5429	--	--	6,215	68.0	22.2	5.8	1.8	2.2	32.0	2.2	58,491
	1	--	4,849	70.0	19.4	6.2	1.9	2.5	30.0	1.1	61,985
		1012	459	73.9	17.2	7.8	1.1	0.0	26.1	--	--

Source: U.S. Census Bureau 2000

Bold cells indicate a high percentage of minority and/or low-income population where 50 percent or more of the population is classified as minority and/or low-income.

Census block group (5426:00:1) has a high low-income population, approximately three times larger than the 15 Census tract comparison group average (3.7 percent). Census block group 6735.00:3 has a $29,464 median household income average which is more than more two times smaller than the 15 Census tracts comparison group average of $69,479. However, the median household income for Census block group (6735.00:3) is not below the U.S. Department of Health and Human Services poverty guideline. No other Census tracts and/or block groups within the study area have high low-income populations or low median household incomes.

Project Level Toll Impacts

H-GAC provided origin destination (OD) data for the proposed project. The OD data helped identify the primary users of SH 99 Segment D. The OD data is based on the Traffic Analysis Zones (TAZs) that people are traveling to or from while using SH 99 Segment D. The H-GAC transportation network years used for the analysis were 2009 and 2035. TAZs are defined as geographic areas (typically the size of a Census block group) which are used to relate travel demand with socioeconomic characteristics. There are approximately 3,000 TAZs in the Houston-Galveston area. The OD data includes the average daily traffic (ADT) traveling from TAZ to TAZ in the Houston-Galveston regional area. The TAZs with 1,000 ADT or greater in the 2009 and 2035 transportation networks were selected and are shown on *Exhibit 2, Appendix A*. TAZs with 1,000 ADT or greater are considered the primary users of SH 99 Segment D. *Table 5* shows TAZs (≥1,000 ADT) located entirely or partially within Census block groups with high minority (i.e. more than 50 percent), high low-income (i.e. more than three times 15-tract comparison group or low median household incomes.

Table 5
Primary User TAZs located within Block Groups with EJ populations

TAZ with over 1,000 ADT	Census Block Group	Percent Minority	Percent Low-Income	Median Household Income
TAZ and Census Block Groups directly adjacent to the Project Corridor				
2228	6729.00:1	**52.2**	1.0	$74,453
2199	6735.00:3	48.6	0.0	**$29,464**
2200	6735.00:3	48.6	0.0	**$29,464**
2210	6737.00:1	**64.6**	0.0	$51,429
2182	6738.00:2	**50.4**	3.0	$85,048
2256	6747.00:2	**50.7**	3.7	$65,556
1463	5426.00:1	42.9	**13.7**	$50,341
TAZ and Census Block Groups not directly adjacent to the Project Corridor				
2282	6751.00:4	**56.2**	2.4	$52,326
2271	6755.00:1	**55.6**	6.8	$43,036
2226	6734.00:2	48.9	**14.0**	$55,500
2227	6734.00:2	48.9	**14.0**	$55,500
2229	6734.00:2	48.9	**14.0**	$55,500
2258	6746.00:4	47.5	**22.7**	$41,250

Bold cells indicate a high percentage minority and/or low-income population or a low median household income.

Mapping of the OD data shows that low-income and minority populations likely utilize SH 99 Segment D. Thirteen of the TAZs that are represented on *Exhibit 2, Appendix A* are located wholly are partially within Census block groups with a either a high percentage minority or low-income population, or a low median household income. A majority of the primary roadway users are not part of environmental justice populations.

The cost for the toll would be based on the distance traveled on the tolled lanes. Currently, the proposed toll collection fees have not been determined. The toll collection fee would be collected via an Electronic Toll Collection (ETC) system, meaning there would no toll collection booths and there would not be an option for paying with cash. Toll tags are currently only available if a person can pre-payment a set minimum for toll fees from a debit card, checking account, or credit card. The pre-payment cost can vary depending on the toll road authority that would be responsible for toll collection. As an example, The Harris County Toll road authority requires pre-payment of $40.00 (or $80.00 for electronic fund transfer from your checking account) and the customers' form of payment (debit card, credit card, or checking account) will be charged another $40.00 or $80.00 when the pre-payment has been used by toll collection fees. Persons who do not have or can not afford to have a debit card, checking account, or credit card would not be able to purchase a toll tag. If a vehicle does not have a toll tag, it is not allowed to use the proposed toll lanes.

Because motorists would pay a toll regardless of their income, the tolling of the proposed improvements may constitute a greater burden on lower-income motorists. The use of the non-toll options may result in a difference in travel time due to lower posted speed limits and signalization on existing non-tolled as compared with travel time on the tolled overpasses. However, those who would use the toll road and those who would choose not to use the toll lanes would both experience benefits. Roadway users that utilize the toll road would benefit from improved access to job markets and services, and decreased travel time to destinations. Roadway users that choose not to use the toll lanes may benefit from reduced traffic on the existing non-tolled lanes and other local roadways thereby, decreasing commuting times.

Mitigation for low-income populations traveling SH 99 Segment D could include: (1) Offering cash purchasing alternatives, such as vending machines at local retailers for applying credit to the toll tag or (2) Offering reduced toll fares for low-income populations for toll road access. Buses may be allowed to use the proposed facility for free to accomodate those riding the bus toll road access.

While users and individuals who cannot afford the toll may not be able to drive on of the toll facility, non-toll options would remain available via the existing SH 99 Segment D and existing roads in the general vicinity of the project (*Exhibit 1, Appendix A*). The existing frontage roads along with already constructed overpasses would remain free for the traveling public after the proposed project is constructed.

The proposed project is expected to improve mobility by reducing congestion along existing roads, as some traffic would likely use the tolled facility overpasses to avoid signalized intersections. In the long term, because the proposed SH 99 improvements would improve mobility, it would benefit all individuals traveling in the vicinity of the proposed project. The implementation of the project would not cause disproportionate adverse impacts to low-income or minority populations. No new ROW would be needed and there would not be changes in access to existing roadways.

System Level Toll Impacts

The 2007 transportation network for Houston-Galveston consists of approximately 7,814 miles of roads. Of the total system, 133 miles are tolled and 7,681 miles are non-tolled. The tolled miles are approximately 1.7 percent of the Houston-Galveston transportation network. The anticipated 2035 transportation network for Houston-Galveston would consist of approximately 9,390 network miles, of which 6.1 percent (approximately 572 miles) is proposed to be tolled. In the 2035 network, the proposed tolling of SH 99 Segment D would be 11 miles, which is 0.2 percent of the total planned tolled miles.

The No-Build alternative would not disproportionably affect minority or low-income populations living or traveling within the project corridor and immediate surrounding area. All motorists living and traveling within the project corridor and immediate surrounding area could experience increased traffic congestion associated with the no-build alternative.

Limited English Proficiency

Executive Order 13166, *Improving Access to Services for Persons with Limited English Proficiency (LEP)*, sets a framework to improve access to federally conducted and federally assisted programs and activities for persons who, as a result of national origin, are limited in their English proficiency. According to the 2000 Census, approximately 6.8 percent of the persons residing within the nineteen Census Block Groups speak English less than "very well," which is considered LEP, and approximately 2.2 percent are Linguistically Isolated (LI) (*Table 6*). The LEP distribution is 48.3 percent Spanish, 25.7 percent Indo-European, 23.7 percent Asian and Pacific Islander, and 2.3 percent Other. The LI distribution is 39.0 percent Spanish, 23.3 percent Indo-European, 37.7 percent Asian and Pacific Island, and 0 percent Other. Within the Cities of Sugar Land and Katy, approximately 10.6 and 11.5 percent and 4.8 and 4.4 percent are LEP and LI, respectively. The population percentage considered as LEP and LI in the nineteen block groups is less than the Cities of Katy and Sugar Land.

Table 6 provides the LEP and LI data for the county, city, and block groups included in the proposed project area.

Table 6
Limited English Proficiency and Linguistically Isolated Data

Geographic Area	Limited English Proficiency			Linguistically Isolated		
	Total Population Sampled	LEP	% LEP	Total Population Sampled	LI	% LI
County and City						
Fort Bend County	327,666	37,065	11.3	111,164	5,710	5.1
Harris County	3,121,999	569,799	18.3	1,206,423	119,700	9.9
Houston, Texas	1,794,753	394,996	22.0	718,897	88,058	12.2
Katy, Texas	10,859	1,244	11.5	3,886	170	4.4
Sugar Land, Texas	56,649	6,120	10.6	20,560	981	4.8
Census Block Groups						
Fort Bend County Block Groups						
6729.00:1	1,644	242	14.7	657	33	5.0

6729.00:2	224	0	0	77	0	0.0
6730.00:1	6,923	196	2.8	2,107	16	0.8
6730.00:2	2,836	133	4.7	1,009	20	2.0
6731.00:2	3,222	143	4.4	1,100	17	1.5
6731.00:3	1,167	95	8.1	408	0	0.0
6734.00:1	2,355	75	3.2	857	8	0.9
6735.00:1	1,026	44	4.3	323	0	0.0
6735.00:3	43	0	0	33	0	0.0
6737.00:1	2,221	192	8.6	16	4	25.0
6738.00:2	4,616	518	11.2	1,518	56	3.7
6739.00:1	9,407	882	9.4	2,585	89	3.4
6747.00:2	3,081	215	6.9	822	7	0.9
Harris County Block Groups						
4551.00:1	3,291	239	7.3	1,151	49	4.3
4552.00:3	1,294	11	0.9	362	0	0.0
4553.00:1	0	0	0	0	0	0.0
5425.00:1	2,147	59	2.8	688	5	0.7
5426.00:1	1,623	207	12.8	546	17	3.1
5429.00:1	4,331	263	6.1	1,520	31	2.0
19 Block Group Total	51,451	3,514	6.8	15,779	352	2.2

Source: U.S. Census Bureau 2000

TxDOT has ensured that opportunities for community input in the National Environmental Policy Act (NEPA) process have been and will continue to be provided. A reasonable attempt to solicit public comments on the proposed project was made at the public meetings held on May 22 and 24, 2007. The meetings were announced in local newspapers, and meeting notices were mailed to elected officials, government agencies, local organizations, civic groups, and published on the TxDOT and Grand Parkway Association websites. The public meeting notice was also published in a Spanish language newspaper, *Rumbo de Houston.*

The mailed notices and newspaper announcements provided opportunities for citizens to request language interpreters, and TxDOT had at least one bilingual English-Spanish employee present at both public meetings.

IX. PROJECT SETTING AND LAND USE

Overall land use adjacent to SH 99 (Segment D) primarily consists of residential and undeveloped properties, with some commercial, retail, and public (e.g., schools) facilities. Consistent with Segment D overall, land use between US 59 and US 90A primarily consists of residential and undeveloped properties, with some commercial, retail, and public facilities. Between US 90A and Harlem Road, land use primarily consists of undeveloped and agricultural properties, where the TDC owns property, facilities, and agricultural fields in the vicinity. Land use between Harlem Road and FM 1093 is primarily undeveloped, with some residential areas. Land use between FM 1093 and IH 10 consists of a mixture of residential, commercial, retail, and public uses.

The project would be constructed within existing ROW and would not require any residential, business, or other displacements. The project does not bisect any established neighborhoods or isolate any neighborhoods or communities, nor would it disrupt orderly planned development of the

project area. Access to and from the residential and commercial areas would be maintained throughout the construction period. The project is consistent with the plans and policies of the local governmental entities. No significant changes to the overall land use in the area would be anticipated as a result of the implementation of the project.

X. SOILS

The soils located within the Segment D ROW include Asa fine sandy loam (Aa), Asa-pledger complex (Ac), Aris - Gessner complex (Ar), Bernard clay loam, 0 to 1 percent slopes (Bb), Bernard clay loam, 0 to 1 percent slopes (Be), Clodine fine sandy loam (Ca), Gessner loam (Ge), Katy fine sandy loam, 0 to 1 percent slopes (Ka), Katy-Waller complex, Katy fine sandy loam (Kf), Lake Charles clay, 0 to 1 percent slopes, Lake Charles clay, 1 to 4 percent slopes (Lb), Miller clay (Ma), Miller silt loam (Mc), Miller silty clay loam (Md), Norwood silt loam (Nc), Pledger clay (Pa), Roebuck clay (Ra), Sandy alluvial land (Sa), Sloping alluvial land (Sb), Water (W), and Waller-Katy complex, slightly saline (Wb). Soils within Segment D that are listed as prime farmland include Aa, Ac, Bb, Be, Ka, Kf, Kc, La, Lb, Ma, Mc, Md, Nc, Pa, and Sb. A Farmland Conversion Rating Form (AD 1006) was submitted to the Natural Resources Conservation Service (NRCS, formerly the Soil Conservation Service) for Segment D in 1986. Since then, the required ROW for Segment D has been acquired.

There would be no impact to prime farmland soils since the proposed project would be constructed within the existing ROW on land that has been previously converted and committed to urban development.

XI. BENEFICIAL LANDSCAPE PRACTICES

In accordance with *Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping*, landscaping would be limited to seeding and replanting the ROW with native species of plants where possible. A mix of native grasses and native forbs would be used to revegetate the ROW. In accordance with the Executive Memorandum, TxDOT will adhere to the following sustainable landscape measures and practices where cost-effective and to the extent practicable.

- Use regionally native plants for landscaping.
- Design, use, or promote construction practices that minimize adverse effects on the natural habitat.
- Seed to prevent pollution by, among other things, reducing fertilizer and pesticide use.
- Implement water-efficient and runoff practices.
- Create outdoor demonstration projects employing the above measures and practices.

Any landscaping that may be included with the proposed project will be in compliance with the Executive Memorandum, and the guidelines for environmentally and economically beneficial landscape practices.

XII. INVASIVE SPECIES

On February 3, 1999, Federal Executive Order 13112 was issued to prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts. To minimize potential impacts to vegetation resources, areas adjacent to the roadway that are cleared during construction would be reseeded as quickly as possible following completion of construction activities to control soil erosion and to reestablish stable vegetative communities. Locally adapted native species would be utilized for reseeding to provide a long-term, low-maintenance roadside vegetation community. In accordance with Executive Order 13112 on invasive species, the ROW would be reseeded using native species, and soil disturbance would be minimized to prevent the establishment of invasive species.

XIII. VEGETATION

In accordance with the "Memorandum of Agreement between the Texas Department of Transportation and Texas Parks & Wildlife Department for Finalization of 1998 MOU, Concerning Habitat Descriptions and Mitigation" (TxDOT-TPWD MOU) for projects on existing locations that require no new ROW, the vegetation habitats in the study area were evaluated. Segment D is located in the Gulf Prairies and Marsh region, as identified by the Texas Parks & Wildlife Department's (TPWD) Ecological Region Map. Segment D lies entirely within the "Crops" vegetation type defined by TPWD "Vegetation Types of Texas" (TPWD 1984). The entire ROW has been disturbed and most of the ROW is regularly mowed and maintained, with the exception of riparian areas adjacent to the Brazos River. Land adjacent to Segment D consists of residential development with some pastureland and farmland.

The project area was evaluated for unusual vegetation features referenced in Provision (4)(A)(i) of the TxDOT-TPWD MOU. The following describes the findings with regard to unusual vegetation features:

- Unmaintained vegetation was found to occupy less than 1 percent of the project area.
- Trees or shrubs along a fenceline adjacent to a field (fencerow vegetation) were not observed within the ROW.
- Areas of riparian vegetation are present within the ROW in a wide strip along the southern bank of the Brazos River. The proposed project would not affect this riparian vegetation.
- Unusually large trees were not observed.
- Unusual stands or islands of vegetation were not observed.

Segment D and adjacent areas are characterized by mixed native or introduced grasses and forbs on grassland sites. Typical grasses and forbs include Bermuda grass (*Cynodon dactylon*), Johnson grass (*Sorghum halepense*), Carolina geranium (*Geranium carolinianum*), white clover (*Trifolium repens*), dallis grass (*Paspalum dilatatum*), Brazilian vervain (*Verbena braziliensi*), spiny cockle-bur (*Xanthium spinosum*), southern carpet grass (*Axonopus affinis*), and Indian sea-oats (*Chasmanthium latifolium*). Typical shrubs, woody species, and vines include yaupon (*Ilex vomitoria*), giant ragweed (*Ambrosia trifida*), and southern dewberry (*Rubus trivialis*). No trees occur within the median of Segment D. Areas within the Segment D ROW adjacent to residential developments have been

landscaped with live oak (*Quercus virginiana*), loblolly pine (*Pinus taeda*), crape myrtle (*Lagerstroemia indica*), bald cypress (*Taxodium distichum*), and non-native ornamentals. These areas would not be affected by the proposed project.

Appendix A presents photographic documentation of typical landscape and vegetation features occurring within the project site; these photographs are representative of vegetation features found throughout the Segment D ROW. Shrubs and pioneer species (such as giant ragweed) have invaded portions of the grassy median within the project site. These shrubs would be removed during construction.

Regarding special habitat features, as defined by the TxDOT-TPWD MOA:

- Defined bottomland hardwood communities were not observed.
- Caves, cliffs, and bluffs do not occur along Segment D.
- Native prairies were not observed.
- Ponds, seeps, and springs were not observed.
- Snags were not observed.
- Numerous water bodies are found along Segment D, including Mason Creek, Buffalo Bayou, Oyster Creek, Jones Creek, Bullhead Slough, and the Brazos River and tributaries thereof.
- Bridges with cliff swallow nests were observed.

Based on site reconnaissance, no adverse impact to regional and local vegetation resources would occur. The proposed project would temporarily affect approximately 200 acres of mowed and maintained ROW. Approximately 100 acres would be returned to mowed and maintained ROW after construction. Cleared areas would be revegetated upon completion of construction and maintained by standard TxDOT practices. Since the existing ROW does not include unusual vegetation or special habitat features as referenced in Provision (4)(A)(ii) of the TxDOT-TPWD MOU, as revised, and defined under "Compensatory Mitigation" in the TxDOT-TPWD MOA, no mitigation for woody species would be required.

XIV. WILDLIFE

The native wildlife populations of western Harris County and northeast Fort Bend County have been largely displaced by urbanization, land fragmentation from development, and from land clearing for agricultural purposes.

The vegetation within the ROW could support few wildlife species, such as small birds and mammals. Riparian habitats along small wetlands areas and ditch crossings are commonly used by mammalian wildlife. Some mammalian species may continue to exist for years in these areas because of their ability to adapt to urban development. Due to heavy vehicular traffic and development within and adjacent to Segment D, medium and large mammals are not likely to use the ROW, except for possibly a transient occurrence. Typical mammals that could occur within the project area include Virginia opossum (*Didelphis virginiana*), house mouse (*Mus musculus*),

common raccoon (*Procyon lotor*), hispid cotton rat (*Sigmodon hispidus*), and eastern cottontail (*Sylvilagus floridanus*).

Grassy fields located throughout the project area serve as habitat for many avian species, which would typically consist of small birds. Birds that may occur within these areas include Cattle Egret (*Bubulcus ibis*), Red-Tailed Hawk (*Buteo jamaicensis*), Turkey Vulture (*Cathartes aura*), Killdeer (*Charadrius vociferus*), Black Vulture (*Coragyps atratus*), American Crow (*Corvus brachyrhynchos*), Snowy Egret (*Egretta thula*), Great-Tailed Grackle (*Quiscalus mexicanus*), Eastern Meadowlark (*Sturnella magna*), European Starling (*Sturnus vulgaris*), Brown Thrasher (*Toxostoma rufum*), American Robin (*Turdus migratorius*), and Mourning Dove (*Zenaida macroura*). These commonly occurring birds could occur in the project area on a transient basis.

Reptiles and amphibians are likely common within the project area. Amphibians include the cricket frog (*Acris crepitans*), gulf coast toad (*Bufo valliceps*), gray treefrog (*Hyla versicolor*), and southern leopard frog (*Rana sphenocephala*). Common reptiles include the green anole (*Anolis carolinensis*), ground skink (*Scincella lateralis*), and rough earth snake (*Virginia striatula*).

The project site is highly disturbed with residential and commercial development adjacent to the ROW in many locations. Construction of the proposed project would lead to the loss of grassy vegetated median areas which provide poor habitat. Since the project site receives constant human disturbance from vehicle traffic and the grassy median offers very little wildlife habitat value, minimal impacts are expected.

Migratory Birds

Cliff Swallow (*Petrochelidon pyrrhonota*) nests were observed during the nesting season on bridges over the following locations: Brazos River, Bullhead Bayou, Oyster Creek, the railroad bridge at US 90, South Fry Road overpass, Little Prong Creek, and Willow Fork of Buffalo Bayou. The proposed project would not affect or remove the existing bridges at these locations.

Several bird species are considered migratory; however, the proposed project would not affect the migration patterns of these species. In the event that migratory birds, such as cliff swallows, or their nests are observed prior to construction activities, measures would be taken to avoid harm to migratory birds, their nests, eggs, or young.

To ensure compliance with the Migratory Bird Treaty Act, clearing vegetation and work within the project area would be conducted outside of the normal nesting season, or measures would be taken to discourage birds from nesting in existing structures. Additionally, the contractor will be notified about and be responsible for complying with the Migratory Bird Treaty Act for migratory birds that may inhabit the project area throughout the duration of the construction project.

XV. THREATENED AND ENDANGERED SPECIES

Databases of sensitive species maintained by the United States Fish and Wildlife Service (USFWS) and Texas Parks and Wildlife Department (TPWD) were reviewed to determine state and/or federally listed threatened or endangered species that occur or historically have occurred in Harris and Brazoria Counties. The potential effects of the proposed project on these species were determined by reviewing the TPWD - Natural Diversity Database (NDD) Element of Occurrence Records and by conducting habitat assessments. A species list for each county outlining the species and habitat

potentially present in the proposed project area is found in *Appendix B*. No unique, critical, designated, or proposed designated habitat exists in or near the proposed project.

A search of the TPWD-NDD Element of Occurrence Records indicated an occurrence of Bald Eagle (*Haliaeetus leucocephalus*) north of the Brazos River. This species was delisted in 2007, but is being monitored for five years following delisting. This occurrence represents a Bald Eagle nest that was last observed in 2001 near the Sugar Land Airport. According to Brent Ortego, TPWD, his agency does not know the present location of the nest. He stated that they suspect it moved to an unknown location nearby. He stated that aircraft restrictions in the area make it difficult to conduct low level aerial surveys (Ortego 2008). No Bald Eagle nests were observed within the proposed project area.

Occurrences of the following species are documented by TPWD NDD to occur outside the project area, but within a 2-mile radius of the project: Texas prairie dawn (*Hymenoxys texana*), Texas windmill-grass (*Chloris texensis*), and plains spotted skunk (*Spilogale putorius interrupta*). Habitat for the various plant species is not present within the proposed project because of previous soil disturbance and regular mowing activities. Plains spotted skunk habitat includes open tallgrass prairies, forests, brushy areas and cultivated land generally associated with streams or rivers; it will also inhabit barns and brush piles.

No habitat for state-listed species was observed on the project site. The ROW has been worked and reshaped in the past and consists primarily of herbaceous vegetation that is regularly mowed and maintained. This creates a low-diversity habitat that offers very little vertical structure for nesting habitat or cover. The state species listed in Appendix A are habitat-specific and would not use the existing disturbed, regularly mowed ROW that is contained within the median of the existing frontage roads. The proposed project would have no effect on any listed species and it would not directly or indirectly effect or diminish the value of critical habitat for the survival or recovery of any listed species.

XVI. ESSENTIAL FISH HABITAT

Segment D, including the project site, does not contain tidal waters within the ROW; therefore, the project is not subject to the Magnuson-Stevens Fishery Conservation and Management Act and would not impact any essential fish habitat, as defined by 16 United States Code (USC) 1802.

XVII. CULTURAL RESOURCES

Historic Structures

A review of the National Register of Historic Places (NRHP), the list of State Archeological Landmarks (SAL), and the list of Recorded Texas Historic Landmarks (RTHL) indicated that no historically significant properties or historic districts have been previously documented within the area of potential effects (APE). It has been determined through consultation with the State Historic Preservation Officer (SHPO) that the APE for the proposed project extends 150 feet beyond the ROW. A site visit conducted by a qualified historical consultant revealed that there are two sites containing structures 50 years old or older (built prior to 1966) within the project APE. No Official State Historical Markers are located within the project's APE. A reconnaissance report is on file at the Houston District office.

Pursuant to Stipulation VI 'Undertaking with Potential to Cause Effects' of the First Amended Statewide Programmatic Agreement for Cultural Resources (PA), among the FHWA, the SHPO, the Advisory Council on Historic Preservation, and TxDOT and the MOU, TxDOT historians have determined that none of the historic-age resources are eligible for listing in the NRHP.

Archeological Resources

On June 25-26, 2007, Ecological Communications Corporation (EComm) conducted a Class I archeological inventory (literature review) of eleven locations along Grand Parkway in Harris and Fort Bend Counties, Texas (*Table 7*).

Table 7
Project Area Locations for Class I Archeological Inventory

Area	Size	Location	UTM (NAD 83)	County
1	1.8km x 650m	Segment D at IH 10	E231498 N3298284	Harris
2	1.4km x 500m	Segment D at FM 1093	E231438 N3288839	Fort Bend
3	700m diameter	Segment D at Bellaire Boulevard	E231949 N3287727	Fort Bend
4	870m x 500m	Segment D at Morton Road	E234205 N3284809	Fort Bend
5	500m diameter	Segment D at Mason Road	E235107 N3284388	Fort Bend
6	700m diameter	Segment D at Harlem Road	E237183 N3283997	Fort Bend
7	1.49km x 500m	Segment D at US 90A	E240024 N3276500	Fort Bend
8	560m diameter	Segment D at New Territory Boulevard	E240586 N3276350	Fort Bend
9	450m diameter	Segment D at West Riverpark	E240268 N3274643	Fort Bend
10	200m diameter	Segment D at Proposed Peek Road	E232397 N3286588	Fort Bend
11	200m diameter	Segment D at Proposed Airport Road	E237727 N3282910	Fort Bend

The entire length of Segment D, including all 11 areas mentioned above, was surveyed in 1989 and 1990 by TxDOT archeologists in five separate investigations. These investigations consisted of a systematic pedestrian survey with selective shovel test and backhoe trench excavations. According to records maintained by the Texas Historical Commission (THC), no previously recorded archeological sites are located within Areas 1-6. However, eight sites are mapped within Areas 7-9, and 11. According to the Potential Archeological Liability Map (PALM), Areas 1-6 and 10-11 are located within an area that has a documented low geoarcheological potential. No further work is warranted in Areas 1 or 2, but pedestrian survey accompanied by shovel testing is recommended by the PALM in Areas 3-6 and 10-11. Finally, Areas 7-9 are located within an area with a high geoarcheological potential. The PALM recommends an archeological survey with shovel testing in Areas 7-9, to be accompanied by backhoe trenching if deep impacts are anticipated. A Class III pedestrian inventory will occur for the APE prior to construction of the 12 overpasses. A copy of the Class I Archeological Report is on file at the Houston District office. At the time of the Class III pedestrian inventory, TxDOT archeological staff would initiate accidental discovery procedures under the provisions of (1) the Programmatic Agreement between TxDOT, the THC, the FHWA, and

the Advisory Council on Historic Preservation and (2) the MOU between TxDOT and the THC. There would be no impact to archeological resources.

XVIII. SECTION 4(F)

There are no public parks located adjacent to Segment D. Public facilities directly adjacent to the Segment D ROW include several churches, schools, and public facilities such as a TDC facility located west of SH 99 and north of US 90A.

The project would not require additional ROW, and there would be no impacts to any public park, recreational area, wildlife refuge, or waterfowl refuge of national, state, or local significance.

XIX. WETLANDS

In 1991, the USACE issued to TxDOT an IP to fill and/or dredge within 30 jurisdictional wetlands comprising an area of 17.95 acres. The mitigation and monitoring has been completed. The original jurisdictional determination has expired.

A preliminary reconnaissance for waters of the United States, including wetlands, was conducted for the project site in June 2007. This site visit found that waters of the United States, including wetlands, occur within the Segment D ROW. The site visit was a cursory review and did not include detailed documentation of vegetation, hydrology, or soils, as required by USACE for jurisdictional determinations or delineation. Areas defined herein as wetlands include areas that are likely to meet all three criteria of the *1987 Corps of Engineers Wetlands Manual* (Technical Report Y-87-1).

Bridges have been constructed over all stream crossings, and the proposed construction would only impact Mason Creek and Bullhead Slough; all other jurisdictional streams would be avoided. Approximately 3.9 acres of potential jurisdictional streams and approximately 7.5 acres of areas meeting wetlands criteria are found within the proposed ROW between Franz Road and US 59. The proposed project includes six separate construction areas; these construction areas contain approximately one acre of waters of the United States and approximately 5 acres of areas meeting wetlands criteria within the proposed ROW. *Figures 2A – 2L* show potential waters of the United States, including wetlands in the proposed project area. The area of jurisdictional waters of the United States, including wetlands, under the Clean Water Act is subject to USACE jurisdictional determination. Before construction, delineation of wetlands within the proposed project will be required to determine those areas under jurisdiction of the USACE.

For any work that would occur within jurisdictional waters of the United States, TxDOT would obtain a Department of Army permit or obtain an amendment to the existing permit for Segment D. The project may require Section 401 water quality certification from the Texas Commission on Environmental Quality (TCEQ).

XX. WATER QUALITY

Segment D crosses several creeks and one river. The major river and creek crossings are at the Brazos River, Bullhead Bayou, Oyster Creek, Little Prong Creek, Buffalo Bayou, and Mason Creek. There is an existing SH 99 bridge at each of these crossings. Mason Creek and Bullhead Bayou are located within the construction areas. Mason Creek (Segment ID 1014L) is an unclassified water body according to *TCEQ's 2006 Texas Water Quality Inventory and 303(d) list*. Bullhead Bayou

(Segment ID 1202N) is listed for bacteria concerns. Since Bullhead Bayou is on the 303(d) list and crosses the proposed project, coordination with TCEQ is required for the proposed project.

The project would disturb more than one acre of land and TxDOT will be required to meet the Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit (CGP) requirements discussed in *Section XXIII.* TxDOT would develop a new stormwater pollution prevention plan (SWP3) or amend a previous plan to address the project, and measures would be taken to prevent or correct erosion that may develop during construction. Guidance documents, such as TxDOT's *Storm Water Management Guidelines for Construction Activities*, provide discussion of stormwater controls to be implemented during construction.

The amount of disturbed earth would be limited so that potential for excessive erosion is minimized and sedimentation outside of the ROW is avoided. Existing vegetation would be preserved wherever possible. Temporary erosion and sedimentation controls would be in place according to the construction plans prior to commencement of construction-related activities and inspected on a regular basis to ensure maximum effectiveness. Disturbed areas will be stabilized to prevent soil erosion and sedimentation during construction during wet weather conditions (erosion control). All temporary erosion controls would be in compliance with TxDOT Standard Specifications and would be in place, according to the construction plans, prior to commencement of construction-related activities and inspected on a regular basis to ensure maximum effectiveness.

Permanent soil erosion control features would be constructed as soon as feasible during the early stages of the contract through proper sodding and/or seeding techniques. Disturbed areas would be restored and stabilized as soon as the construction schedule permits, and temporary sodding would be considered where large areas of disturbed ground would be left bare for a considerable length of time. Temporary erosion control measures would be coordinated with the permanent soil erosion control features that are to be part of the completed project to assure economical, effective, and continuous erosion control throughout the construction and post-construction periods. In addition, efforts would be made to prevent long-term water pollution by reducing fertilizer and pesticide use during the installation and maintenance of landscaping.

The contractor would take appropriate measures to prevent, minimize, and control hazardous materials spills in the construction staging area. Removal and disposal of all materials by the contractor would be in compliance with applicable federal and state laws, with no degradation of ambient water quality. The implementation of the project would not result in any direct impacts to surface water or any contamination to or effect upon a public water supply.

XXI. FLOODPLAINS

Topography along Segment D, including the project site, is relatively flat. Segment D crosses several 100-year floodplain boundaries, primarily at creek and river crossings. Approximately 40 acres of floodplain occur within Segment D's ROW, and of that approximately 17 acres occur within the construction areas of the 12 overpasses and approaches. The hydraulic design of the proposed project will be in accordance with current TxDOT policies and standards. The project will be designed to prevent inundation at recurrence intervals of at least 100 years, inundation of the roadways being acceptable, without causing significant damage to the roadway, streams, or other property. The proposed project would not increase the base flooding elevations to a level that would violate applicable floodplain regulations and ordinances. Harris and Fort Bend Counties are participants in the National Flood Insurance Program.

XXII. COASTAL ZONE MANAGEMENT PROGRAM

The Texas Coastal Management Program, under authority of the federal Coastal Zone Management Act of 1972, directs federal agencies proposing activities or projects within the state coastal zone to assure that those activities or projects are consistent, to the maximum extent practicable, with the state coastal management program. Segment D is not located within the designated Texas Coastal Management Zone.

XXIII. PERMITS

A. TCEQ

The TPDES CGP became effective on March 5, 2003. Since the project would disturb more than one acre of land, TxDOT will be required to meet the following TPDES CGP requirements for the proposed project.

- Obtain a copy of the TCEQ CGP (TPDES Permit Number TXR150000)
- Develop and implement an SWP3
- Complete and submit a Notice of Intent (NOI) to the TCEQ
- Submit a Notice of Termination (NOT) once the site has reached final stabilization

TxDOT will develop a new SWP3 plan or amend a previous plan to address the project, and measures would be taken to prevent or correct erosion that may develop during construction. Guidance documents, such as TxDOT's *Storm Water Management Guidelines for Construction Activities*, provide discussion of stormwater controls to be implemented during construction, as previously discussed in this EA in *Section XX*.

B. USACE

Construction could occur within jurisdictional waters, including wetlands. In 1991, the USACE issued to TxDOT an IP to fill and/or dredge within 30 jurisdictional wetlands comprising an area of 17.95 acres. The mitigation and monitoring has been completed. The construction areas of the 12 overpasses contain approximately one acre of waters of the US and approximately 5 acres of areas meeting wetlands criteria within the proposed ROW. *Figures 2A – 2L* show potential waters of the US, including wetlands, in the proposed project area. The area of jurisdictional waters of the US, including wetlands, under the Clean Water Act is subject to USACE jurisdictional determination. Before construction, delineation of wetlands within the proposed project will be required to determine those areas under jurisdiction of the USACE. For any work that would occur within jurisdictional waters of the United States, TxDOT would obtain a Department of Army permit or obtain an amendment to the existing permit for Segment D. The project may require Section 401 water quality certification from the TCEQ.

C. Coast Guard

The General Bridge Act of 1946 and Sections 9 and 10 of the Rivers and Harbors Act of 1899 prohibit the unauthorized obstruction, including bridge construction, or alteration of any navigable

waters of the United States, unless the work has been authorized by permit from the U.S. Coast Guard (USCG) and the USACE. The Brazos River (a navigable waterway) crosses the Segment D ROW. However, no construction would occur at the Brazos River. No other navigable waterways cross the Segment D ROW. Therefore, a Section 9 permit from the USCG or a Section 10 permit from the USACE would not be required.

XXIV. NOISE

This reevaluation does not involve any changes in the design of the 12 previously approved overpasses or associated traffic volumes that would change the results of the original noise analysis. The only change is the movement of West Airport Boulevard overpass approximately 230 feet north of the previously approved location. There are no receivers at this location.

Noise analysis for the entire Segment D project was conducted for the EA completed in 1987. Although traffic noise levels were predicted to increase throughout the entire Segment D, at that time (1987) only two residences were determined to actually experience an impact. The noise analysis in 1987 determined that a noise barrier was not feasible due to cost and access constraints. These two affected residences are no longer present. The 1987 EA, which included a summary of the noise analysis and associated exhibits, was made available to local officials so that future development adjacent to Segment D could be planned to be compatible with the predicted sound contours.

The noise analysis for the construction of SH 99 from 0.24 mile south of Highland Knolls Drive and to 0.75 mile north of Kingsland Boulevard was performed in 2003 and results were included in the January 2004 EA. The results of this analysis indicated that eight eligible receivers would benefit from a noise wall. These receivers were under construction prior to the date the FONSI for the 1987 EA was signed. Construction of a noise wall was approved by TxDOT and local residents. Noise barriers were not considered for impacted receivers that were platted after the original FONSI for the 1987 EA was signed.

Toll plazas would consist of an automated electronic tolling system. Therefore, the plazas will be free-flowing and will not introduce main lane stop and go traffic. The redistribution of traffic from tolled lanes to non-tolled lanes would not change the results of the original noise analysis.

Land use activity areas located adjacent to the proposed project consist of Category B (residential), Category C (commercial), and Category D (undeveloped land) properties. There are no noise abatement criteria for undeveloped land. However, to avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs should ensure, to the maximum extent possible, no new activities are planned or constructed along or within the following predicted (2030) noise impact contours (*Table 8*).

Table 8
Noise Impact Contours

Land Use	Impact Contour	Distance From Proposed ROW From FM 1093 to US 90A
Residential	66 dBA	Varies from 200 to 300 feet
Commercial	71 dBA	Varies from 75 to 200 feet

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise during construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable. None of the receivers would be expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities would not be expected. Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

XXV. AIR QUALITY

Segment D is located within Harris County and Fort Bend County, which are designated as in a "moderate" ozone 8-hour nonattainment area under the National Ambient Air Quality Standards (NAAQS); therefore, the transportation conformity rule does apply. Traffic volumes for the proposed project do not exceed 140,000 Average Daily Traffic (ADT) for either the 2010 or 2030 design year; therefore, a Traffic Air Quality Analysis (TAQA) is not required because previous analyses of similar projects did not result in violation of NAAQS. A qualitative analysis of mobile source air toxics is provided for the proposed facility.

The Houston-Galveston Area Council (H-GAC), the metropolitan planning organization for this area, includes all projects that are proposed for funds within the transportation improvement program (TIP) and was initiated in a manner consistent with federal guidelines in 23 CFR 450 and Subpart B of 49 CFR 613.200. Energy, environment, air quality, cost, and mobility considerations are addressed in the programming of the TIP. The proposed project is consistent with the area's financially constrained the *2035 RTP,* and the *2008-2011 Transportation Improvement Program for the Houston-Galveston Transportation Management Area.* Both the RTP and the TIP have been found to conform to the State Improvement Program (SIP). The conformity determination by DOT's (FHWA/Federal Transit Administration) for the RTP was approved in November 2007.

There may be short-term, localized effects to air quality (e.g., increase in dust) in the immediate area adjacent to the project during construction. The effects to air quality during construction would be temporary, and measures such as watering construction areas to control dust could minimize adverse effects to air quality during construction.

Mobile Source Air Toxics

In addition to the criteria air pollutants for which there are NAAQS, the U.S. EPA also regulates toxic air pollutants. Most toxic air pollutants originate from human sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories and refineries). Mobile Source Air Toxics (MSATs) are a subset of the 188 toxic air pollutants defined by the Clean Air Act (CAA). The MSATs are compounds emitted from on-road vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metals that are toxic air pollutants also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead federal agency for administering the CAA and has some responsibilities on the health effects of MSATs. The EPA issued a final rule on controlling emissions of hazardous air pollutants from mobile sources (66 Federal Register[FR] 17229, March 29, 2001). This rule was

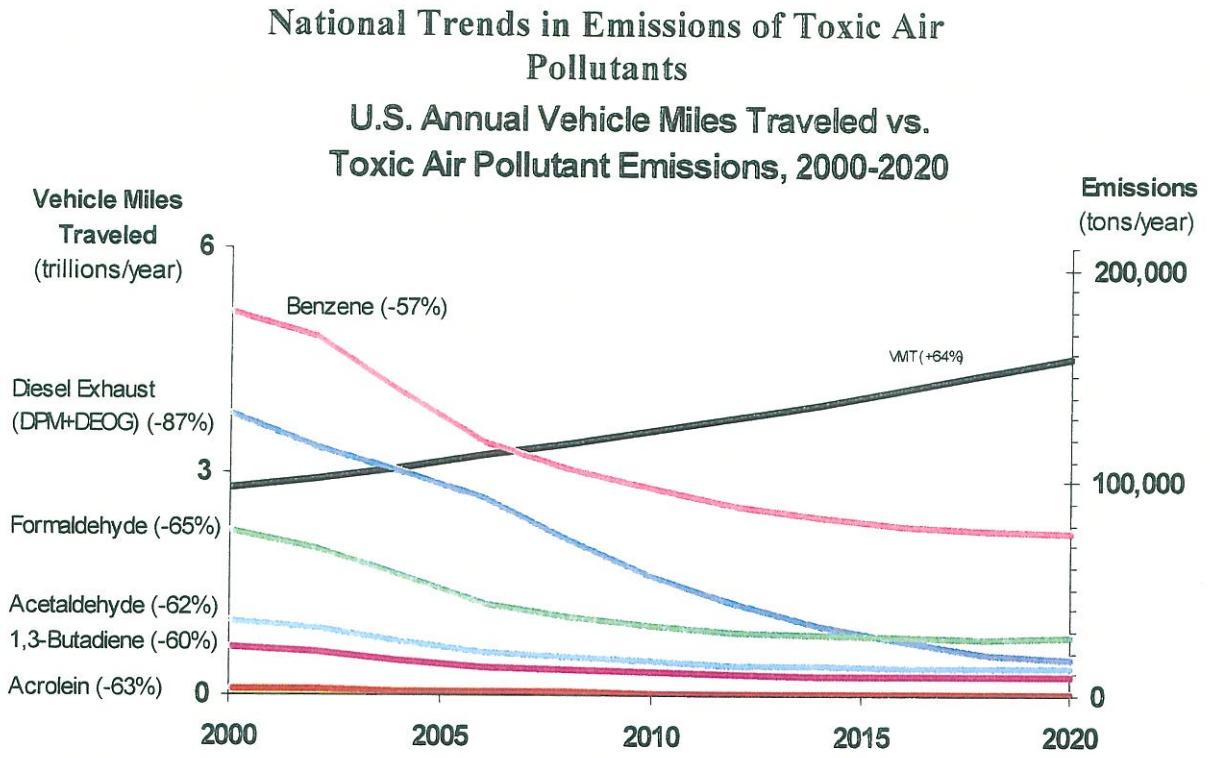
issued under the authority in Section 202 of the CAA. In its rule, the EPA examines the impacts of current and newly promulgated mobile source control programs, including its reformulated gasoline program, its national low-emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, the FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel particulate matter (PM) emissions by 87 percent, as shown in the graph below.

In an ongoing review of MSATs, the EPA finalized additional rules under authority of CAA Section 202(l) to further reduce MSAT emissions that are not reflected in the graph below. The EPA issued Final Rules on *Control of Hazardous Air Pollutants from Mobile Sources* (72 FR 8427, February 26, 2007) under Title 40 CFR Parts 59, 80, 85 and 86. The rule changes are effective on April 27, 2007. As a result of the EPA's review, EPA adopted the following new requirements to significantly lower emissions of benzene and the other MSATs:

- Lower the benzene content in gasoline.
- Reduce evaporative emissions that permeate through portable fuel containers.
- Reduce non-methane hydrocarbon (NMHC) exhaust emissions from passenger vehicles operated at cold temperatures (under 75 degrees Fahrenheit).

Beginning in 2011, petroleum refiners must meet an annual average gasoline benzene content standard of 0.62 percent by volume, for both reformulated and conventional gasolines, nationwide. This would be a 38 percent reduction from 2007. EPA standards to reduce NMHC exhaust emissions from new gasoline-fueled passenger vehicles will become effective in phases. Standards for light-duty vehicles and trucks ($\leq$ 6000 pounds [lbs]) become effective during the period of 2010 to 2013, and standards for heavy light-duty trucks (6,000 to 8,000 lbs) and medium-duty passenger vehicles (up to 10,000 lbs) become effective during the period of 2012 to 2015. Evaporative requirements for portable gas containers become effective with containers manufactured in 2009. Evaporative emissions must be limited to 0.3 gram of hydrocarbons per gallon per day.

EPA has also adopted more stringent evaporative emission standards (equivalent to current California standards) for new passenger vehicles. The new standards become effective in 2009 for light vehicles and in 2010 for heavy vehicles. In addition to the reductions from the 2001 rule, the new rules will significantly reduce annual national MSAT emissions. The EPA estimates that emissions in the year 2030, when compared to emissions in the base year prior to the rule, will show a reduction of 330,000 tons of MSATs (including 61,000 tons of benzene), more than one million tons of volatile organic compounds, and more than 19,000 tons of $PM_{2.5}$.



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: *Highway Statistics 2000* , Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM +DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO_4 from diesel-powered vehicles, with the particle size cutoff set at 10 microns.

Project Specific MSAT Information

Numerous technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of MSAT of this project. However, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative assessment cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, for the Build and No-Build alternatives. The qualitative analysis below is derived in part from a study conducted by the FHWA entitled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternative.*

For the Build and No-Build alternative in this reevaluation, the amount of MSATs emitted would be proportional to the vehicle miles traveled (VMT) assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build alternative is slightly higher than that for the No Build alternative, because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. This increase in VMTs would lead to higher MSAT emissions for the Build alternative along the roadway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE 6.2 emissions model, emissions of all of the priority MSATs except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases will offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models.

Because the estimated VMT for each alternative is nearly the same it is expected there would be no appreciable difference in overall MSAT emissions among the Build and No-Build alternatives. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent between 2000 and 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional traffic lanes contemplated as part of the project will have the effect of moving some traffic farther from nearby homes, schools, and businesses because traffic currently on the frontage roads would be moved to the main lanes inside of the frontage roads. Any localized increase in MSAT concentrations would likely be pronounced along the roadway sections where additional traffic/toll lanes would be built along SH 99 Segment D. Therefore, there may be localized areas where ambient concentrations of MSATs could be higher under the Build alternative than under the No-Build alternative. However, as discussed previously, the magnitude and the duration of these potential increases compared to the No-Build alternative cannot be accurately quantified due to the inherent deficiencies of current models. The localized level of MSAT emissions for the Build alternative could be higher than the No-Build alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). MSATs could also be lower in locations when traffic shifts from the frontage roads to toll lanes in the middle of the ROW. However, on a regional basis, EPA's vehicle and fuel regulations coupled with fleet turnover will cause region-wide MSAT levels to be significantly lower than current levels in almost all cases.

Sensitive Receptor Assessment

There may be localized areas where ambient concentrations of MSATs are slightly higher for the Build scenario than in the No-Build scenario. Dispersion studies have shown that for the "roadway" Build scenario, air toxics start to drop off at 100 meters (328 feet), and by 500 meters (1,640 feet) most studies have shown it is difficult to distinguish the roadway from background air toxic concentrations in any given area. An assessment of some potential sensitive receptors within both 100 and 500 meters should be conducted. Sensitive receptors include those facilities most likely to contain larger concentrations of sensitive population (hospitals, schools, licensed day cares, and elder care facilities), as shown in *Table 9* and *Figures 2A – 2L*.

Unavailable Information for Project-Specific MSAT Impact Analysis

This document includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable the prediction of project-specific health impacts of the emission changes associated with the alternatives in this project. Due to these limitations, the following discussion is included in this reevaluation in accordance with Council on Environmental Quality regulations (40 CFR §1502.22 (b)) on incomplete or unavailable information.

Table 9
Sensitive Air Receptors within 100 and 500 Meters of SH 99 Segment D

Type of Receptor	Address	Number of Receptors Within 100 Meters	Number of Receptors Within 500 Meters
Schools			
Sartartia Middle School	8125 Homeward Way Sugar Land, Texas 77479	0	1
Cimmaron Elementary/YMCA	1100 S. Peek Road Katy, Texas 77494	0	1
Cinco Ranch High School	Cinco Ranch High School 23440 Cinco Ranch Boulevard Katy, Texas 77494	0	1
Edna Mae Fielder Elementary	2100 Greenway Village Drive Katy, Texas 77494	0	1
Travis High School	1111 Harlem Road Sugar Land, Texas 77487	1	0
Licensed Day Cares			
Mayra Escobar	23015 Governorshire Drive Katy, Texas 774650	0	1
Fielder Westside YMCA	2100 Greenway Village Drive Katy, Texas 77494	0	1
Cinco Ranch Montessori	2530 S. Peek Road Katy, 77450	0	1
Kindercare # 1490	2650 S. Peek Road Katy, Texas 77450	0	1
Cinco Cottage Private Montessori School	23144 Cinco Ranch Boulevard Katy, Texas 77494	0	1
Children's Lighthouse	23060 Westheimer Parkway Katy, Texas 77494	0	1
Babytime	4519 Jaymar Drive Sugar Land, Texas 77479	0	1
Jeannette Gonzalez	134 Chandlet Court Sugar Land, Texas 77479	0	1
First Foundation Learning Center	4888 Highway 90A, Suite 500 Sugar Land, Texas 77479	0	1
Childtime Learning Centers	4935 Sandhill Drive Sugar Land, Texas 77479	0	1
Kid R Kids # 11	8202 Homeward Way Sugar Land, Texas 77479	0	1
Sa Thi Vu	2211 Thistlerock Lane Sugar Land, Texas 77479	0	1
Rochell Pollard	2310 Sparrow Branch Sugar Land, Texas 77479	0	1
Montessori School	5630 W. River Park Drive Sugar Land, Texas 77479	0	1
Holy Cross Kids preschool & Childrens Day Out	5653 W. River Park Drive Sugar Land, Texas 77479	1	0
Primrose School of Greatwood	6550 Greatwood Parkway Sugar Land, Texas	0	1
Total Sensitive Receptors		2	19

Source: Fort Bend and Harris County Appraisal Districts and Texas Department of Family and Protective Services 2007
Note: Sensitive air receptors within 100 to 500 meters were included for the entire Segment D. Some licensedday cares and schools are not located within 100 or 500 meters from current SH 99 improvements.

Information That is Unavailable or Incomplete.

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

1. Emissions: The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model—emission factors are projected based on a typical trip of 7.5 miles, and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE 6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis.

These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE 6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations.

2. Dispersion: The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The NCHRP is conducting research on best practices in applying models and other technical methods in the analysis of MSATs. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with th ese general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

3. Exposure Levels and Health Effects: Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for

70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs

Research into the health impacts of MSATs is ongoing. For different emission types, there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken verbatim from EPA's IRIS database and represents the Agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- **Benzene** is characterized as a known human carcinogen.
- The potential carcinogenicity of **acrolein** cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- **Formaldehyde** is a probable human carcinogen, based on limited evidence in humans, and sufficient evidence in animals.
- **1, 3-butadiene** is characterized as carcinogenic to humans by inhalation.
- **Acetaldehyde** is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- **Diesel exhaust** (DE) is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases.

- **Diesel exhaust** also represents chronic respiratory effects, possibly the primary noncancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts near roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research MSAT hot spots near roadways, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years.

Some recent studies have reported that proximity to roadways is related to adverse health outcomes, particularly respiratory problems. Much of this research is not specific to MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable us to perform a more comprehensive evaluation of the health impacts specific to this project.

Relevance of Unavailable or Incomplete Information

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from the project build alternative and MSAT concentrations or exposures created by the project build alternative cannot be predicted with enough accuracy to be useful in estimating health impacts. As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects. Therefore, the relevance of the unavailable or incomplete information makes it not possible to determine whether the build or no-build alternative would have "significant adverse impacts on the human environment."

In this document, a qualitative assessment has been provided relative to the build and no-build alternative MSAT emissions and has acknowledged that the build alternative may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

XXVI. HAZARDOUS MATERIALS

Regulatory Records Review

Approximately one-half of the property adjacent to the 12 overpasses is developed. Most of this development consists of residential subdivisions that were built since the original EA was prepared. To support this development, commercial facilities such as gas stations, auto repair shops, dry cleaners, and other potential generators of hazardous materials have been constructed adjacent to or in close proximity to Segment D. These facilities may handle, store, or dispose of hazardous materials and wastes.

A regulatory database search was conducted in June 2007 according to the American Society for Testing and Materials (ASTM) *Standard Practice for Environmental Site Assessments* (Designation:

E1527-00) and TxDOT guidance to determine the potential for hazardous materials within or near the project site since the previous EA. The regulatory listings are limited and include only those sites that are known by the regulatory agencies to be contaminated or in the process of evaluation for potential contamination at the time of publication. The database search located sixteen potential sites within the various search radii. A copy of the regulatory database search results for this project and a site location map of the regulated facilities is located at the Houston District office. A field reconnaissance of the project area in June 2007 was conducted to confirm the location of selected listed facilities and to observe the existing environmental conditions at these sites and within the project limits.

The regulatory database report included a review of all of the ASTM-recommended databases. The following is an abbreviated list of ASTM-recommended federal and state databases and records that were searched for relevant information.

- National Priority List (NPL), within 1.0 mile, priority hazardous waste sites under the Superfund program, including delisted NPL sites
- Comprehensive Environmental Response, Compensation, and Liability Information Service (CERCLIS), within 0.5 mile, proposed or possible NPL sites
- CERCLIS - No Further Remedial Action Planned (NFRAP), property and adjoining properties, CERCLA sites where contamination was removed quickly or was not considered serious
- Superfund (SFND) List, within 1.0 mile, Superfund sites
- Resource Conservation and Recovery Act (RCRA) Information System (RCRIS)- transport, storage, or disposal (TSD) sites, within 1 mile for corrective action sites and within 0.5 mile for non-corrective action sites, TSD sites that handle RCRA wastes
- RCRIS - generator sites, property and adjoining properties, sites that generate RCRA wastes
- Emergency Response Notification System (ERNS), property only, reported spills of regulated materials
- Spill State of Texas Incident List (SPIL), within 0.25, information on release notifications of hazardous substances that have occurred in Texas
- State Superfund Sites (STFS), within 1.0 mile, state equivalent to NPL sites
- Municipal Solid Waste (MSW) Sites, within 0.5 mile
- Leaking Underground Storage Tank (LUST), within 0.5 mile, underground storage tanks that have reported leaks of petroleum substances (The Texas Commission on Environmental Quality's Office of Permitting, Remediation and Registration, Waste Permits Division, Petroleum Storage Tank Program

- Underground/Aboveground Storage Tanks (UST/AST), within 0.25 mile, underground storage tanks that have been registered with the Texas Commission on Environmental Quality's (TCEQ) Office of Permitting, Remediation and Registration

Table 10 summarizes the findings of the regulatory database search; databases not listed returned no results. All locations with specific addresses were confirmed to exist in their known locations. The location of the two orphan sites was not determined, but these sites do not present a high level of concern.

Table 10
Summary of Regulatory Database Search

Database	Updated	Radius	Number of Sites
ERNS	12-31-06	0.25	2
Texas LUST	03-01-07	0.50	1
State UST/AST	03-01-07	0.25	9*
State Other	03-01-07	0.25	4*

*Note: Contains one site located by ZIP Code only; no address determined.

Two ERNS were discovered during the regulatory database search. These events included the following: 1) a spill of hydrochloric acid on US 59 in 2004 that had no impact and was cleaned up according to the ERNS report, and 2) a train derailment of 24 cars in 2002 with no release of materials. These events would not affect the possibility of encountering hazardous materials during construction of the proposed project.

One LUST site, reported in 1986, was discovered within the search radius at 19310 Beechnut Rd. The tank was removed and cleanup was completed; final concurrence was issued and the case was closed. There was no impact to groundwater. The LUST would not affect the possibility of encountering hazardous materials during construction of the proposed project.

Visual Observations

A site reconnaissance was conducted in June 2007 with the purpose of identifying other sites with potential hazardous materials that are not included in the regulatory database search. Several recently-built facilities are located adjacent to Segment D. These facilities include fuel stations, automotive repair facilities, dry cleaners, and one construction staging area.

The only facility identified during visual reconnaissance that is located within the ROW is the construction staging area for TxDOT contractors working on IH 10. This site is located in the median of Segment D north of IH 10. This staging area includes materials laydown and storage areas, a concrete batch plant, and a large fueling station with at least one large AST containing diesel fuel. This area appears to be properly maintained and appropriate spill prevention and containment measures appear to be in place.

The following facilities are adjacent to the project ROW but present very low potential to encounter hazardous materials (listed in order from US 59 to Franz Rd): HEB Fuels (US 59), My Favorite Cleaners drop station, Cache Cleaners drop station, Shell Gas Station (West Riverpark Drive), Christian Brothers Automotive (New Territory), Pilgrim Cleaners (New Territory), Exxon Speedy

Stop (New Territory), Goodyear Tire (US 90), Happy Dry Cleaners, HEB Fuels (S. Fry), NTB, Kroger Fuel, Peavy's Garage, Christian Brothers Automotive (Highland Knolls), Pilgrim Cleaners (Bayhill), Goodyear Tire (Highland Knolls), Shell Gas Station (Kingsland Blvd), Exxon Fuels (Kingsland), Firestone, Houston Garden Center, and Brake Check.

Dry-cleaning facilities likely handle hazardous waste as RCRA small quantity generators, but most of the facilities are drop stations only. Houston Garden Center sells retail pesticides, fertilizers and herbicides. All of the fuel facilities were constructed within the past two to ten years and therefore present little threat for leakage or migration of hazardous materials into the Segment D ROW. Stormwater runoff could represent a source of non-point source contaminants into the project area, but no known contamination was observed during the field investigation. No obvious signs of contamination, such as stained soil or stressed vegetation, were observed within or immediately adjacent to the project ROW.

If hazardous constituents are unexpectedly encountered in the soil and/or shallow groundwater during construction, TxDOT would initiate appropriate measures for the proper assessment, remediation, and management of the contamination in accordance with applicable federal and state regulations.

XXVII. CONSTRUCTION IMPACTS

Traffic control during project construction will be in accordance with Part VI (Traffic Controls for Street and Highway Construction and Maintenance Operations) of the Texas Manual on Uniform Traffic Control Devices.

There may be some short-term noise impacts resulting from the construction of the project. It is possible that the areas adjacent to the project ROW would experience noise above normal levels during road construction. To minimize construction noise, provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems. Due to the relatively short-term exposure periods imposed on any one receptor, extended disruption of normal activities is not considered likely. Every reasonable effort will be made to minimize construction noise.

There may be short-term, localized effects to air quality (e.g., increase in dust) in the immediate area adjacent to the project during construction, which may temporarily degrade air quality through dust and exhaust gases associated with construction equipment. Measures to control dust will be considered and incorporated into the final project design and construction specifications.

TxDOT requires its contractors to take appropriate measures to prevent, minimize, and control accidental spills that may occur during construction. All construction equipment and materials will be removed as soon as the schedule permits.

XXVIII. INDIRECT AND CUMULATIVE IMPACTS

This section describes the indirect and cumulative effects analyses conducted for this Reevaluation. SH 99 Segment D has influenced land use in western Harris and northern Fort Bend Counties by making remote areas more accessible. This analysis examines the indirect and cumulative impacts SH 99 has had on the landscape prior to and since it opened in 1994. In general, indirect and

cumulative impacts include those consequences of a proposed action that are not direct and may not be readily observable. Indirect impacts are those effects that would be expected to be caused by the proposed project but would be later in time or removed in distance. Cumulative impacts are those impacts that would result from the incremental consequences of an action when added to other past, present, and reasonably foreseeable future actions. Indirect and cumulative impacts are less defined than direct impacts, and by definition, cumulative impacts are incremental in nature and usually are less defined than indirect impacts.

This analysis follows the requirements and processes outlined in the following regulations and guidance:

- 23 CFR 771 – This regulation prescribes the policies and procedures of the FHWA for implementing NEPA and the regulations of the Council on Environmental Quality (CEQ), 40 CFR 1500 through 1508
- Guidance on Preparing Indirect and Cumulative Impact Analyses, TxDOT, December 2006
- Guidance for Preparing and Processing Environmental and Section 4(F) Documents, FHWA Technical Advisory T6640.8A, 1987
- Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process, FHWA, 1992
- Report 466: Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects, National Cooperative Highway Research Program (NCHRP), 2002
- Questions and Answers Regarding the Consideration of Indirect and Cumulative Impacts in the NEPA Process (Interim Guidance), FHWA, 2003
- Considering Cumulative Effects Under the National Environmental Policy Act, CEQ, 1997
- Guidance on the Consideration of Past Actions in Cumulative Effects Analysis, CEQ, 2005
- Guidance for Preparers of Cumulative Impact Analysis Approach and Guidance, California Department of Transportation, 2005

The 1987 EA addressed the impacts associated with the proposed construction of a six-lane arterial, with overpasses at some existing and future intersections. An ultimate six-lane freeway would require the preparation of additional environmental documentation when traffic demands justify the expansion of the four-lane facility.

The 1987 EA and the subsequent January 2004 EA (for the construction of two overpasses using federal funds) were completed without the consideration of tolling. Since the time of the last environmental documentation for this project, there have been no changes in ROW requirements or design. The only design and operational change is the proposed addition of toll collection facilities for operation of the roadway as a toll facility. This section reviews and reassesses the indirect and cumulative effects analyses of 1987 EA and addresses subsequent proposed operational changes to the project.

A. Indirect Effects Analysis

The CEQ defines indirect effects as "...effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems" (40 CFR 1508.8).

Indirect effects often occur outside of the project ROW, and may include growth-inducing effects on air, water, and other natural resources. Examples of potential indirect effects of transportation projects include the following:

- Development and land use changes due to improved access
- Stormwater runoff increases due to changes in land use and increased development on land surrounding a proposed roadway facility
- Increased sedimentation of wetlands and streams and decreased water quality due to future development of land adjacent to a new facility
- Loss of vegetation and wildlife habitat and decreased habitat value in areas of increased land development caused indirectly by improved access
- Impact to historic or archeological resource sites from development projects on private property that do not require cultural resource investigation because public funds or permits are not required
- Increased use of parks and recreational areas due to more convenient access provided by a new facility
- Stimulation of the local economy from the circulation of construction spending; improved access to employment opportunities, markets, goods, or services such as health and education; an increased work force related to construction; and developments stemming from a new facility

There are three broad categories of indirect effects:

- Alteration of the behavior and functioning of the affected environment caused by project encroachment (physical, chemical, biological) on the environment;
- Project-influenced development effects (i.e, the land use effect); and
- Effects related to project-influenced development effects (i.e., effects of the change in land use on the human and natural environment, NCHRP, 2002).

Land Use

The approximately 175,200-acre resource study area (RSA) for Segment D was comprised using a 5-mile radius from the Segment D ROW. The five-mile radius was used because the next major road

to the east, SH 6, is approximately 5 miles from SH 99. Those areas east of SH 6 would be primarily influenced by SH 6 and Beltway 8. To the west, existing development extends in some areas to approximately five miles, except for Cities of Richmond and Rosenberg, which were present prior to construction of Segment D. Since the roadway has been open since 1994 (13 years), based on aerial photography and development trends, Segment D does not appear to have influenced/induced development past the 5-mile western boundary of the RSA. Direct impacts can be described as changes in land use due to ROW requirements. TxDOT acquired approximately 800 acres of ROW for Segment D, starting in 1988.

As discussed in *Section IX*, the prevailing land uses within the vicinity of the project consist of residential with interspersed commercial development. Between US 90A and FM 1093 the land use has a large rural component, however; the rural land continues to be developed into residential developments.

Indirect land use changes have occurred as a result of the construction of Segment D. In January 1995 approximately 49,636 acres of the RSA had been developed. Eleven years later approximately 92,407 acres of the RSA had been developed or an 86 percent increase. The exact amount of indirect impacts on land caused by Segment D is unknown, but based on review of historical aerial photographs an 86 percent increase in developed land has occurred since the construction of Segment D.

Farmlands

SH 99 is a limited access roadway. Because the proposed project has had indirect effects to land use, some indirect effects on agricultural land and prime farmland soils have occurred. Due to the increase in residential development in a once predominantly agricultural area, SH 99 has indirectly caused the loss of farmland in western Harris County and eastern Fort Bend County.

Communities/Quality of Life

This section discusses the analysis of potential indirect effects of the proposed project to the human environment, including the people who live or travel in the area, and the factors that can influence the quality of life for persons in the vicinity of the proposed project or in larger geographic areas.

Community and Public Resources

As noted in this reevaluation, potential increases in the rate of area urbanization have occurred or are planned as result of original development of the SH 99 Segment D; resulting in population changes, new housing, and business developments.

The proposed tolling of the 12 overpasses would not be expected to adversely impact the traveling public, including low-income and minority persons/populations, due to the availability of existing non-tolled frontage roads and main lanes of SH 99 Segment D and other non-tolled roadways within the study area. The existing frontage roads provide a non-toll option to access major arterials such as IH 10 and US 59. Future development in the RSA would increase the overall population, which would require the development of additional infrastructure elements to serve the demands for energy, water and wastewater utilities, municipal services, medical services, police and fire protection, and other services.

Environmental Justice and Populations

As identified in the reevaluation, the RSA has experienced a high rate of residential and commercial developed since SH 99 Segment D was constructed. An increased rate of area urbanization has occurred and would be expected to continue; resulting in population changes, new housing, and business development. New places of employment closer to area residents could be a positive impact for low-income and minority populations in adjacent residential communities. The traveling public, including minority and/or low-income persons, may choose to utilize the non-tolled existing roadways specifically for cost-saving measures. The non-tolled existing roadways would be used by motorists who do not want to use, or cannot afford to use, the proposed toll facility.

Employment/Economic Activity

Construction of the proposed project would have direct, indirect, and induced effects on local, regional, and state employment, output, and income. Indirect effects are the sum of all the rounds of purchases by all the interrelated sectors of the state economy (including direct, induced, and all additional effects) beginning with those that supply the suppliers of the new roadway/highway construction sector. Indirect effects distribute throughout the economy at each round of purchases. Induced effects are also indirect effects of the project, but are farther removed in time, and are generated by the consumption of goods and services made possible by the payrolls associated with the construction project.

The estimated construction cost for the proposed project is $151.9 million. The total jobs that would be created in the short-term, indirectly by the implementation of the proposed project, are estimated to be 2,223 jobs. The total additional income that would be created indirectly by implementation of the proposed project is estimated to be $88.1 million. The total statewide effect from the proposed project is estimated to be $560.3 million (Texas State Office of Comptroller 1986).

Water Quality

An increase in area development has occurred since the construction of SH 99 Segment D. These developments increase the amount of permeable cover, which causes an increase in stormwater runoff into area streams. Impacts should be avoided or mitigated through compliance with state and local regulations, and therefore the indirect impact to water quality would be minor.

Floodplains

Development within floodplains would be in accordance with the NFIP and local regulations, and the proposed project would not indirectly impact the 100-year floodplain. No indirect impacts to floodplains have occurred or are anticipated as the result of the construction of the 12 overpasses.

Wetlands and Vegetative Communities

Land development has occurred, resulting in a decrease in undeveloped land. Due to this increase in development, a loss in wetlands has occurred within the RSA. In 1992 according to the U.S. Fish and Wildlife Service's National Wetlands Inventory (NWI) maps, approximately 10,027 acres of wetlands occurred in the RSA. Based upon review of 2006 aerial photography in conjunction with the NWI maps, approximately 8,695 acres of wetlands are currently in the RSA, a decrease of approximately 1,332 acres or approximately 95 acres per year. At the rate current development is

predicted, wetlands could almost be eliminated within the RSA except in special conservation green space areas. It is expected that wetland regulations would be followed and mitigation would occur for the loss of jurisdictional wetlands within the RSA.

Cultural Resources

Because Segment D has indirectly affected land use, some indirect effects could occur on cultural resources, if the resources are present within the boundaries of adjacent developments.

Air Quality

An increase in the rate of development is expected as a result of the proposed project. A temporary increase of emissions such as non-road vehicle exhaust and dust could be generated from construction activities associated with land development. The proposed project would not be expected to cause development of large industrial facilities with associated air emissions. Predicted land development would be primarily residential and commercial uses.

B. Cumulative Effects Analysis

This section presents the cumulative effects analysis conducted for this Reevaluation. This section includes an introduction to the background and project-specific requirements for the cumulative effects evaluation followed by a description of the methodology utilized to perform the analysis. Subsequent subsections provide the resource specific cumulative effects evaluations, followed by a summary of the results of the analysis.

The construction of the 12 overpasses and tolling of those overpasses is not expected to have a direct or indirect impacts in the RSA. Since the opening of SH 99 Segment D in 1994, the roadway has had an influence on land use in the RSA. This cumulative impacts analysis will focus on the change in land use in the RSA prior to and since Segment D opened in 1994. This cumulative impact analysis will also focus on wetlands and vegetation impacts as a result of the change in land use. Specific resources and environmental effects categories evaluated in this reevaluation are listed in *Table 11*.

Table 11
Determination of Resources/Issues Considered in Cumulative Effects Analysis

Current Health of Resource	Direct Impacts	Indirect Impacts	Resource/Issue to be Included in Cumulative Effects Analysis
Land Use			
Changing – Land use adjacent to SH 99, Segment D from Franz Road to US 59 consists of a mixture of mostly residential properties with associated commercial development and some undeveloped land. Areas adjacent to the roadway have been changing from undeveloped to residential and commercial uses since the late 1980s. The prevailing land uses within the RSA consists of residential developments, commercial uses, and undeveloped land uses, including Barker Reservoir.	Direct impacts can be described as changes in the land use due to the ROW requirements of the project. Segment D ROW is approximately 800 acres, which has already been acquired. No additional ROW is needed for the twelve overpasses.	Land use changes have occurred as a result of the construction of Segment D. Improved mobility has enhanced the appeal of the area to potential residents desiring to move away from more populated central portions of Harris and Fort Bend Counties. Induced development by Segment D has indirectly resulted in land development from the addition of a new roadway. Urbanization in the RSA has increased the overall population and required the development of additional infrastructure elements to serve the demands for energy, water and wastewater utilities, municipal services, medical services, police and fire protection, and other services.	Yes
Farmland			
Declining – Farmlands in Texas are increasingly being developed, with 2.2 million acres of rural land in Texas converted to developed use in a five-year period between 1992 and 1997.	It was determined that the land along the proposed alignment for Segment D has been dedicated as urban land use and therefore not subject to the Farmland Protection Policy Act (FPPA). No prime farmland soils would be converted to ROW use, as result of the construction of the twelve overpasses.	Some prime farmland soils have been impacted by Induced development and changes in land use in the RSA and additional prime farmland soils will likely be impacted in the future.	No

Table 11 cont.

Communities/Quality of Life (The communities/quality of life resource/issue encompasses human environment effects. The issues listed below were evaluated.)			
Displacements and Relocations			
Not applicable, not a resource	The ROW for this project was acquired. The proposed project would not require additional ROW and there will be no residential, business, or other displacements.	The proposed project would not indirectly cause displacements and relocations.	No
Community and Public Resources			
Community Changing- Single-family communities (primarily master planned communities) are expanding to areas previously used for agriculture or rangeland. Land would continue to be converted to residential and commercial uses as area population increases. **Public Resources** Steady but declining – Due to the fast-paced development of residential communities adjacent to the proposed roadway, stress is put on public resources. For example, the increased need for water supply to residential communities puts stress on aquifers, which is causing subsidence. Other demands on public resources includes: school districts, which need to accommodate new students; local governments for treatment of wastewater; energy supply to power new homes and businesses; coverage for emergency services; and the need for public infrastructure. The proposed improvements to SH 99 Segment D are needed to accommodate existing and proposed traffic, to ensure reasonable travel times for roadway users, which are primarily comprised of residents living in adjacent communities, as discussed in *Section VII*.	No displacements of community or public resources would occur. The existing SH 99 frontage roads and other non-tolled public roadways would continue to be available to all motorists, including low-income and minority populations. The project would not change access to residential neighborhoods/communities in the project area. It is expected that the proposed project would reduce congestion on the existing roadway; therefore, benefiting all roadway users by improving mobility in the project area. Public concerns discussed during the public meetings are discussed in *Section VII*. The primary concerns are addressed in the *Community Cohesion and Community Impact section*. No major impacts to adjacent communities/neighborhoods are expected as a result of the proposed project. In the short-term, an increase in traffic congestion would be expected due to roadway construction. In the long-term, the proposed project would improve mobility in the study area, therefore having a positive impact on citizens living in nearby residential neighborhoods/communities and/or trying to access community and public facilities. The system level impact of building the toll section of this project is discussed in the *Environment Justice section*. The tolled portion of SH 99 Segment D would be 0.2 percent of the planned toll miles in the Houston-Galveston transportation network.	As discussed in the *Land Use section*, SH 99 Segment D has indirectly impacted land development. Future development in the RSA would increase the overall population and require the development of additional infrastructure elements to serve the demands for energy, water and wastewater utilities, municipal services, medical services, police and fire protection, and other services.	No

Table 11 cont.

Environmental Justice and Population			
Not applicable, not a resource.	As identified in this re-evaluation, the SH 99 Segment D area has experienced a high rate of residential and commercial development since the 1987 EA. Several residential neighborhoods are adjacent to the roadway. The proposed SH 99 improvements would be within existing ROW. Tolling of the project may constitute a greater burden on lower-income motorists because they may not choose to use the toll facility. The existing frontage roads and some areas with main lanes would not be tolled. However, the non-toll options may result in difference in travel time due to lower posted speed limits and signalization as compared to travel time on the overpasses. However, it is expected that the proposed project would reduce congestion on the existing roadway; therefore, benefiting all roadway users by improving mobility in the project area. There would not be disproportionate adverse effects to environmental justice populations. Some induced development would be expected, primarily between US 90A and FM 1093. No indirect impact to population and demographics would be expected as a result of the proposed project.	No indirect impact to environmental justice populations or demographics changes of the study area is expected as a result of the proposed project.	No
Employment/Economic Characteristics			
Not applicable, not a resource.	Direct impacts include those arising from purchases made by the new construction sector. Roadway construction activities would create new job opportunities and income potential in the area in the short-term. The toll costs would be based on the distance traveled on the proposed tolled section. Currently the proposed toll collection fees have not been finalized. Individual minority and/or low-income persons may choose to utilize the non-tolled roadways in the vicinity specifically for cost-saving measures; however, the non-tolled existing roadways would be used by motorists who do not want to use, or cannot afford to use, the proposed facility. SH 99, Segment D would generate revenue for the construction, operation, and maintenance of this segment of SH 99 that would help complete the area's regional mobility plans.	Indirect Impacts and induced effects on local, regional, and state employment, and income would be expected as discussed in *Section XXVIII*.	No

Table 11 cont.

Noise			
Not applicable, not a resource.	Noise was studied in the 1987 EA, and noise contours were made available to the public. Two previously impacted structures are no longer present adjacent to the ROW. A noise wall was approved in 2004 for Governor's Place subdivision since it was being constructed prior to the 1987 FONSI and impacts were expected from the construction of the Highland Knolls and Kingsland Boulevard overpasses. All other developments adjacent to the ROW were constructed after the approved original EA. Noise impacts due to construction activities are difficult to predict. None of the receivers are expected to be exposed to construction noise for long periods of time; therefore, extended disruption of normal activities is not expected.	No indirect impacts anticipated.	No
Visual and Aesthetic Qualities			
Not applicable, not a resource.	The proposed project would introduce a new visual element in the immediate area. The design of the Grand Parkway incorporates scenic easements for the entire project. Two groups would be visually and aesthetically impacted by the proposed project: (1) individuals with a view from the road, roadway users, and (2) individuals with a view of the road, roadway viewers. In general, views would change from the perspectives of both parties.	Some new development could occur and would affect visual quality.	No
Air Quality			
According to studies conducted by H-GAC, the regional MPO, air quality has been improving in the Houston-Galveston area over the past 30 years and is expected to continue to improve. The Houston-Galveston-Brazoria area is currently classified as a "moderate" 8-hour nonattainment area for ozone. The Houston-Galveston Area is currently in attainment for CO. According to EPA studies Mobile Source Air Toxics (MSAT) are expected to be much lower in the future compared to current levels due to improvements in vehicle technology and fuels.	The proposed project is included in the Regional Transportation Plan and Transportation Improvement Program that have been determined to conform to the SIP. A qualitative analysis for MSATs was performed. The MSAT analysis indicated that there would be an increase in MSAT emissions, but that concentrations, durations, and any potential for negative health effects remain uncertain. However, it is expected that air quality would improve in the area with or without the proposed project. Overall emissions of pollutants are expected to decrease due to rapidly improving fuel and vehicle technology and the turnover in motor vehicles. There may be short-term, localized effects to air quality (e.g., increase in dust) in the immediate area adjacent to the project during construction.	The proposed project would indirectly affect the rate of land development in the RSA. Therefore, non-road vehicle emissions and dust caused from construction would be produced temporarily.	No

Table 11 cont.

Water Quality			
Declining – Water quality has been impacted in Harris and Fort Bend Counties primarily due to agricultural practices, oil and gas production, and the conversion of undeveloped land to an urban environment. Bullhead Bayou are on the TCEQ's 2006 Texas Water Quality Inventory and 303(d) list, indicating that they do not meet water quality standards. Bacteria is the primary concern for this stream segment.	During construction, exposed soil could runoff into streams and increase turbidity and sediment loading downstream. Use of BMPs would minimize the impact to water quality. Construction activities would increase erosion potential in areas of disturbed ground cover and soils, and the presence of pavement and buildings would increase the non-permeable area thus increasing storm water runoff. Landscaping efforts and roadway design would minimize these effects from increased runoff.	Some indirect impacts to water quality as a result of increased storm water runoff would be expected as a result of induced land development.	No
Floodplains			
Changing – development has caused encroachment on the floodplain. Development in the floodplain is typically offset with detention. Flooding continues to be a problem in the Houston area.	Direct impacts would include ROW within up to 17 acres of floodplain (based on preliminary assessment). The project would not raise base floodplain elevation.	Development within floodplains caused by induced land development would be in accordance with the federal and local regulations. The proposed project would not indirectly impact the 100-year floodplain.	No
Wetlands/Waters of the United States			
Declining – Changes in land use due primarily to residential development.	Segment D impacted approximately 18 acres of wetlands during construction. These wetlands were mitigated off-site, and the terms of the mitigation have been completed. A reconnaissance of the ROW in June 2007 revealed that areas that exhibit the three mandatory wetland criteria are present within the ROW. However, these areas have not been quantified. A formal delineation and submittal to the USACE will occur prior to construction.	The construction of Segment D has had an effect on land use, and some indirect impacts to wetlands have occurred.	Yes
Vegetation			
Declining – Changes in land use due primarily to residential and commercial development.	Direct impacts included up to 800 acres of ROW, mostly farmed fields, or pasture.	The construction of Segment D has had an effect on land use, and indirect impacts to vegetative communities have occurred.	Yes
Wildlife			
Declining – Future development may cause fragmentation and habitat loss, which affects species in the immediate vicinity. Majority of wildlife species occur throughout southeast Texas and populations are not in jeopardy.	Loss of habitat was minimal. Segment D crossed land that was being farmed or had been farmed in the past; however some fragmentation of existing habitat did occur. Direct impact to wildlife could be mortality as a result of construction.	The construction of Segment D has had an effect on land use, and indirect impacts to wildlife have occurred.	No

Table 11 cont.

Threatened and Endangered Species			
Stable – Impacts to individuals likely occur, especially plant species, threats to overall populations are not expected. Suitable habitat would continually be lost through land conversion.	No known direct impacts	None	No
Cultural Resources: Historic and Archeological			
Known archeological resources are within the proposed project ROW.	TxDOT will consult with the THC regarding any potential affect that the proposed undertaking may have on historic properties and archeological resources.	No known indirect impacts are anticipated; coordination with THC will occur as described under direct impacts.	No

Introduction

The CEQ regulations for implementing the NEPA define cumulative effects as: "the impact on the environment which results from the incremental impact of the action (project) when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Cumulative effects (impacts) include both direct and indirect, or induced, effects that would result from the project, as well as the effects from other projects (past, present, and reasonably foreseeable future actions) not related to or caused by the proposed action. The cumulative effects analysis considers the magnitude of the cumulative effect on the resource health. Health refers to the general overall condition, stability, or vitality of the resource and the trend of that condition. Laws, regulations, policies, or other factors that may change or sustain the resource trend were considered to determine if more or less stress on the resource is likely in the foreseeable future.

Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time. Cumulative impacts of the proposed project would be the incremental impacts that the project's direct or indirect effects have on that resource in the context of all other past, present, and reasonably foreseeable future impacts on that resource from unrelated activities.

Methodology for Cumulative Impact Analysis

An eight-step process was followed to assess cumulative impacts, based on the TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses. The steps are outlined in *Table 12*.

Table 12
Guidelines for Identifying and Assessing Cumulative Effects

1	Identify the resources to consider in the analysis
2	Define the study area for each affected resource
3	Describe the current health and historical context for each resource
4	Identify direct and indirect impacts that may contribute to a cumulative effect
5	Identify other reasonably foreseeable actions that may affect resources
6	Assess potential cumulative effects to each resource
7	Report the results
8	Assess and discuss mitigation issues for all adverse impacts

Source: TxDOT 2006

The eight steps used in this cumulative effects analysis are described below.

Step 1: Identify Resources to Consider

The first step in performing the cumulative impact analysis was to identify which resources to consider in the analysis. The cumulative impact analysis should focus only on (1) those resources

significantly impacted (directly or indirectly) by the project; and (2) resources currently in poor or declining health or at risk, even if project impacts are relatively small (less than significant).

Table 9 summarizes each resource impact, presents a determination of which resources would be carried forward and evaluated in the cumulative effects analysis, and identifies why some resources and effects categories were eliminated from the cumulative effects evaluation. Resource categories for which cumulative effects were evaluated include: Land; Water Resources; and Wetlands, Vegetation, and Waters of the United States.

Step 2: Define the Study Area for Each Resource

The cumulative effects analysis considered both geographic and temporal study limits, where applicable. A Resource Study Area (RSA) was defined for each resource and is discussed in the subsection for each resource. The RSAs are used for characterization of the health condition and trend for each resource and to determine the potential cumulative effects on a resource when quantitative information was not available. Cumulative effects were determined considering the potential cumulative effect on the health and trend on the resource within the RSA.

Step 3: Describe the Current Status/Viability and Historical Context for Each Resource

The historical context and health of each resource is described and presented in each resource subsection. This information is important to establish the baseline condition and trend the resource is experiencing to be able to estimate the magnitude of the resource effect. The historical context is first described to provide an explanation of the factors that have caused the current health of the resource. As previously mentioned, health refers to the general overall condition, stability, or vitality of the resource and the trend of that condition. Past actions represent the projects or activities in the area that have collectively caused the current status, health, vitality, and trend of the resources summarized in each resource section. Where possible, a quantitative assessment of the current health condition and the trend it is experiencing was provided; however, for many resources, quantitative data were not available to document the current health or trend of the resource. For these resources, a qualitative discussion of the resource health and trend is presented, and the types of actions that have caused or influenced resource health and trends are discussed.

Step 4: Identify the Direct and Indirect Impacts of the Project

This step identifies the direct and indirect effects that could result from the project that may contribute to a cumulative effect when added to non-project related effects. Direct and indirect impacts are defined by CEQ regulations (40 CFR 1508.8) as follows: "Direct impacts are caused by the action and occur at the same time and place." (40 CFR 1508.8)" Indirect (secondary) impacts are caused by the action and are later in time and farther removed in distance, but are still reasonably foreseeable. Indirect impacts may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate and related effects on air and water and other natural systems, including ecosystems." (40 CFR 1508.8) A summary of the direct and indirect effects is presented for each resource.

Step 5: Identify Other Reasonably Foreseeable Effects

A cumulative and indirect effects analysis requires consideration of past, present and reasonably foreseeable future actions. The approach used for this cumulative effects analysis included an

assessment of past, present and future actions with the purpose of characterizing the types of actions that are representative of past, present, and future development in the RSA. This provides a context for the types of development projects that have caused the current health of the land and other resources, and the trends the resources are experiencing. It also provides insight as to the effect of development on future resource stress and future trends.

Step 6: Identify and Assess Cumulative Impacts

Quantitative assessment of the cumulative effects on resource health and trends in the RSA was the goal of the cumulative effects analysis. However, where incomplete or unavailable information precluded a quantitative assessment of all resources, a qualitative assessment of the cumulative effect on each resource was performed. The cumulative effects analysis considered the direct and indirect effects of the project, together with the effects of past, present, and reasonably foreseeable future projects. The magnitude of the cumulative effect was determined by comparing the effect to the health and trend of the affected resource.

Step 7: Report the Results

The results of the cumulative effects analysis are reported herein. Direct effects are summarized under each resource in *Section IX,* and indirect effects were reported in the above *Indirect* section. Both are summarized below as they are included in the cumulative effects analysis. The assumptions and methods used are described in each resource section.

Step 8: Assess the Need for Mitigation

Opportunities for mitigation of adverse effects are discussed for each resource. These are not meant to be mitigation measures that TxDOT would, or has the authority to, implement. Rather, they are intended to disclose steps or actions that could be undertaken by local, state, and federal agencies and organizations to minimize the potential cumulative effect on each resource health and trend.

Land

Resource Study Area (RSA)

The approximately 175,200-acre resource study area (RSA) for Segment D was developed using a 5-mile radius from the SH 99 Segment D ROW. The 5-mile radius was used because the next major road to the east of SH 6 is approximately 5 miles from SH 99. Those areas east of SH 6 would be primarily influenced by SH 6 and Beltway 8. To the west, development ceases at approximately five miles, except for the Cities of Richmond and Rosenberg, which were present prior to Segment D. Since the roadway has been open since 1994 (13 years), based on aerial photography and development trends, Segment D does not appear to have influenced/induced development past the 5-mile western boundary of the RSA. Direct impacts can be described as changes in land use due to ROW requirements. TxDOT acquired approximately 800 acres of ROW for Segment D, starting in 1988.

Summary of Current Health and Historical Context

Current Health

In 2003, the Texas A&M University System, in cooperation with American Farmland Trust, published *Texas Rural Lands: Trends and Conservation Implications for the 21st Century*. The 2003 *Texas Rural Lands* study found that Texas leads all other states in the loss of rural farming and ranching lands. According to the study, "if the trend continues at the same rate for the next two decades, much more of the land in south, central, and east-central portions of the state will become fragmented." As discussed in *Section IX*, land use adjacent to SH 99 Segment D consists of a mixture of mostly residential areas with some agricultural uses. Existing land use categories in the RSA include residential, industrial, commercial, public (such as schools and the TDC), and parks. The prevailing land uses within the RSA consist of densely populated residential development, decreasing rural development, and Barker Reservoir. Large tracts of undeveloped land are present throughout the RSA; however, those tracts are being converted to residential uses at a fairly rapid rate.

Historical Context

The 2003 *Texas Rural Lands* study evaluated historic, current, and future trends in rural land use within the State of Texas. The study found that rural land, including farmlands, in Texas is increasingly being developed, with 2.2 million acres of rural land in Texas converted to urban use in a five-year period between 1992 and 1997.

Review of the aerial photographs dated 1952 and 1972 showed that farmland and associated single-family farmhouses comprised the majority of the land use in the RSA. The RSA remained primarily undeveloped through the early 1970s. Fort Bend County reported 8,774 acres (or 1.5 percent) of residential and commercial land use in 1970. The only residential and commercial developments were concentrated in the towns of Richmond/Rosenberg and Katy. As the 1970 decade progressed, urban development began to extend from Houston began to extend westward in the RSA to SH 6. Development in the 1970s was concentrated in the RSA just south of IH 10 and along Westgreen Road. The subdivisions of West Memorial, Cimarron, and Memorial Parkway were started during the 1970s. Development also began in the southeast portion of the RSA, south of US 59. Sugar Creek and Sugarwood subdivisions were constructed in the RSA.

In the 1980s the RSA began to develop more rapidly and large master planned communities were being started within the RSA. During the early 1980s the City of Katy began to expand north of IH 10 other developments started north of IH 10. The following developments north of IH 10 began construction during the early 1980s: Westgreen, Silvermill, Williamsburg Hamlet, and Williamsburg Settlement. The US 59 corridor also continued to develop within the RSA with The Highlands and Colony Bend subdivisions beginning construction. Near the City of Richmond north of US 90A, Pecan Grove Plantation and The Grove also started development during this time. Lastly, along SH 6 near the Fort Bend and Harris County line the developments of Mission Bend, Mission Glen, Townewest, Mission West, and Providence started construction.

The mid-to-late-1980s development continued south of IH 10 and began north of US 59 within the RSA. SH 99 Segment D was approved in 1987 and developments began to plan and build along the new roadway at street intersections. Construction of Governor's Place began in 1985 along the planned SH 99 corridor at Kingsland Boulevard. Cinco Ranch master-planned community began

developing plans to construct south of Highland Knolls to FM 1093. The subdivisions of Mission Glen, Townewest, and Providence were expanding in the SH 6 area of the RSA.

The RSA in the 1990s experienced tremendous growth. Residential land use in Fort Bend County grew to 22,320 acres in 1990, an increase of approximately four times the acreage in 1970. SH 99 opened to the traveling public in 1994, improving access and providing new access to previously remote areas. Subdivisions near IH 10, such as Cinco Ranch, Lake Pointe, Pin Oak Village, and Falcons Landing, began to grow rapidly after the construction of SH 99 Segment D. Development continued to expand near US 59 in the RSA with the construction of New Territory and First Colony. Along with these residential developments, retail centers were constructed. Development in 1995 totaled approximately 49, 636 acres within the RSA and approximately 63,342 acres in Fort Bend County.

Development in the 2000s has continued to expand in the RSA. *Figure 7* shows existing and past land use within the RSA. Aerial photography produced by the USGS (1995) and HGAC (2006) was reviewed for the RSA to determine the extent of past and present development within the RSA. The 1995 developed acreage in the study area was 49,636 acres, and the 2006 developed acreage in the study area was 92,407 acres, a 86 percent increase in development over an 11-year period or a growth rate of approximately 8 percent each year.

Summary of Direct Effects

Segment D is in an area with a long-term development trend. The construction of Segment D has led to additional development. As stated in the EA, the roadway made remote areas more accessible and attractive for residential and commercial development. Segment D required approximately 800 acres of ROW. The 12 overpasses will have a negligible effect on land use.

Summary of Indirect Effects

Indirect land use changes have occurred as a result of the construction of Segment D. In January 1995 approximately 49,636 acres of the RSA had been developed. Eleven years later approximately 92,407 acres of the RSA had been developed, an 86 percent increase. The indirect impacts to land use caused by Segment D cannot be quantified, but based on review of historical aerial photographs a correlation can be drawn between the change in land use and the construction of Segment D.

Other Reasonably Foreseeable Effects

Reasonably foreseeable actions are those that are likely to occur, or are probable, rather than those that are possible. Reasonably foreseeable projects include roadway projects and large master planned communities. These reasonably foreseeable projects could contribute to land use changes in the study area. Reasonably foreseeable roadway projects in the RSA include the following:

- Construction of Segment E of the Grand Parkway from Franz Road to US 290 (approximately 694 acres)
- Construction of Segment C of the Grand Parkway from US 59 to SH 288 (approximately 1,000 acres)
- Extension of the Westpark Tollway west of SH 99 Segment D

- The continued expansion of existing residential developments in the RSA, including Cinco Ranch Southwest (2,000+ acres) and the development of portions of George Ranch property south of US 59 (23,000 acres)

Open areas continue to convert to residential developments with the associated commercial developments. A study developed by The West Houston Association predicts that except for reserved green space areas, the entire RSA will be developed by the year 2050.

Results of Cumulative Effects Analysis

Segment D directly converted approximately 800 acres of agricultural land to road ROW. Since the roadway was constructed, indirect impacts have occurred and will likely continue to occur within the RSA. These indirect impacts are the results of the conversion of undeveloped land to residential and other uses. Portions of the RSA would have likely developed without SH 99 Segment D. These portions would have included areas adjacent to existing roadways such as IH 10, US 59, FM 1093, US 90 A, FM 723, FM 762, and FM 1464, because these roads provided access to business centers. Land located between FM 1093 and north of US 90 A would have had little access without Segment D; thus, Segment D has influenced land use between those two roads. Areas near IH 10, US 90 A and US 59 have been influenced by SH 99 since the roadway provided a much faster travel route to the interstate and highways when compared to local roadways, making adjacent land more attractive to developers and home buyers.

Mitigation Opportunities

The 2003 *Texas Rural Lands* study indicated that Purchase of Development Rights (PDR) programs are used in other states to slow the land use conversion and fragmentation of farms, ranches, and wildlife habitats. According to the study, PDR programs buy development rights from willing landowners, and based on simulation models, the study found that Texas would benefit most if a PDR was to be implemented in areas where relatively large ownerships (greater than 2,000 acres) are present. Because the mean farm size in Harris County is 124 acres and the median is only 40 acres (United States Department of Agriculture [USDA] Census of Agriculture, 2002), a PDR program by the State of Texas would not be an effective mitigation within the RSA.

C. Wetlands and Vegetation

Resource Study Area (RSA)

Wetlands

The cumulative effects RSA was developed by using the land use RSA (*Exhibit 8*). The watershed approach typically used for the cumulative effects analysis encompasses thousand of square miles (Brazos River watershed) of primarily undeveloped land. The land use RSA more accurately depicts the land use cover for these portions of Fort Bend and Harris Counties. This allows the cumulative effects analysis to focus on a smaller geographic area where the majority of development impacts have occurred.

Vegetation

The RSA for vegetation is the same as the RSA for land use, approximately 175,200 acres square miles (*Figure 6*). The RSA for land use encompasses primarily residential land use with some farmland/ranchland.

Summary of Historical Context and Current Health

Wetlands and Vegetation

There have been substantial losses to wetlands and other habitats, and in turn wildlife habitat diversity, in Harris and Fort Bend Counties since the 1950s. Continued urbanization and industrialization of the Houston area will cause continued pressure on remaining habitats and the ecosystem. The 1995 developed acreage in the study area was 49,636 acres, and the 2006 developed acreage in the study area was 92,407 acres, an 86 percent increase in development over an 11-year period or a growth rate of approximately 8 percent each year.

Summary of Direct Effect

Wetlands

In 1991, the USACE issued to TxDOT an IP for construction of Segment D, for fill and/or dredge within 30 jurisdictional wetlands comprising an area of 17.95 acres. All bridges have been constructed over jurisdictional streams. Modifications at the Mason Creek and Bullhead Slough crossings would occur; all other streams would be avoided. The mitigation and monitoring has been completed. Approximately 3.9 acres of potential jurisdictional streams and approximately 7.5 acres of areas meeting wetlands criteria are found within the proposed ROW between Franz Road and US 59. The 12 overpasses include six separate construction areas; these construction areas contain approximately 1 acre of waters of the United States and approximately 5 acres of areas meeting wetlands criteria within the proposed ROW. *Figure 2A – 2L* shows potential waters of the United States, including wetlands in the proposed project area. The area of jurisdictional waters of the US, including wetlands, under the Clean Water Act is subject to USACE jurisdictional determination. Before construction, delineation of wetlands within construction areas will be required to determine those areas under jurisdiction of the USACE.

Vegetation

The majority of the vegetation impacts from construction of Segment D occurred to agricultural and pastureland communities, a total of approximately 800 acres. Some forested riparian habitats were impacted during construction of SH 99; however, these areas were not quantified in the original EA. The 12 overpasses would temporarily affect approximately 200 acres of mowed and maintained ROW. Approximately 100 acres would be returned to mowed and maintained ROW after construction. Cleared areas would be revegetated upon completion of construction and maintained by standard TxDOT practices.

Summary of Indirect Effects

Wetlands and Vegetation

Construction of SH 99 Segment D indirectly caused development in the RSA. If wetlands were impacted by other developments, it is expected that mitigation would have offset the impacts in accordance with USACE permitting requirements. The majority of vegetation in the RSA has been altered by past agricultural activities. No significant indirect losses to natural vegetation have occurred as a result of construction of Segment D.

Other Reasonably Foreseeable Effects

Reasonably foreseeable actions are those that are likely to occur, or are probable, rather than those that are possible. Reasonably foreseeable projects include roadway projects and large master planned communities. Reasonably foreseeable roadway projects in the RSA include those identified in the land use RSA. These reasonably foreseeable projects could cause potential permanent degradation and loss of pastureland and small amounts of forest land, and potential loss and degradation of wetlands and waters of the United States.

Results of Cumulative Effects Analysis

Wetlands

Segment D impacted approximately 18 acres of wetlands during construction, and impacts were mitigated off site. Land use in the RSA has changed rapidly since the construction of SH 99 Segment D. An increase in residential development and associated commercial development has occurred within the RSA. Due to this increase in development a loss in wetlands has occurred within the RSA. In 1992, according the U.S. Fish & Wildlife Service's National Wetlands Inventory (NWI) maps, approximately 10,027 acres of wetlands were in the RSA. Based upon review of 2006 aerial photography in conjunction with the NWI maps, approximately 8,695 acres of wetlands are currently in the RSA, a decrease of approximately 1,332 acres or approximately 95 acres per year. At the rate current development is predicted, wetlands could almost be eliminated within the RSA except in special conservation green space areas. It is expected that wetland regulations would be followed and mitigation would occur for the loss of jurisdictional wetlands within the RSA.

Vegetation

The majority of the vegetation within the RSA has been impacted by urbanization or farming practices. The majority of the vegetation that would be impacted by the 12 overpasses is within existing ROW and consists of mowed grasses. It is predicted that the majority of the RSA will be developed by 2050, except for green space areas. The majority of natural vegetation outside of these green space areas will be eliminated through construction of housing and commercial developments.

Mitigation Opportunities

Wetlands

TxDOT mitigated for the approximately 18 acres of wetlands that were impacted by the construction of SH 99 Segment D through 52 acres of offsite wetland mitigation. TxDOT would mitigate for any additional impacts to jurisdictional waters of the United States within the ROW would be mitigated

for. Possible mitigation sites would include TxDOT's Coastal Bottomlands Mitigation Bank in Brazoria County, or payment of an in-lieu fee to another entity as compensation for impacts. If necessary, a compensatory mitigation plan would be prepared, as necessary, and submitted to the USACE as part of a Section 404 permit application. Impacts to wetlands within the RSA would be avoided, minimized, or mitigated by compliance with existing federal statutes that apply to private and government interests. The USACE (under Section 404 of the Clean Water Act) has legislative mandates to reduce or avoid significant, adverse impacts to wetlands on an individual as well as a cumulative basis. TxDOT would not mitigate for any filled wetlands caused by indirect impacts to the aquatic environment. Mitigation would be the responsible of the developer or the entity proposing to construct in wetlands. The entity causing the wetland impacts would coordinate with the USACE and other resource agencies directly.

Vegetation

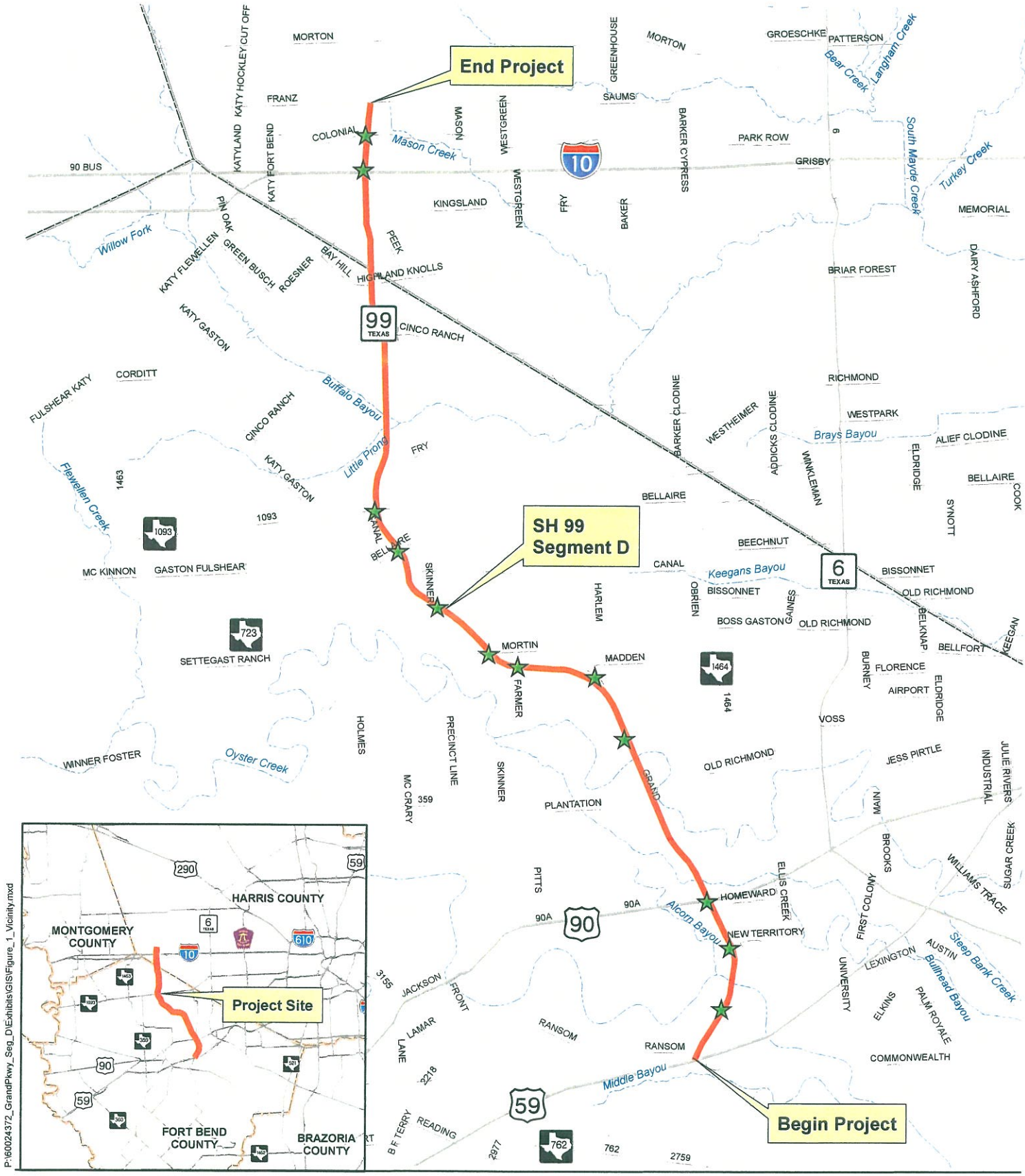
Construction of SH 99 Segment D impacted approximately 800 acres of undeveloped land, which was primarily agricultural land. TxDOT would not mitigate for past construction activities. The 12 overpasses, approaches, and main lanes would be constructed within the existing ROW and would not disturb any regionally significant vegetation. TxDOT does not mitigate for cumulative impacts to vegetation other than direct impacts to special or unique vegetation as described in the MOU with TPWD. Currently, there are no local, state, or federal requirements in Harris County or Fort Bend County that mandate mitigation for impacts to non-protected-vegetation. Any impacts caused by indirect development would have to be mitigated by the entity causing the loss to the vegetation. However, since there are no vegetation mitigation requirements for the area, mitigation would be at the discretion of the developer.

XXIX. CONCLUSION

Since the time of the last environmental documentation for this project, there have been no changes in ROW requirements, and the only change is the proposed addition of toll collection facilities for the 12 overpasses, approaches, main lanes, and the relocation of the future West Airport Boulevard overpass 230 feet north of its previously approved location. The previously approved EA and the subsequent January 2004 EA were completed without the consideration of tolling. Two public meetings (May 22 and 24, 2007) were held to inform the public about the proposed tolling of the 12 overpasses along SH 99 Segment D. This Reevaluation determines that project modifications (tolling the proposed overpasses and relocation of the West Airport Boulevard overpass) would not result in impacts substantially different than those identified in the previously approved studies. Implementation of these changes would not appreciably increase the potential for impacts beyond those considered in previous assessments. No additional public involvement is required, and further environmental studies are not warranted.

XXX. SUMMARY

The environmental documentation for this project has been reviewed, and it has been determined that there have been no significant changes to the assessed areas. The FONSI designation remains valid. No additional public involvement is required, and further environmental studies are not warranted.



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

VICINITY MAP

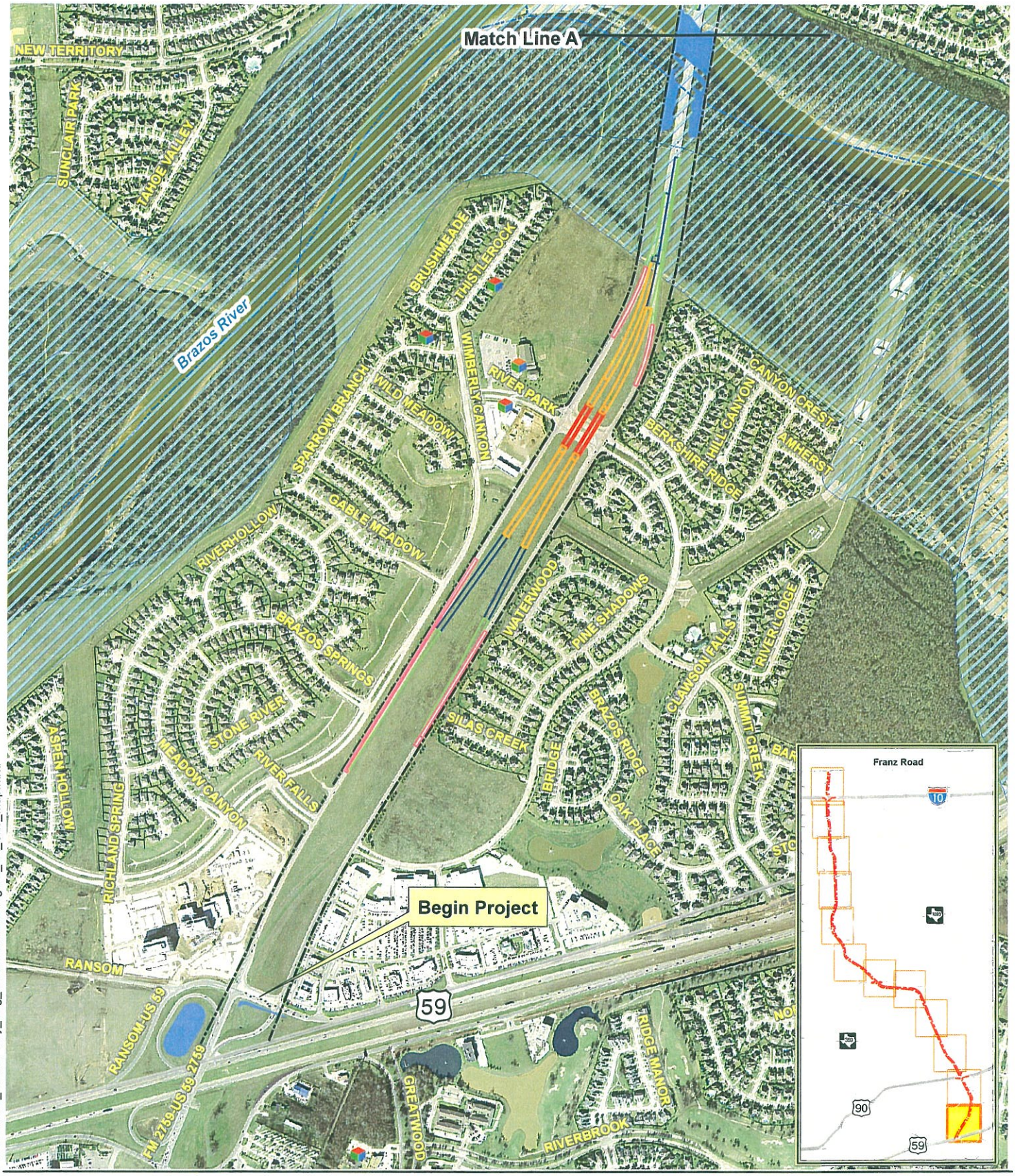
Texas Department of Transportation
Houston District

0 N 12,000 Feet

Legend

- Grand Parkway Segment D
- Proposeed Overpass

FIGURE 1



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

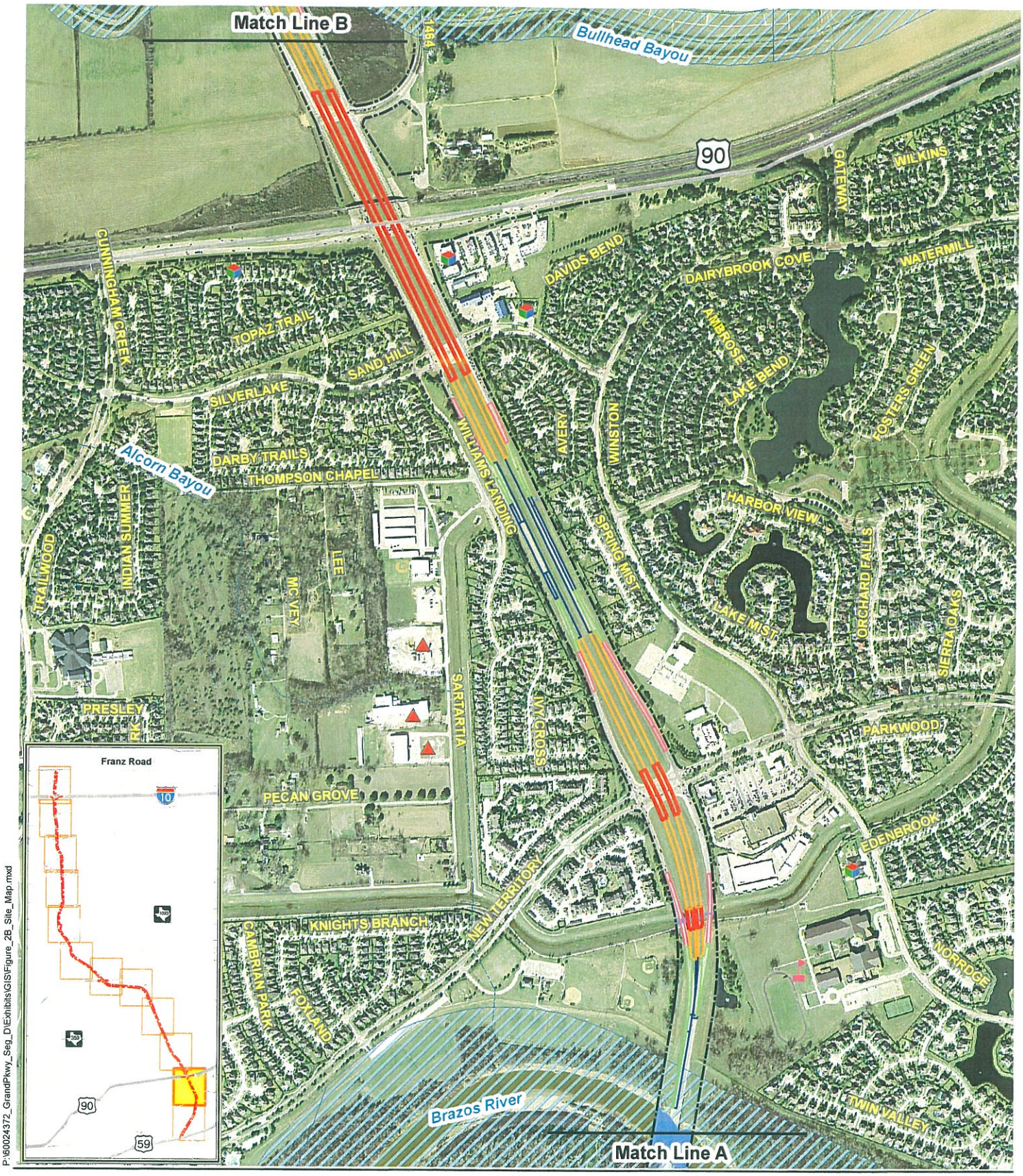
Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

Texas Department of Transportation
Houston District

0 N 1,000 Feet

FIGURE 2A



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD) ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

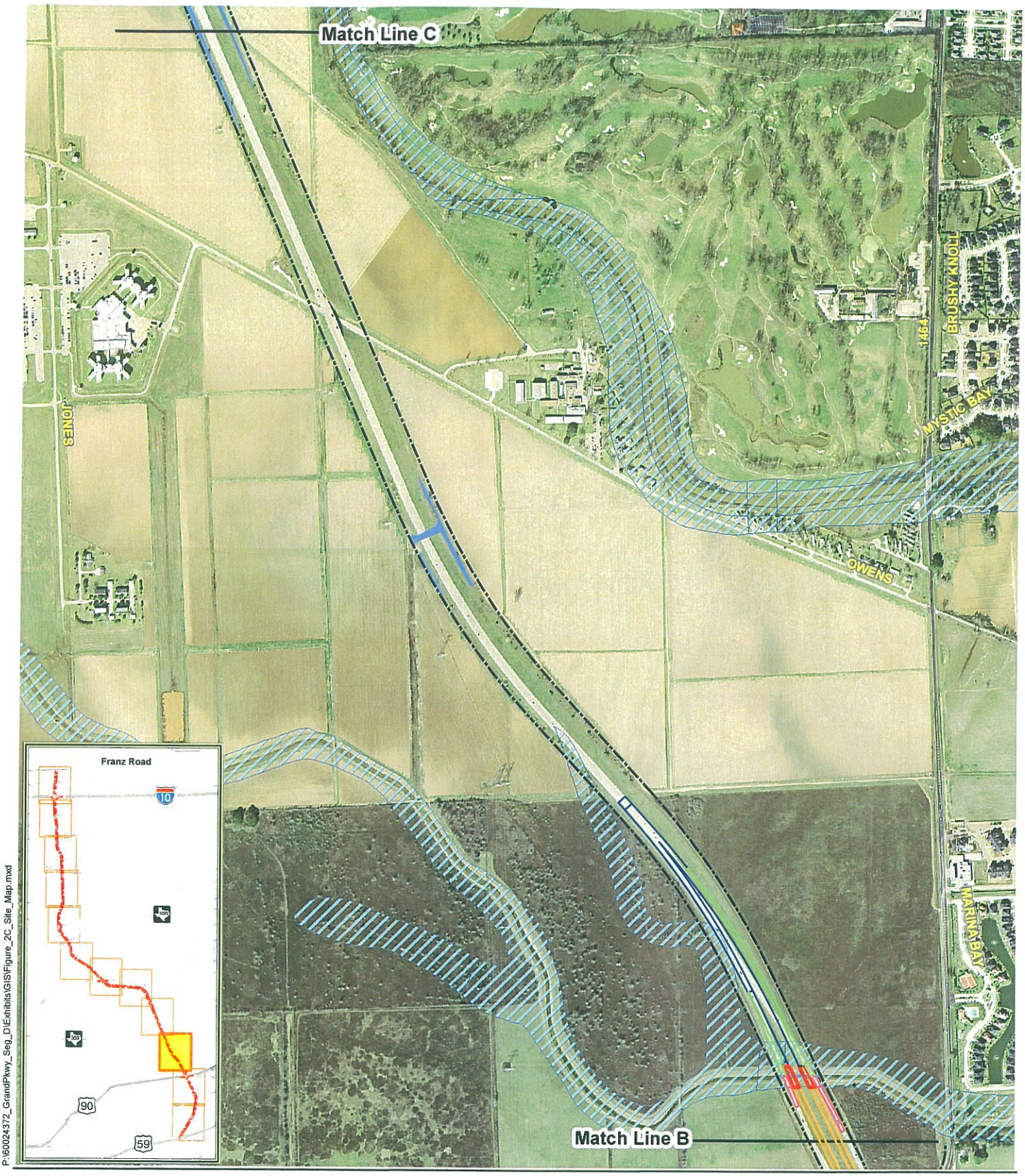
Texas Department of Transportation
Houston District

0 N 1,000 Feet

Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

FIGURE 2B



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

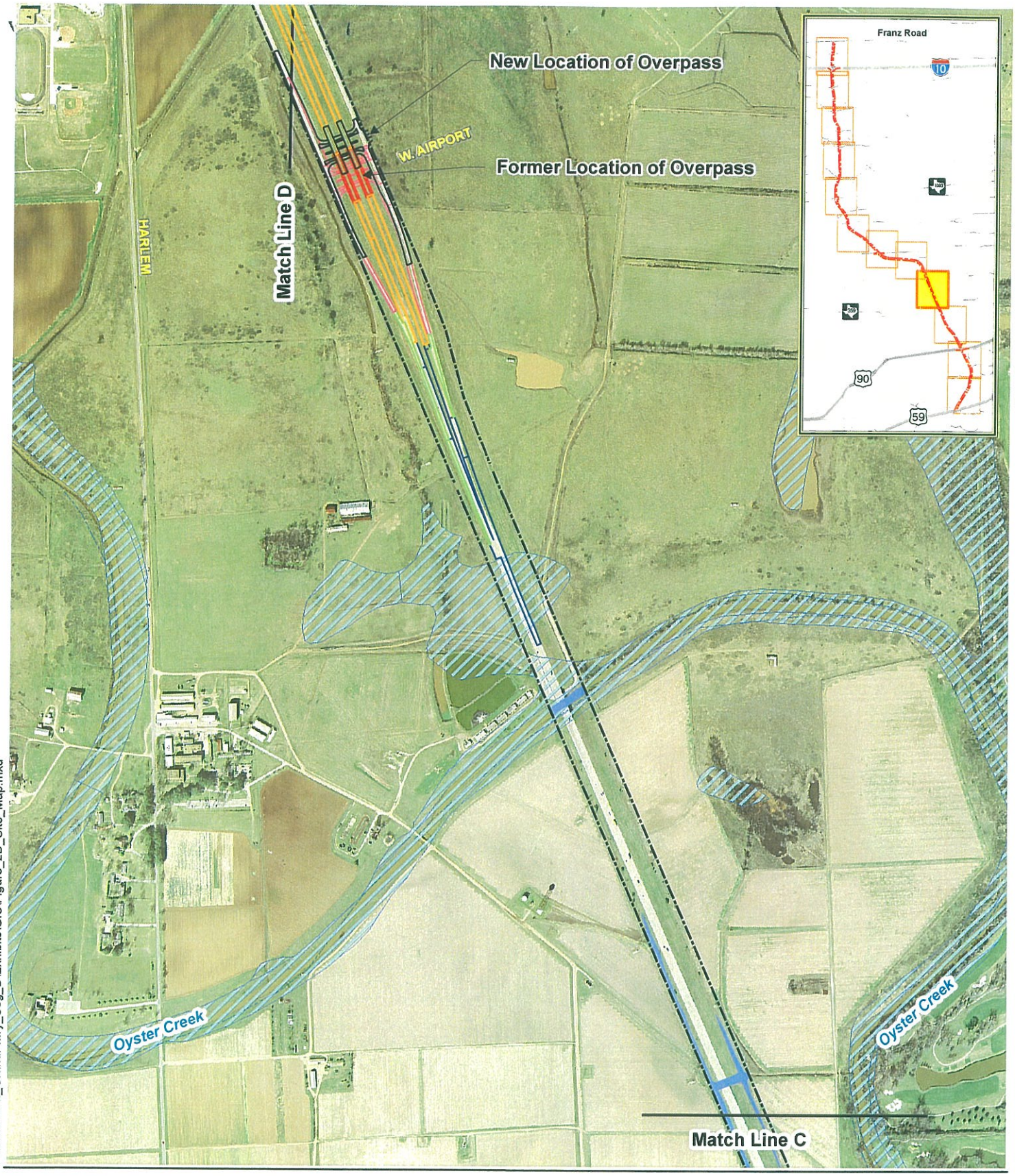
Texas Department of Transportation
Houston District

0 N 1,000 Feet

Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

FIGURE 2C



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

Texas Department of Transportation
Houston District

0 N 1,000 Feet

Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

FIGURE 2D

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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

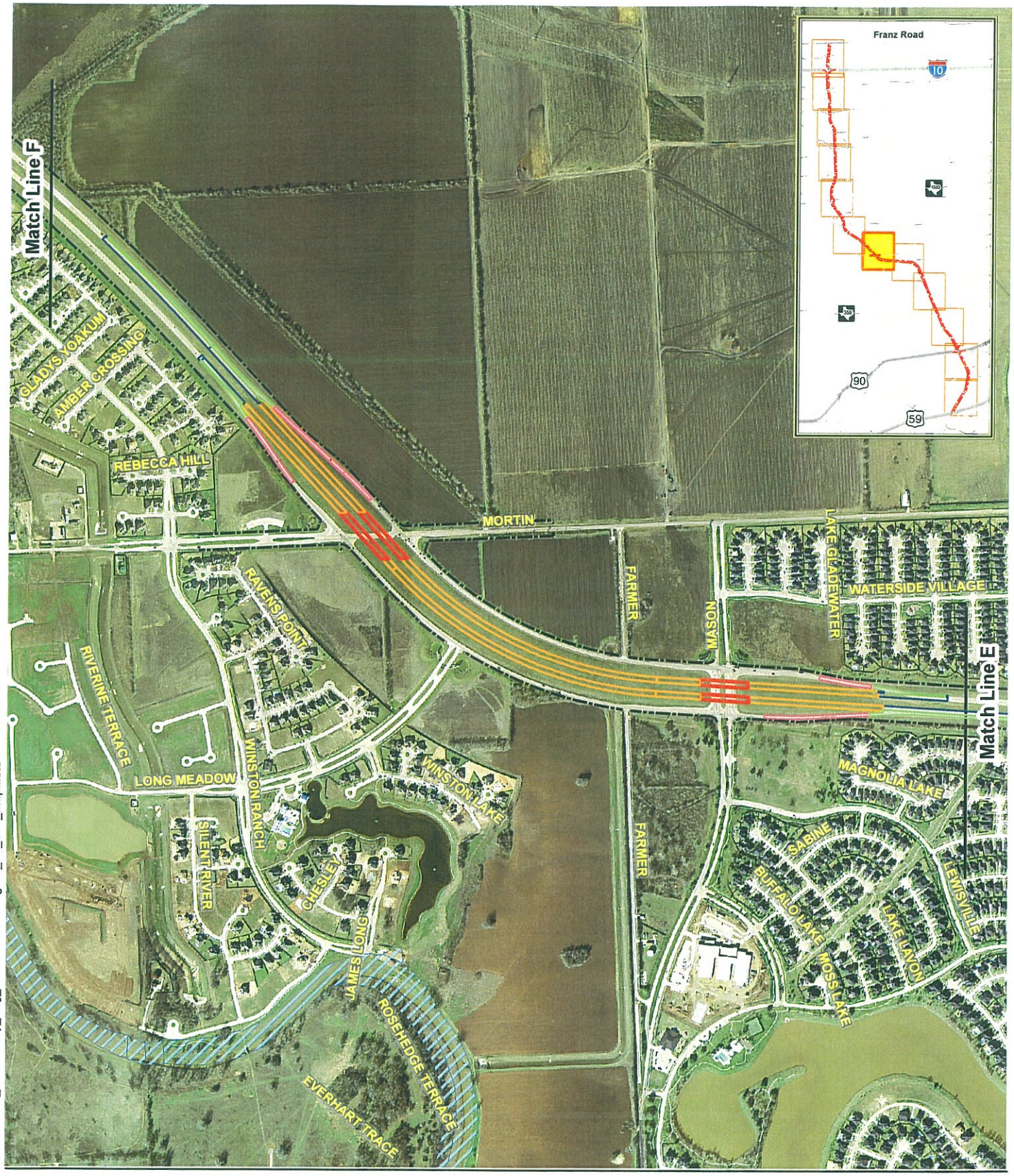
Legend

- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

Texas Department of Transportation
Houston District

0 N 1,000 Feet

FIGURE 2E



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD) ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

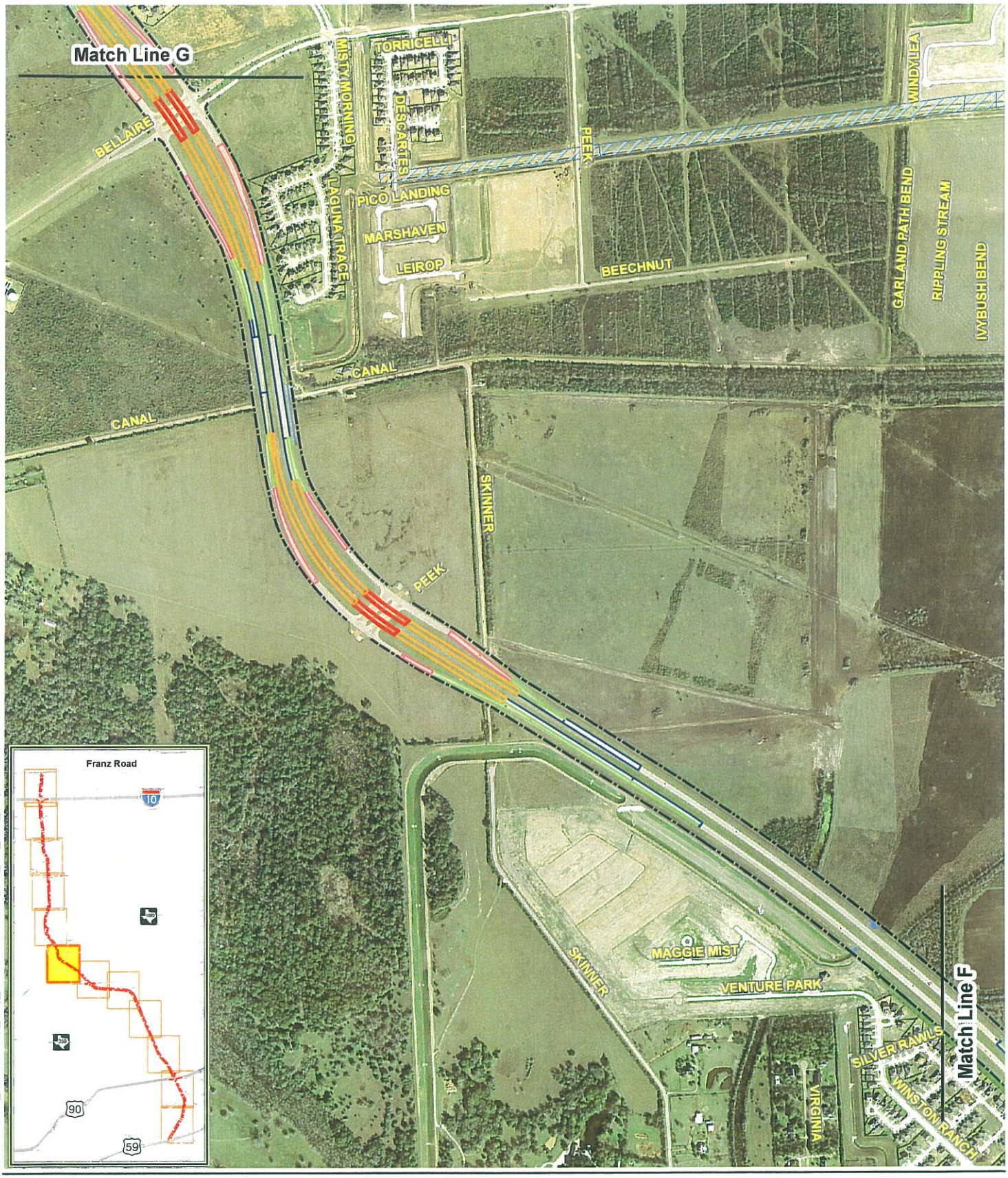
Texas Department of Transportation
Houston District

0 N 1,000 Feet

Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

FIGURE 2F



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

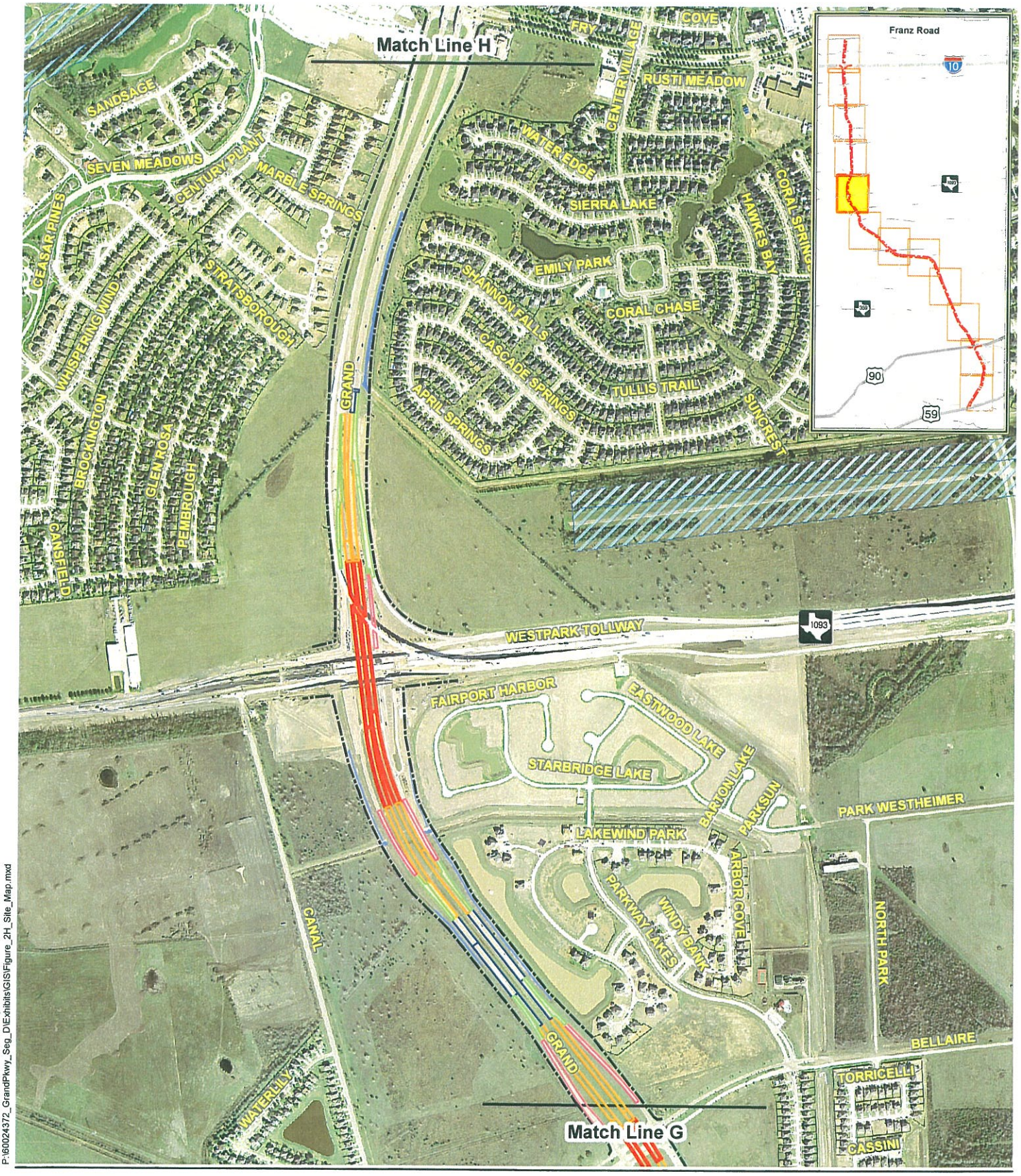
Texas Department of Transportation
Houston District

0 N 1,000 Feet

Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

FIGURE 2G



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

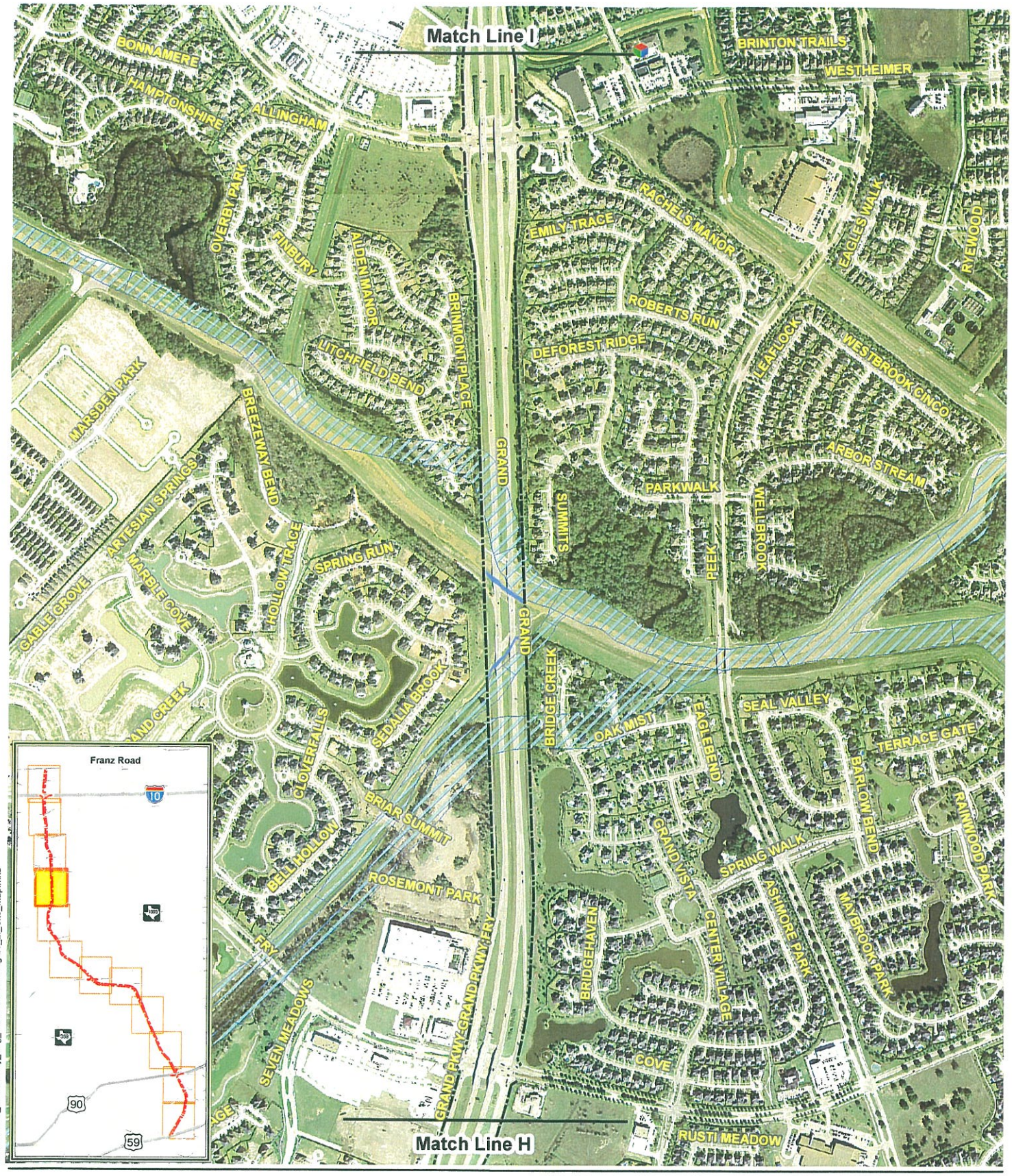
Texas Department of Transportation
Houston District

0 N 1,000 Feet

Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

FIGURE 2H



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

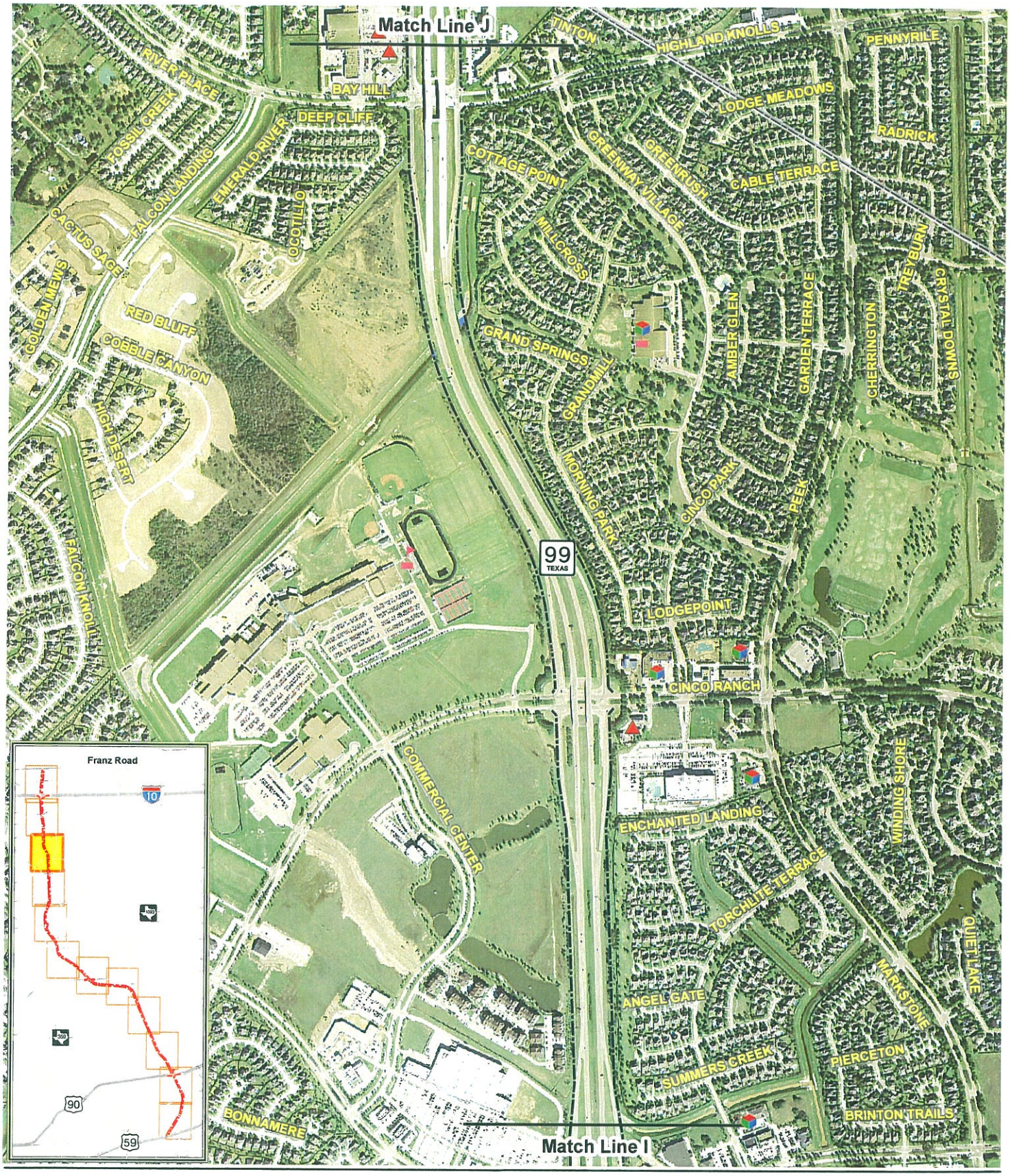
Texas Department of Transportation
Houston District

0 N 1,000 Feet

Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

FIGURE 2I



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD) ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

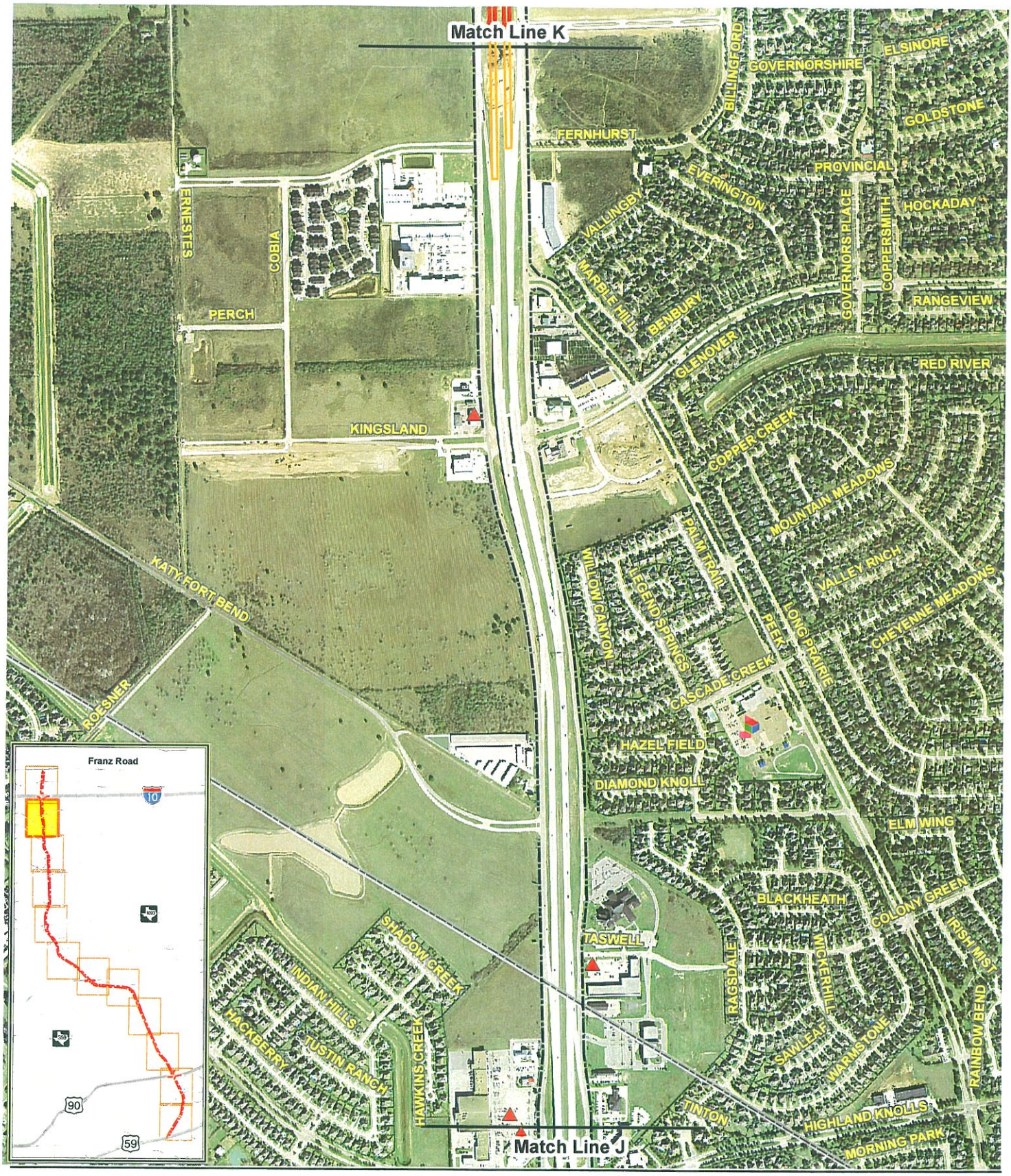
Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

Texas Department of Transportation
Houston District

0 N 1,000 Feet

FIGURE 2J



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

Legend

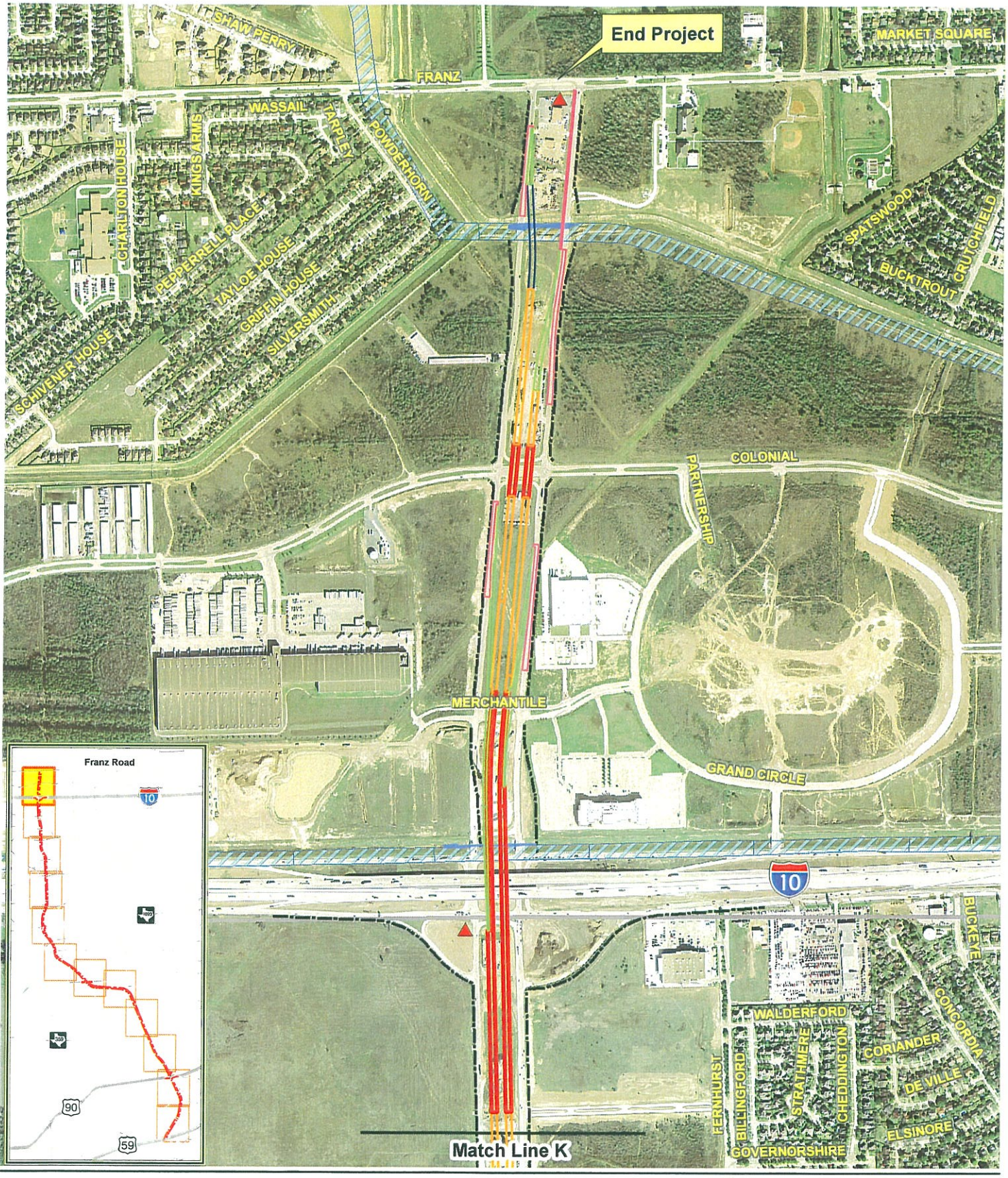
- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

Texas Department of Transportation
Houston District

N

0 1,000 Feet

FIGURE 2K



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD) ENVIRONMENTAL ASSESSMENT REEVALUATION

SITE MAP

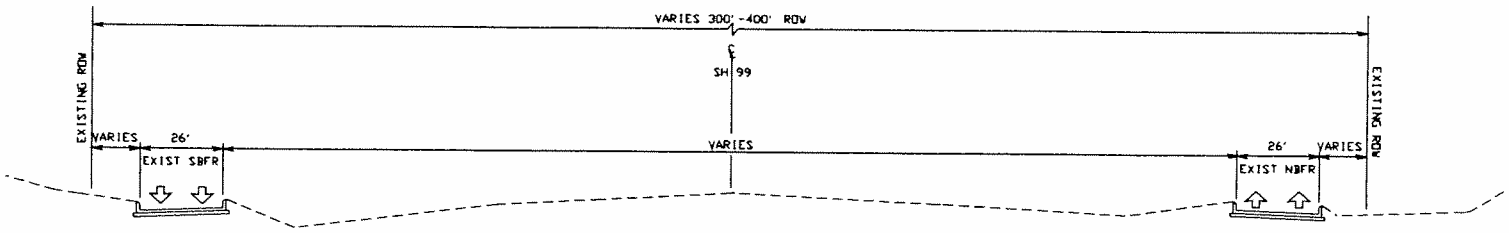
Texas Department of Transportation
Houston District

0 N 1,000 Feet

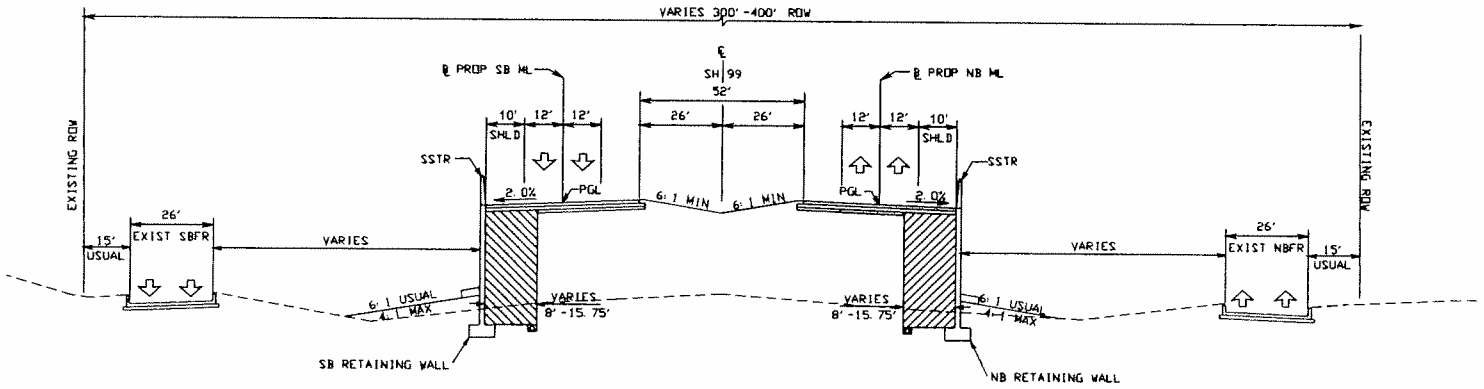
Legend

- Potential Hazardous Sites
- Licensed Child Care Facility
- School
- Potential Jurisdictional Areas
- 100-Year Floodplain
- Proposed Bridges
- Proposed Approaches
- Frontage Roads
- Proposed MainLanes
- Proposed Ramps
- Existing ROW

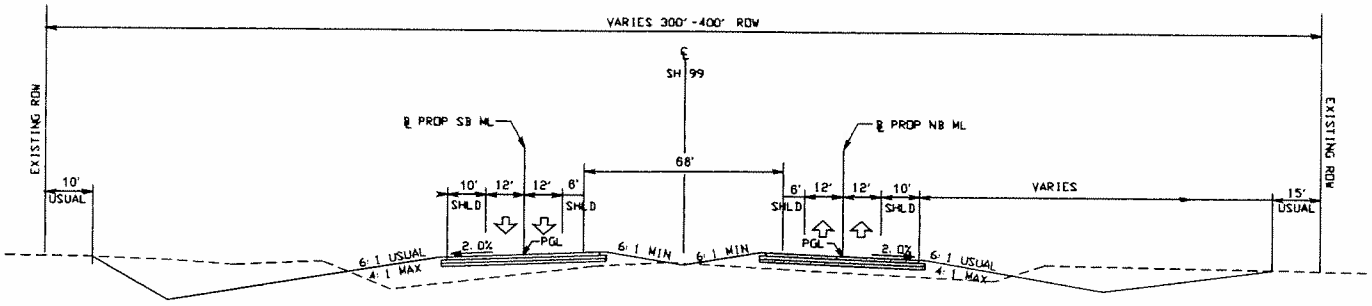
FIGURE 2L



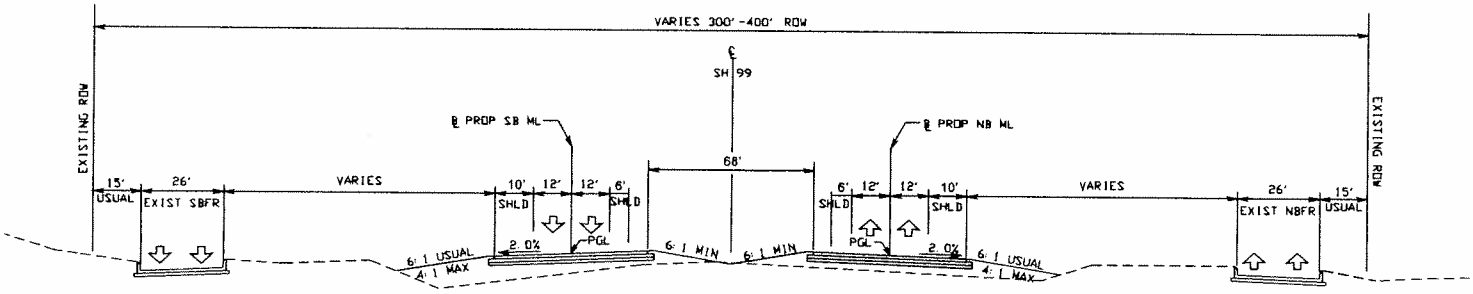
EXISTING TYPICAL SECTION WITH NO MAIN LANES
TYPICAL OF LOCATION OF TWELVE PROPOSED OVERPASSES



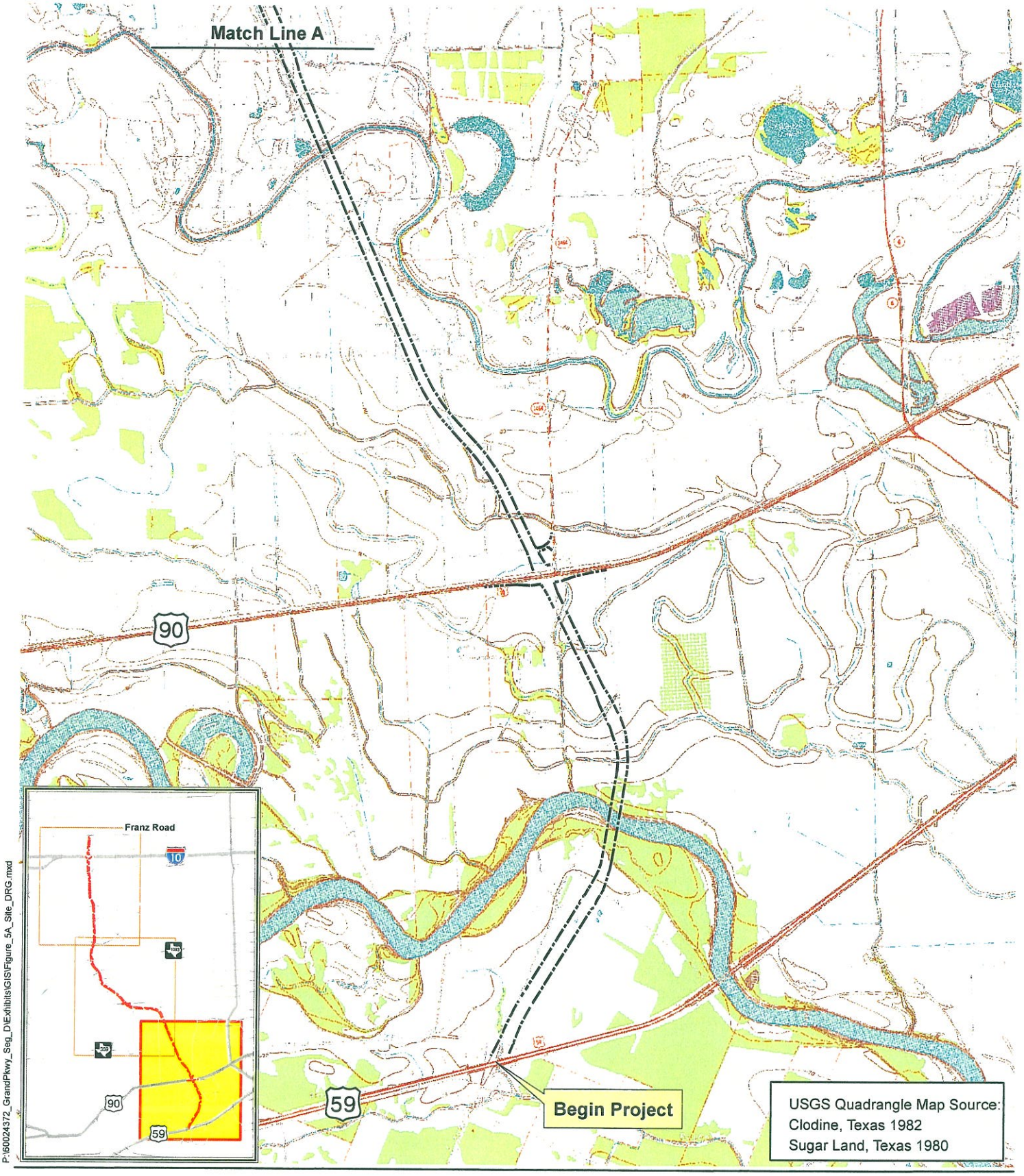
PROPOSED TYPICAL SECTION AT TWELVE OVERPASSES
MAIN LANES WITH FRONTAGE ROADS



EXISTING TYPICAL SECTION
MAIN LANES WITHOUT FRONTAGE ROADS



PROPOSED TYPICAL SECTION
MAIN LANES WITH FRONTAGE ROADS



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

USGS QUADRANGLE MAP

Texas Department of Transportation
Houston District

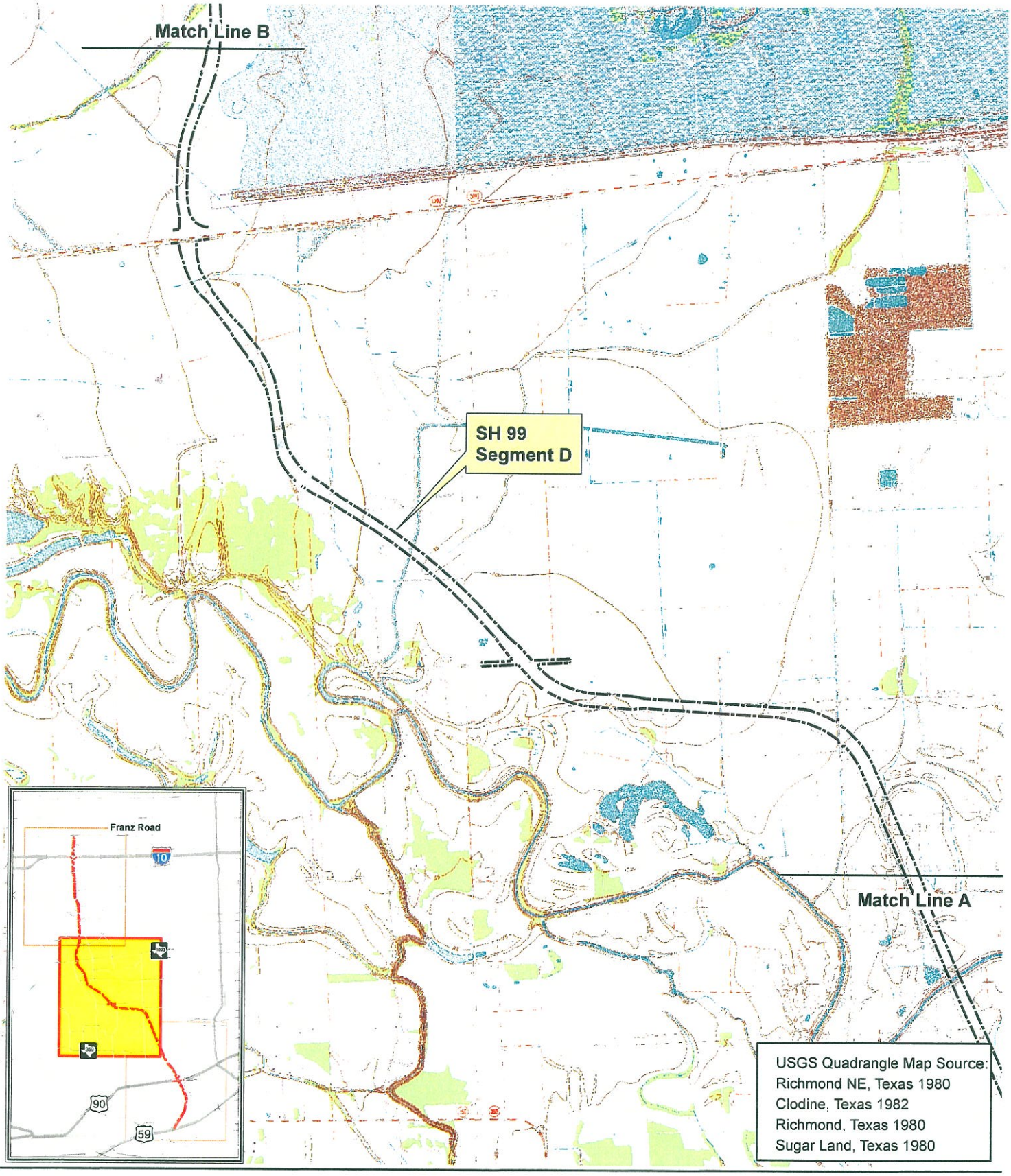
N

0 4,000 Feet

Legend

Existing ROW

FIGURE 5A



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

USGS QUADRANGLE MAP

Texas Department of Transportation
Houston District

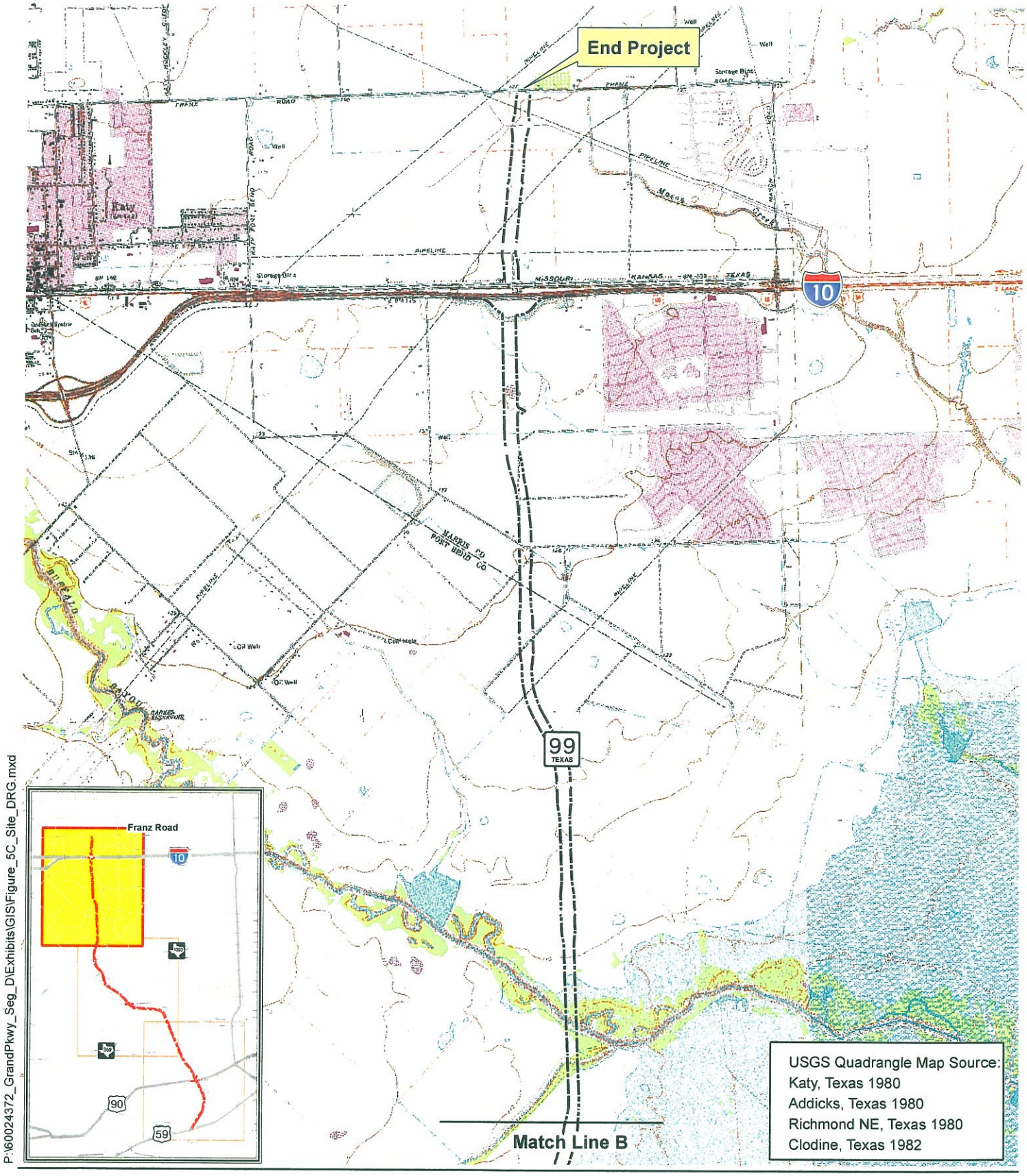
N

0 4,000
Feet

Legend

Existing ROW

FIGURE 5B



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

USGS QUADRANGLE MAP

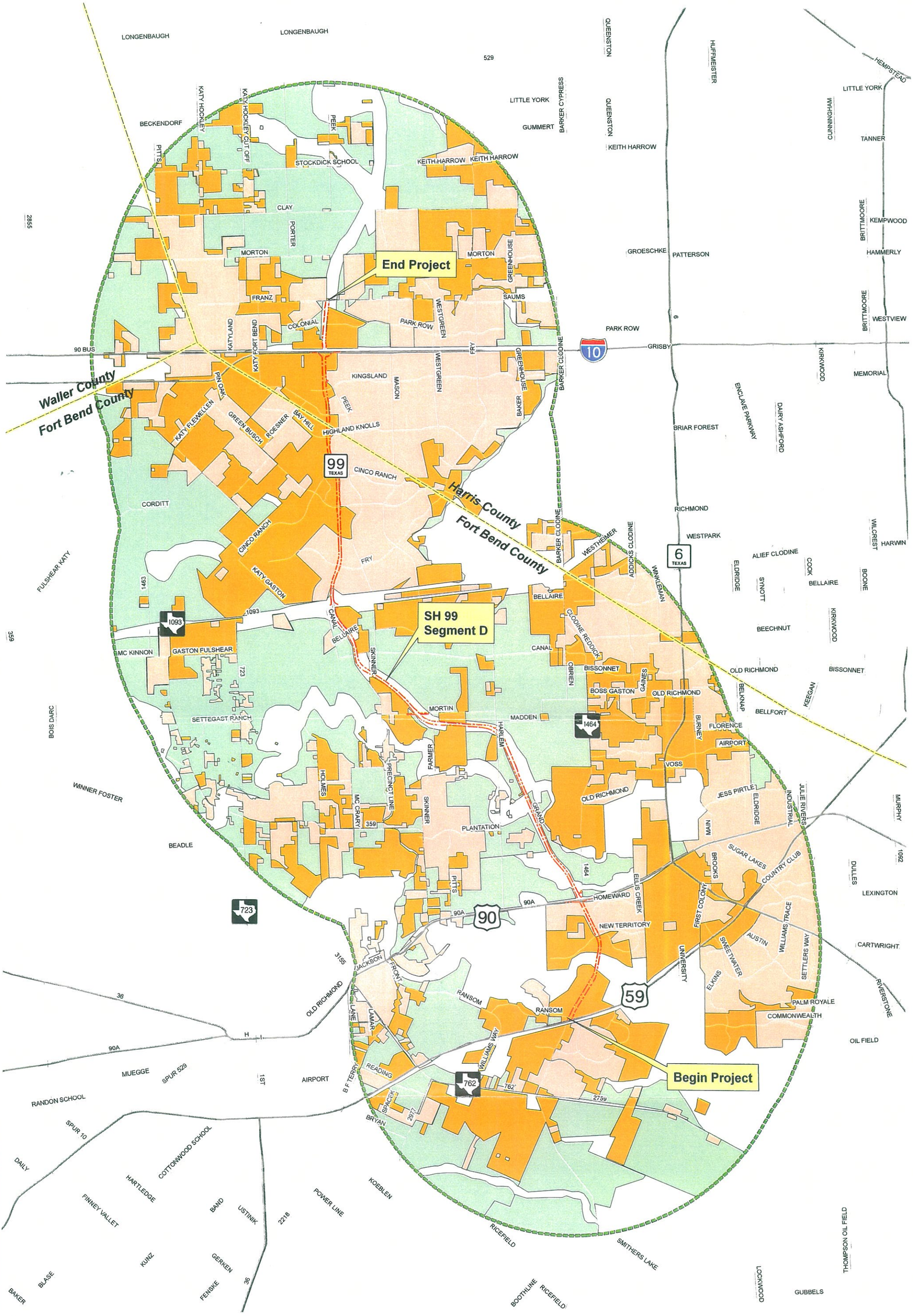
Texas Department of Transportation
Houston District

0 4,000 Feet

Legend

Existing ROW

FIGURE 5C



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

LAND USE IN RSA

Texas Department of Transportation
Houston District

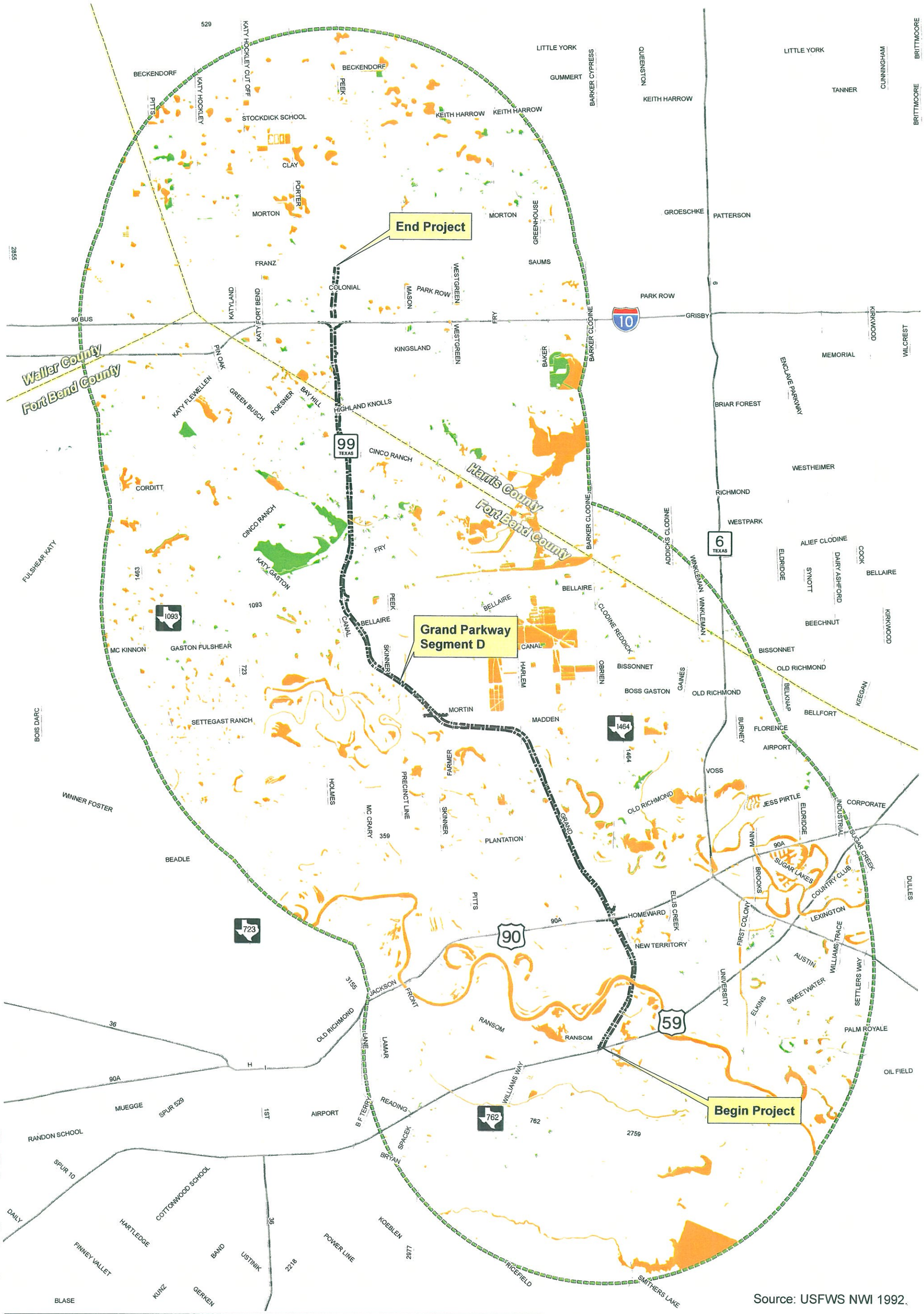
0 N 10,000 Feet

Legend

- County Boundary
- Existing ROW
- RSA
- Development in 1995
- Development in 2006
- Development in 2050
- Estimated Green Space/ 100-year Floodplain

FIGURE 6

P:\60024372_GrandPkwy_Seg_D\Exhibits\GIS\Figure_6_Land_Use.mxd



SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

NWI IN RSA

Texas Department of Transportation
Houston District

0 10,000 Feet

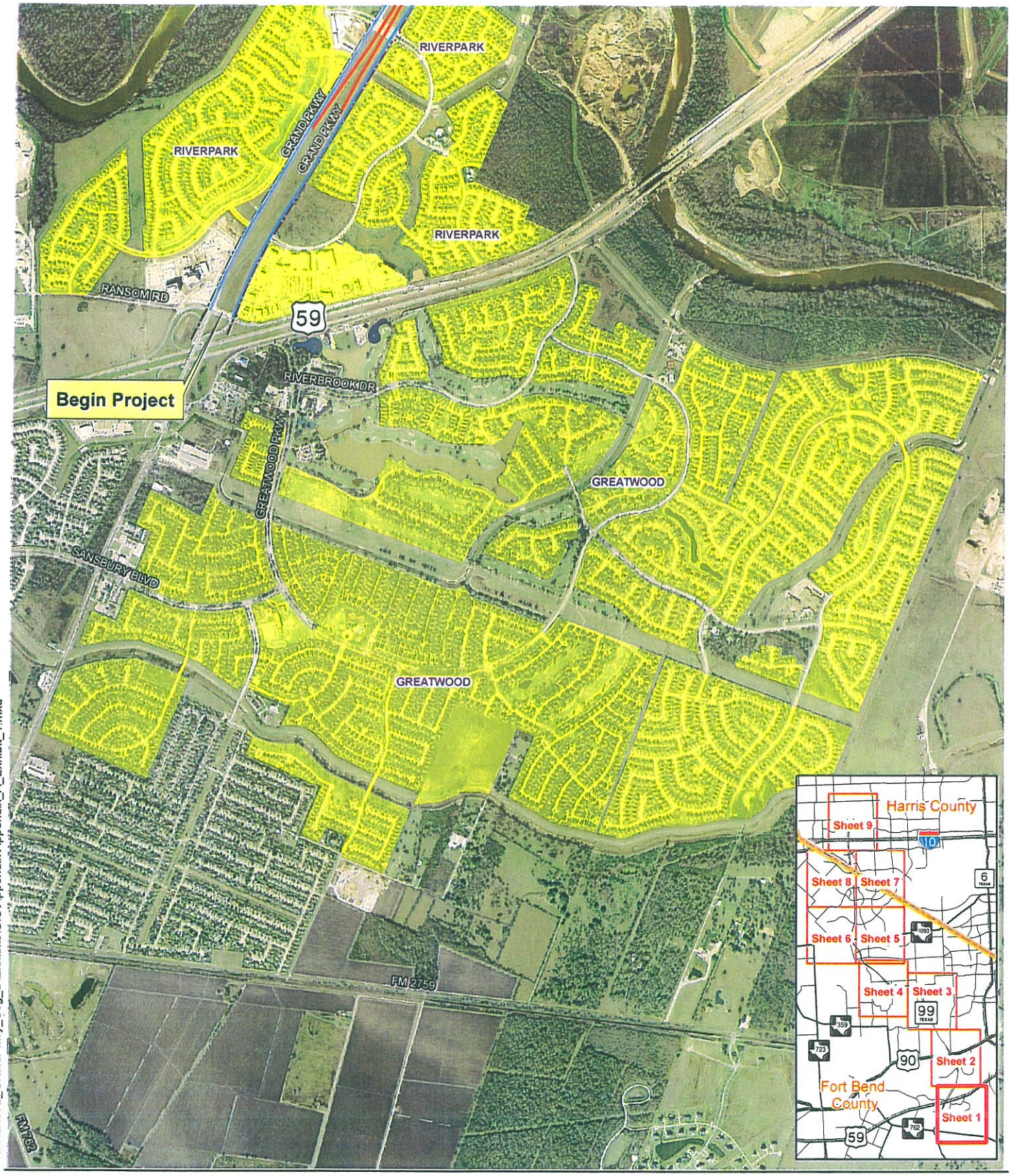
Legend
- RSA
- Wetlands 2006
- Wetlands 1992
- Existing ROW
- County Boundary

FIGURE 7

P:\60024372_GrandPkwy_Seg_D\Exhibits\GIS\Figure_7_NWI_In_RSA.mxd

APPENDIX A

- ADJACENT NEIGHBORHOODS/COMMUNITIES
- TRAFFIC ANALYSIS ZONES WITH AVERAGE DAILY TRAFFIC ≥ 1,000



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

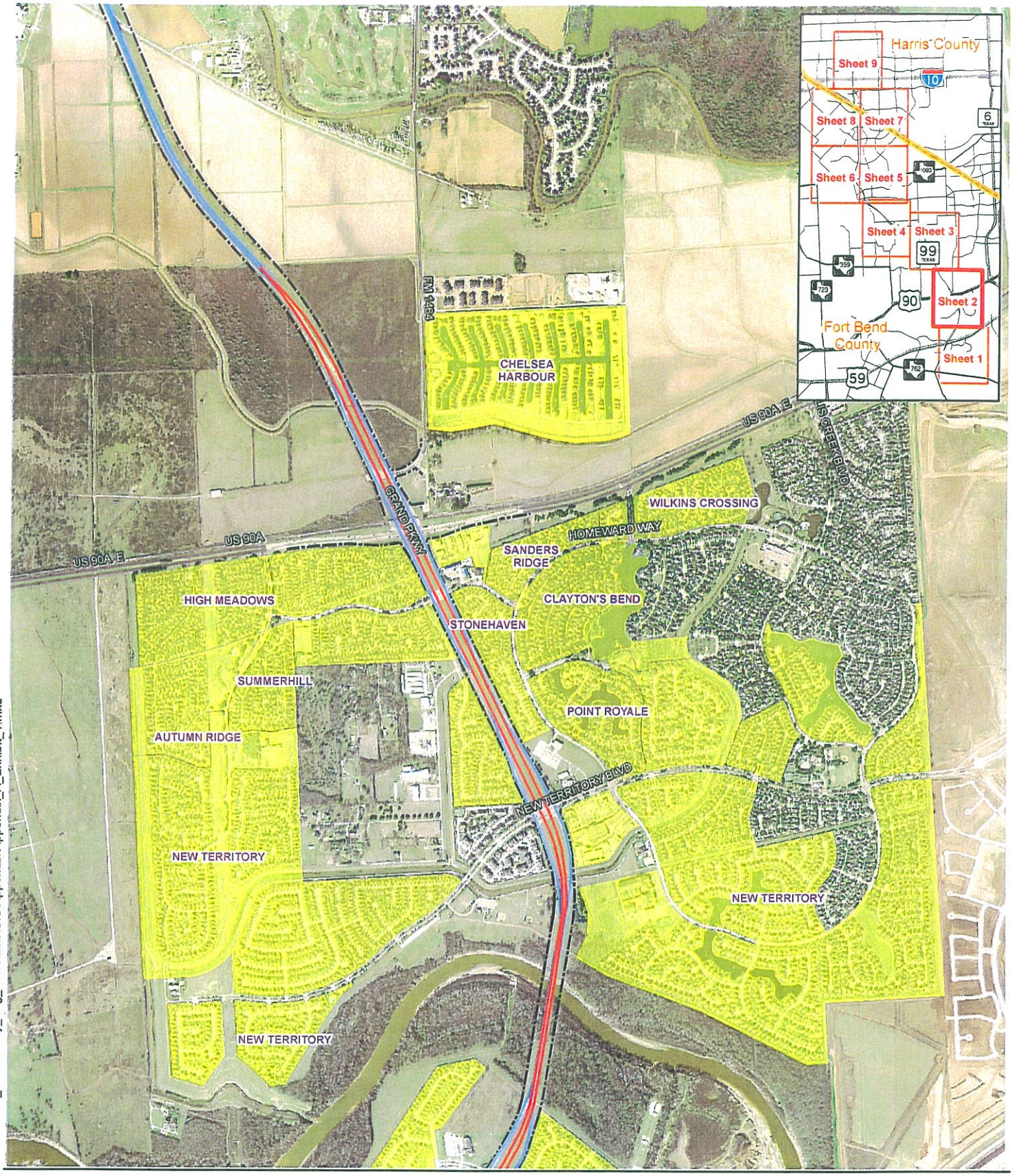
COMMUNITIES/NEIGHBORHOODS
ADJACENT TO
SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000
Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 1



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

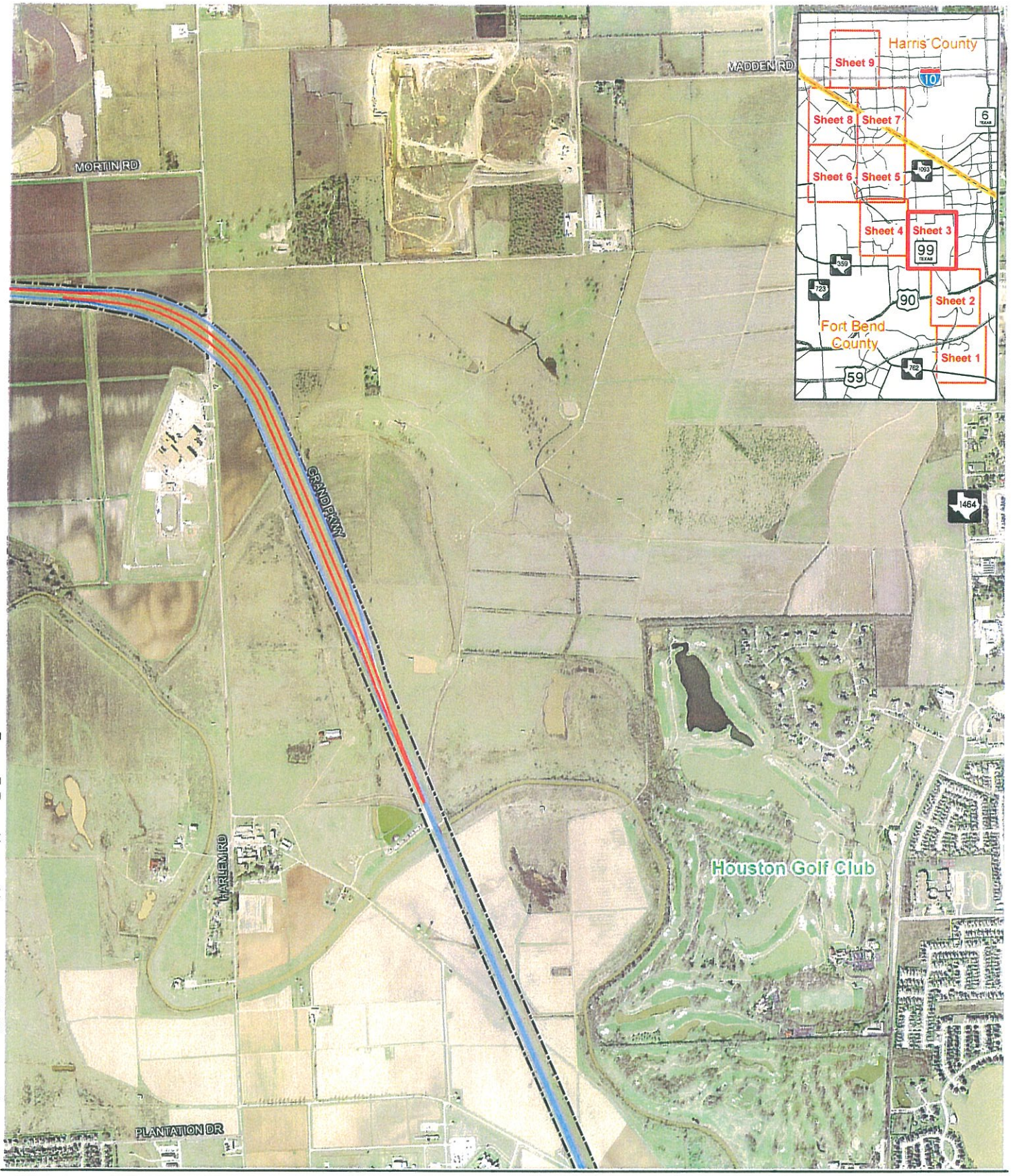
COMMUNITIES/NEIGHBORHOODS
ADJACENT TO
SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000
Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 2



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

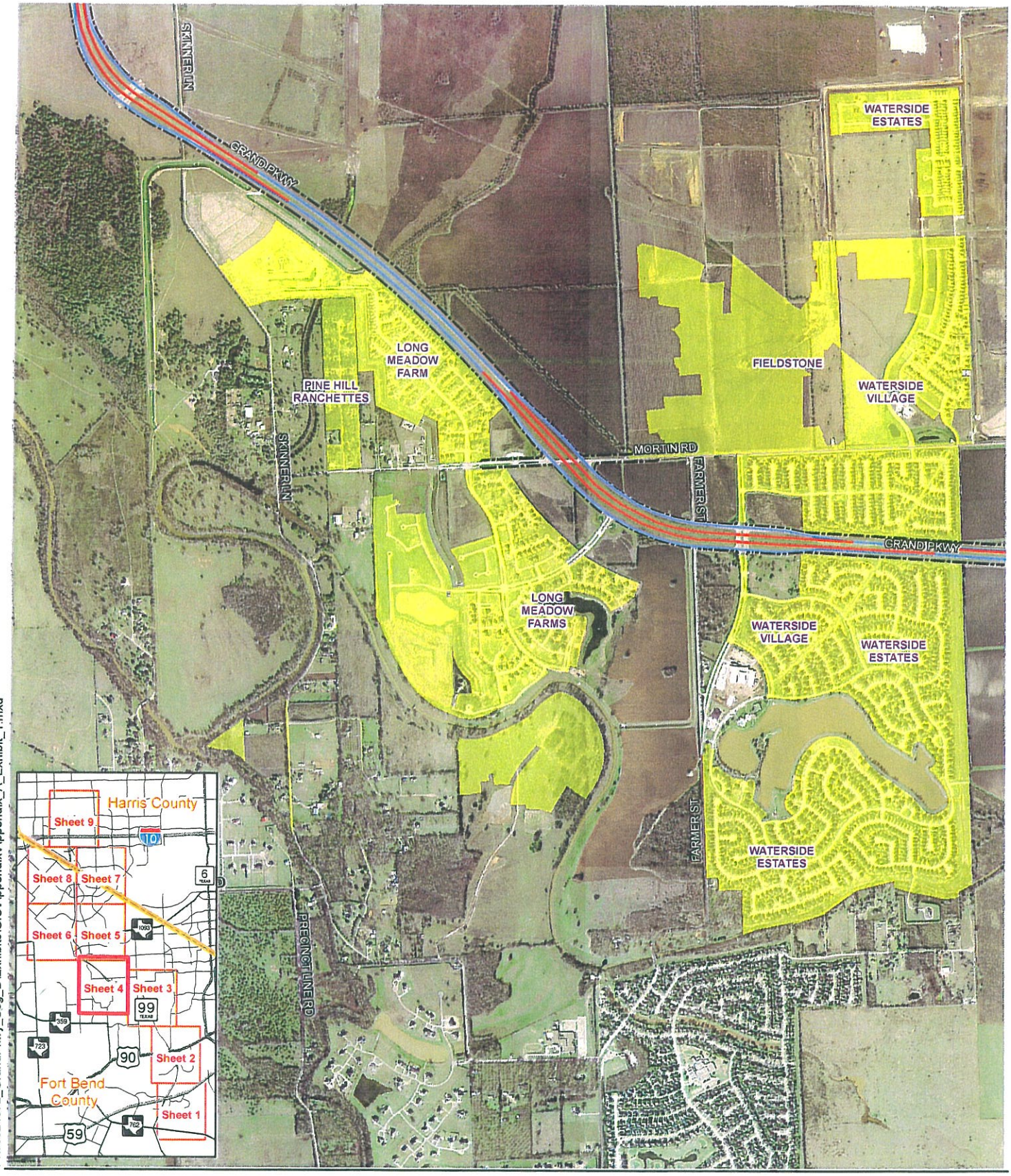
COMMUNITIES/NEIGHBORHOODS
ADJACENT TO
SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000 Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 3



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

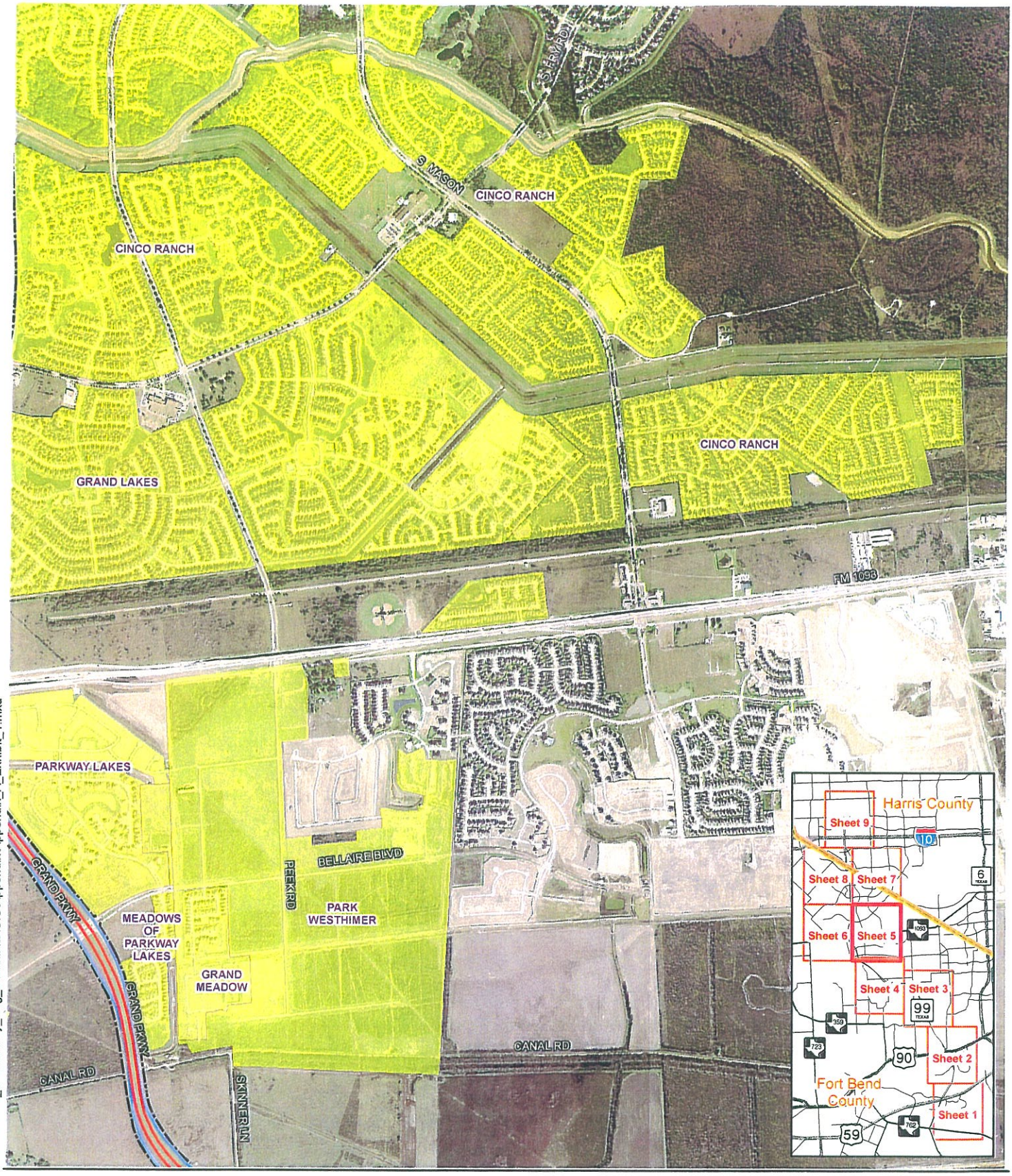
COMMUNITIES/NEIGHBORHOODS ADJACENT TO SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000 Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 4



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

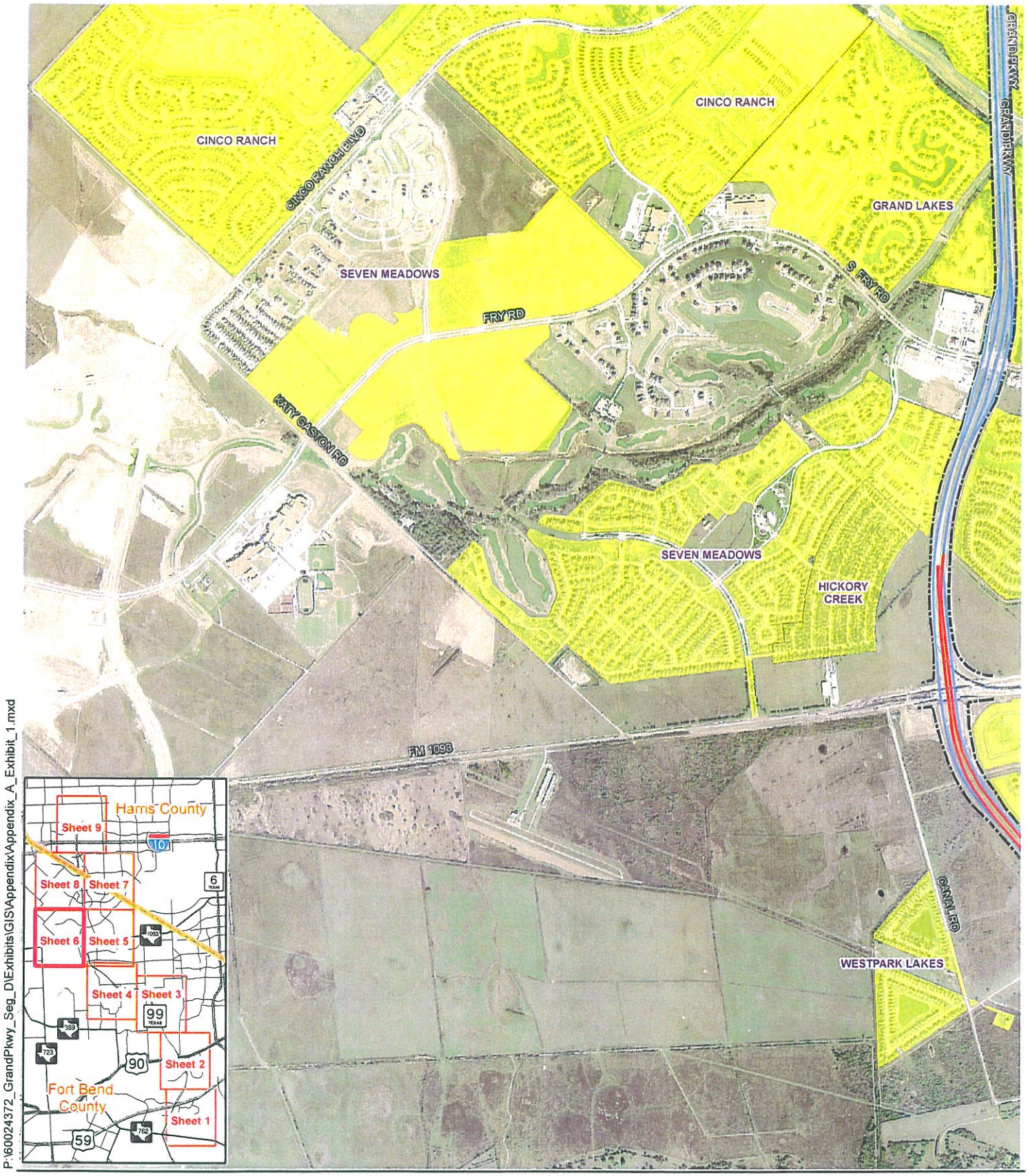
COMMUNITIES/NEIGHBORHOODS ADJACENT TO SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000 Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 5



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

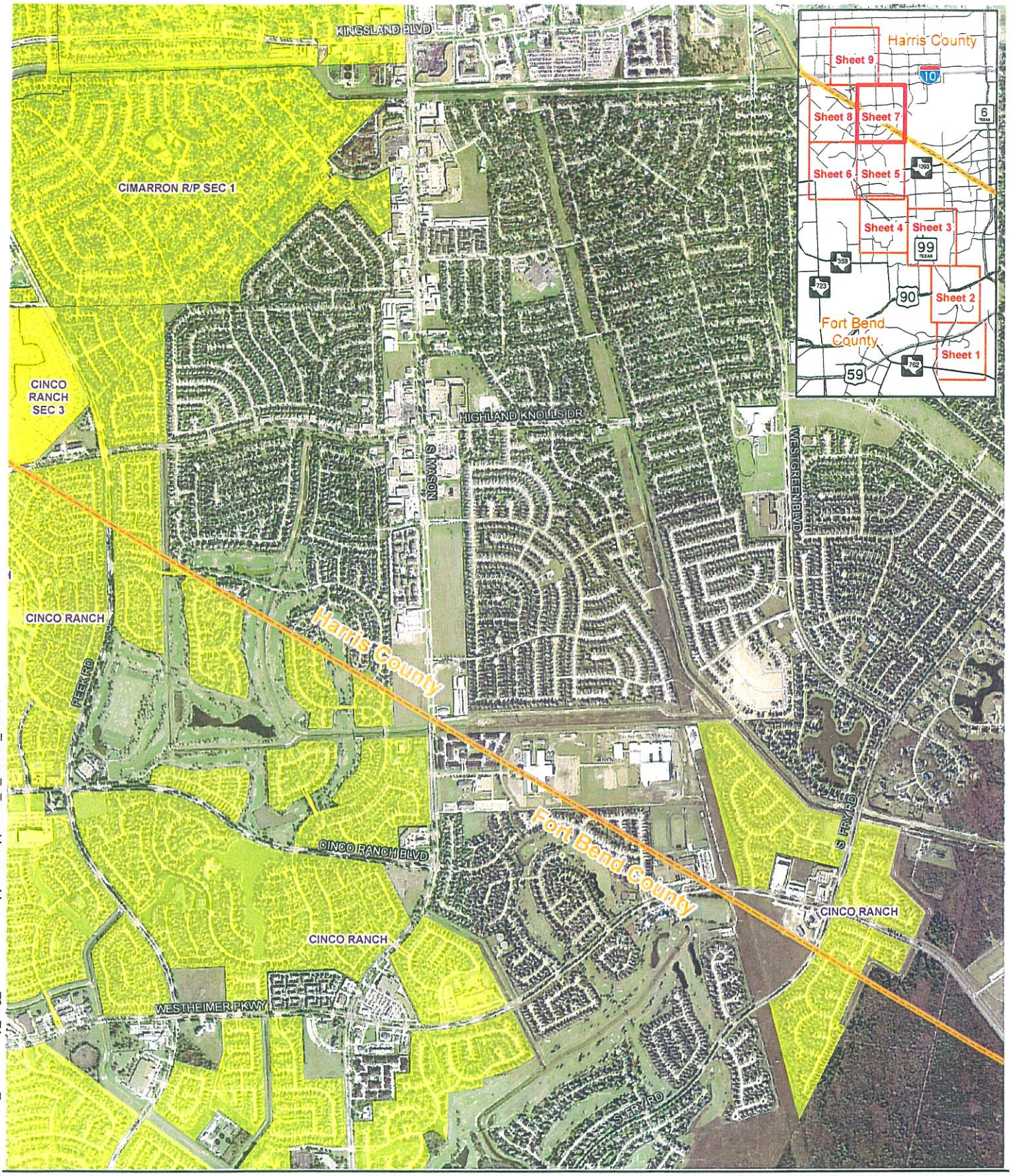
COMMUNITIES/NEIGHBORHOODS
ADJACENT TO
SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000
Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 6



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

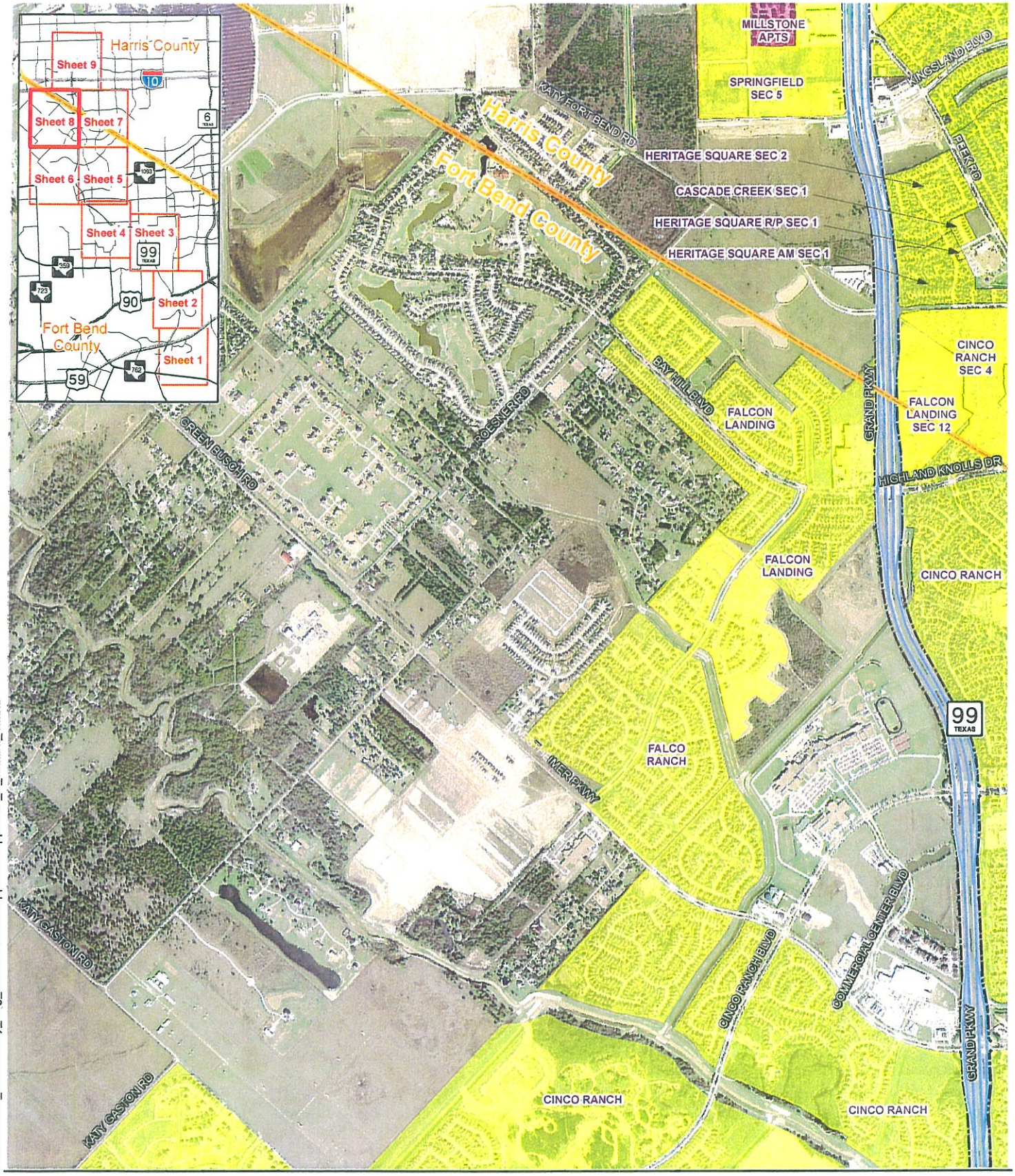
COMMUNITIES/NEIGHBORHOODS ADJACENT TO SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000 Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 7



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

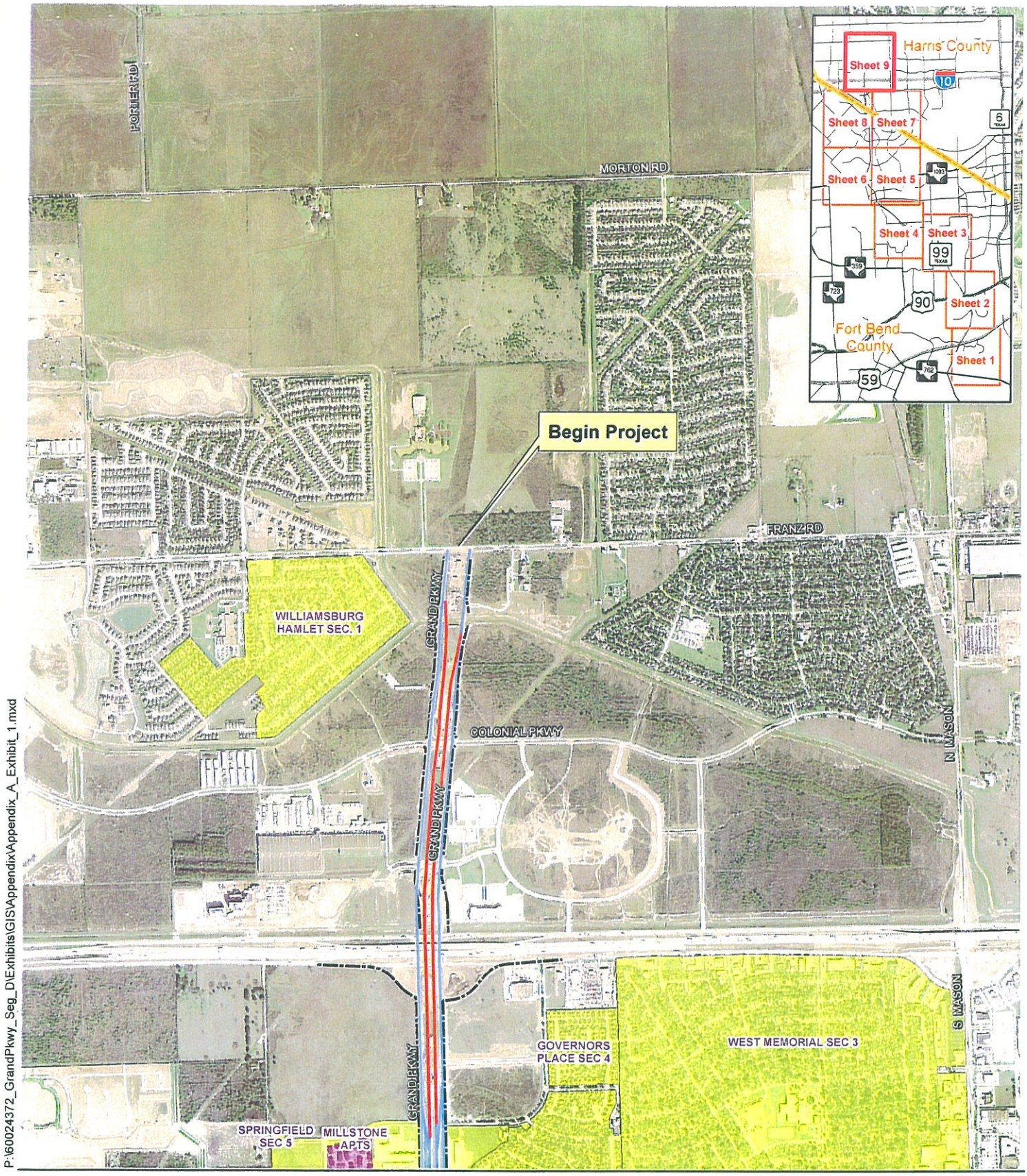
COMMUNITIES/NEIGHBORHOODS
ADJACENT TO
SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000 Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 8



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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

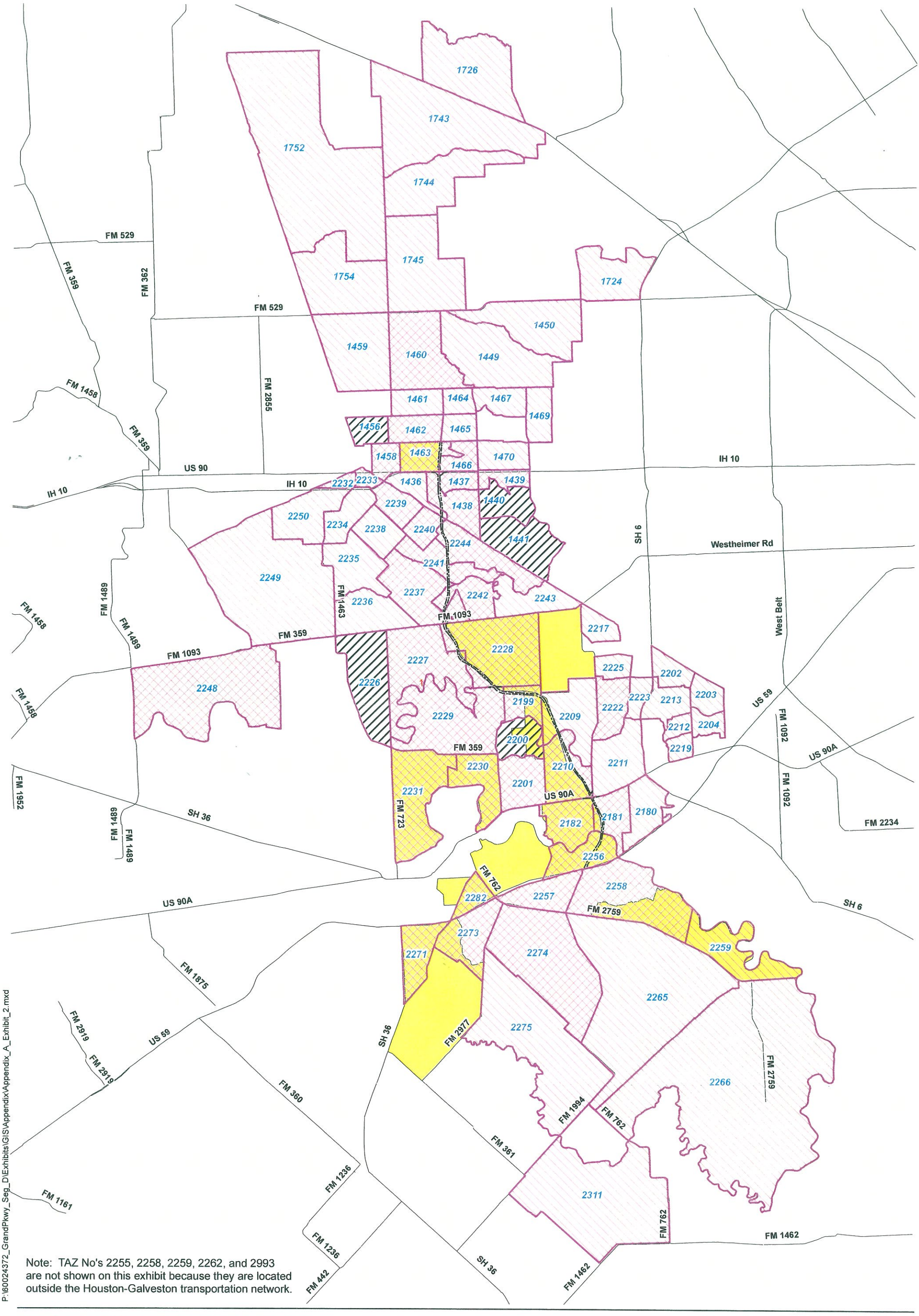
COMMUNITIES/NEIGHBORHOODS ADJACENT TO SH 99 SEGMENT D

Texas Department of Transportation
Houston District

0 N 2,000 Feet

Legend
- Proposed Toll Lanes
- Non-Tolled Lanes
- Existing ROW
- Single-Family Communities
- Multi-Family Community

APPENDIX A
Exhibit 1, Sheet 9



Note: TAZ No's 2255, 2258, 2259, 2262, and 2993 are not shown on this exhibit because they are located outside the Houston-Galveston transportation network.

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SH 99 SEGMENT D (US 59 TO FRANZ ROAD)
ENVIRONMENTAL ASSESSMENT REEVALUATION

TRAFFIC ANALYSIS ZONES WITH
AVERAGE DAILY TRAFFIC ≥ 1,000 WITH

Texas Department of Transportation
Houston District

0 N 18,000
Feet

Legend

- Existing ROW
- Environmental Justice Area
- 2035 TAZs
- 2009 TAZs
- 2035 and 2009 TAZs

APPENDIX A
Exhibit 2

APPENDIX B

- SITE PHOTOGRAPHS
- STATE AND FEDERAL THREATENED AND ENDANGERED SPECIES OF HARRIS AND FORT BEND COUNTIES

Photo 1 - Typical view of ROW.

Photo 2 - Typical view of ROW with adjacent development.

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Table B-1
State and Federal Threatened and Endangered Species of Harris County

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Unique, Critical, or Designated Habitat Present
AMPHIBIANS					
Houston toad	*Bufo houstonensis*	E	E†	Sandy soil, breeds in ephemeral pools	No
BIRDS					
American peregrine falcon	*Falco peregrinus anatum*	E	DL†	Potential migrant, nest in west Texas	No
Arctic peregrine falcon	*Falco peregrinus tundrius*	T	DL†	Potential migrant	No
Bald eagle	*Haliaeetus leucocephalus*	T	DL	Near water areas, in tall trees	No
Black rail	*Laterallus jamaicensis*	SOC	SOC†	Brackish and freshwater marshes, nest at base of Salicornia	No
Brown pelican	*Pelecanus occidentalis*	E	E†	Island near coastal areas	No
Henslow's sparrow	*Ammodramus henslowii*	SOC	*	Weedy fields with bunch grasses	No
Mountain plover	*Charadrius montanus*	SOC	*	Shortgrass plains; plowed, bare fields	No
Red-cockaded woodpecker	*Picoides borealis*	E	E	Nest in 60+ year pine, forages in 30+ pine	No
Snowy plover	*Charadrius alexandrinus*	SOC	*	Beach and bayside mud or salt flats	No
Southeastern snowy plover	*Charadrius alexandrinus tenuirostris*	SOC	SOC†	Beach and bayside mud or salt flats	No
White-faced ibis	*Plegadis chihi*	T	*	Freshwater marshes, but some brackish or salt marshes	No
White-tailed hawk	*Buteo albicaudatus*	T	*	Coastal Prairies	No
Whooping crane	*Grus americana*	E	E†	Winters in coastal marshes of Aransas, Calhoun, and Refugio counties	No
Wood stork	*Mycteria americana*	T	*	Prairie ponds and flooded pastures	No
BIRD RELATED					
Colonial waterbird nesting & migratory songbird fallout areas	*N/A*	SOC	*	N/A	No
FISHES					
American eel	*Anguilla rostrata*	SOC	*	Muddy bottoms, still waters, large streams, lakes, brackish estuaries with access to ocean	No
Creek chubsucker	*Erimyzon oblongus*	T	*	Variety of small rivers and creeks, prefers headwaters	No
MAMMALS					
Louisiana black bear	*Ursus americanus luteolus*	T	T†	Bottomland hardwoods; large, undisturbed forested areas	No
Plains spotted skunk	*Spilogale putorius interrupta*	SOC	*	General; woods, fields, prairies, shrub	No
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	T	SOC	Cavity trees in hardwood forest, concrete culverts, abandon buildings	No
Red wolf	*Canis rufus*	E	E†	Extirpated, brushy, forested areas, coastal prairies	No
Southeastern myotis bat	*Myotis austroriparius*	SOC	SOC†	Cavity trees in hardwood forest, concrete culverts, abandoned buildings	No
MULLOSKS					
Little spectaclecase	*Villosa lienosa*	SOC	*	Creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along banks	No
Louisiana pigtoe	*Pleurobema riddellii*	SOC	*	Streams and moderate-size rivers; usually flowing water on substrates of mud, sand, and gravel	No
Pistolgrip	*Tritogonia verrucosa*	SOC	*	Large rivers with rock, hard mud, silt, and soft bottoms, often buried deeply	No
Rock-pocketbook	*Arcidens confragosus*	SOC	*	Mud, sand, and gravel substrates of medium to large rivers in standing or slow flowing waters	No
Sandbank pocketbook	*Lampsilis satura*	SOC	*	Small to large rivers with moderate flows and swift current on gravel, gravel-sand, and sand	No

Table B-1
State and Federal Threatened and Endangered Species of Harris County

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Unique, Critical, or Designated Habitat Present
				bottoms	
Texas pigtoe	*Fusconaia askewi*	SOC	*	Rivers with mixed mud, sand, and fine gravel in protected areas	No
Wabash pigtoe	*Fusconaia flava*	SOC	*	Creeks to large rivers; mud, sand and gravel, not in deep shifting sands.	No
REPTILES					
Alligator snapping turtle	*Macroclemys temminckii*	T	SOC	Deep water of rivers and canals	No
Green sea turtle	*Chelonia mydas*	T	T†	Gulf and bay system	No
Leatherback sea turtle	*Dermochelys coriacea*	E	E†	Gulf and bay system	No
Loggerhead sea turtle	*Caretta caretta*	T	T†	Gulf and bay system	No
Smooth green snake	*Liochlorophis vernalis*	T	*	Gulf coastal prairies, prefers dense vegetation	No
Texas horned lizard	*Phrynosoma cornutum*	T	SOC†	Open, semi-arid regions, with bunch grass	No
Timber/canebrake rattlesnake	*Crotalus horridus*	T	*	Swamps/floodplains of hardwood/upland pine	No
VASCULAR PLANTS					
Coastal gay-feather	*Liatris bracteata*	SOC	SOC	Black clay soil of coastal prairie remnants	No
Giant sharpstem umbrella-sedge	*Cyperus cephalanthus*	SOC	*	Remnant coastal prairies in poor to moderately drained soils	No
Houston daisy	*Rayjacksonia aurea*	SOC	SOC	Seasonally wet, saline barren areas	No
Texas meadow-rue	*Thalictrum texanum*	SOC	SOC	Mesic woodlands, partially shaded ditches	No
Texas prairie dawn	*Hymenoxys texana*	E	E	Poorly drained areas in open grasslands; pimple mounds	No
Texas windmill-grass	*Chloris texensis*	SOC	SOC	Sand/sandy loam in open/barren grasslands	No
Threeflower broomweed	*Thurovia triflora*	SOC	SOC	Black clay soil of remnant grasslands	No

* These species occur on the State listing of threatened or endangered species; however, they are not federally listed at this time by the U.S. Fish and Wildlife Service (2006).

† These species are listed by the U.S. Wildlife Service, however, they are not listed to occur within this county by the Clear Lake office of the U.S. Fish and Wildlife Service (2006).

E = endangered; T = threatened; DL = delisted taxon, recovered, being monitored first five years; SOC = species of concern

Table B-2
State and Federal Threatened and Endangered Species of Fort Bend County

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Unique, Critical, or Designated Habitat Present
AMPHIBIANS					
Houston toad	*Bufo houstonensis*	E	E†	Sandy soil, breeds in ephemeral pools	No
BIRDS					
American peregrine falcon	*Falco peregrinus anatum*	E	DL†	Potential migrant	No
Arctic peregrine falcon	*Falco peregrinus tundrius*	T	DL†	Potential migrant	No
Attwater's greater prairie-chicken	*Tympanuchus cupido attwateri*	E	E†	Thick 1-3' tall grass from 0'-200' above sea level along coast	No
Bald eagle	*Haliaeetus leucocephalus*	T	DL	Near water areas, in tall trees	No
Interior least tern	*Sterna antillarum athalassos*	E	E	Nests along sand and gravel bars within streams and rivers, only listed when 50 miles inland	No
Western burrowing owl	*Athene cunicularia hypugaea*	SOC	SOC	Open grasslands, prairie, plains, nests and roosts in abandoned burrows	No
White-faced ibis	*Plegadis chihi*	T	*	Freshwater marshes, but some brackish or salt marshes	No
White-tailed hawk	*Buteo albicaudatus*	T	*	Coastal Prairies	No
Whooping crane	*Grus americana*	E	E†	Winters in coastal marshes of Aransas, Calhoun, and Refugio counties	No
Wood stork	*Mycteria americana*	T	*	Prairie ponds and flooded pastures	No
FISHES					
American eel	*Anguilla rostrata*	SOC	*	Coastal waterways; aquatic habitats with access to ocean, muddy bottoms and still waters	No
Sharpnose shiner	*Notropis oxyrhynchus*		C	Aquatic waterways with access to ocean; brackish estuaries, coastal waterways	No
MAMMALS					
Louisiana black bear	*Ursus americanus luteolus*	T	T†	Bottomland hardwoods; large, undisturbed forested areas	No
Plains spotted skunk	*Spilogale putorius interrupta*	SOC	*	General; woods, fields, prairies, shrub	No
Red wolf	*Canis rufus*	E	E†	Extirpated, brushy, forested areas, coastal prairies	No
MULLOSKS					
False spike mussel	*Quincuncina mitchelli*	SOC	*	Substrates of cobble and mud, with water lilies present; Rio Grande, Brazos, Colorado, and Guadalupe (hist.)	No
Pistolgrip	*Tritogonia verrucosa*	SOC	*	Large rivers with rock, hard mud, silt, and soft bottoms, often buried deeply	No
Rock-pocketbook	*Arcidens confragosus*	SOC	*	Mud, sand, and gravel substrates of medium to large rivers in standing or slow flowing waters	No
Smooth pimpleback	*Quadrula houstonensis*	SOC	*	Small to moderate streams and rivers, reservoirs; mixed mud, sand, and fine gravel; lower Trinity, Brazos, and Colorado (hist.)	No
Texas fawnsfoot	*Truncilla macrodon*	SOC	*	Little known; possible rivers and larger streams, intolerant of impoundments; flowing rice irrigation canals; Brazos and Colorado basins	No

Table B-2
State and Federal Threatened and Endangered Species of Fort Bend County

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Unique, Critical, or Designated Habitat Present
REPTILES					
Alligator snapping turtle	*Macrochelys temminckii*	T	*	Water bodies with mud bottom and abundant vegetation	No
Texas horned lizard	*Phrynosoma cornutum*	T	*	Open, semi-arid regions, with bunch grass	No
Timber/canebrake rattlesnake	*Crotalus horridus*	T	*	Swamps/floodplains of hardwood/upland pine	No
VASCULAR PLANTS					
Texas prairie dawn	*Hymenoxys texana*	E	E	Poorly drained areas in open grasslands; pimple mounds	No
Threeflower broomweed	*Thurovia triflora*	SOC	SOC	Black clay soil of remnant grasslands	No

* These species occur on the State listing of threatened or endangered species; however, they are not federally listed at this time by the U.S. Fish and Wildlife Service (2006).

† These species are listed by the U.S. Wildlife Service, however, they are not listed to occur within this county by the Clear Lake office of the U.S. Fish and Wildlife Service (2006).

E = endangered; T = threatened; DL = delisted taxon, recovered, being monitored first five years; SOC = species of concern