Texas Department of Transportation

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May 16, 2012

CONTACT: DPD

Re-Evaluation of Final Environmental Impact Statement
Harris and Montgomery Counties
SH 99, Grand Parkway, Segment G from IH 45 to US 59
Control 3510-06-903, 3510-06-001, 3510-07-001and 3510-07-901

Mr. Daniel Mott, P.E.
Houston Major Projects Engineer
Federal Highway Administration
300 East 8th Street, Room 826
Austin, Texas 78701

Dear Mr. Mott:

Attached is one copy of the Re-Evaluation of the Final Environmental Impact Statement for the SH 99, Grand Parkway, Segment G roadway project.

Currently, this Segment is being procured as a single design-build project concurrently with Segments F-1 and F-2 of the SH 99/Grand Parkway with a scheduled Conditional Award on September 27, 2012, and Contract Execution/Final Award on December 15, 2012. At this time, your concurrence is requested that this Segment re-evaluation has been prepared in accordance with 23 CFR 771.129 and the Federal Highway Administration Technical Advisory T 6640.8A, Section XI with a determination that the Record of Decision analysis remains valid.

If you have any questions, please contact Mr.Lance Olenius, Environmental Coordinator, at (713) 802-5271.

Sincerely,

Pat Henry, P.E.
Director of Project Development
Houston District

LO:ljh
Attachment
cc: Mr. Lance Olenius

Concur: _____ Date: 5/22/12
Federal Highway Administration

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RE-EVALUATION
OF THE
FINAL ENVIRONMENTAL IMPACT STATEMENT

FOR

State Highway 99
Grand Parkway
Segment G
FROM: IH 45
TO: US 59

HARRIS and MONTGOMERY COUNTIES, TEXAS

CSJs: 3510-06-903, 3510-06-001, 3510-07-001, and 3510-07-901

FHWA-TX-EIS-03-03-F

U.S. DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

and

TEXAS DEPARTMENT OF TRANSPORTATION

May 2012

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1.0 INTRODUCTION

This document is a re-evaluation of the approved State Highway (SH) 99, Grand Parkway, Segment G Final Environmental Impact Statement (FEIS) for the construction of a 13.6-mile new location, four-lane, controlled access toll road with intermittent frontage roads within a 400-foot right-of-way (ROW) from Interstate Highway (IH) 45 to United States Highway (US) 59 in Harris and Montgomery Counties, Texas (**Exhibit 1**). The Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT) jointly approved the FEIS for the project in January 2009. A Record of Decision (ROD) was issued by FHWA on December 29, 2010.

As described in the ROD, the project consists of the construction of a four-lane, divided toll road on new location from IH 45 to US 59 through Harris and Montgomery Counties. The project limits and Selected Alternative are shown on an aerial photograph in **Exhibit 2**. The approved design consists of two 12-foot travel lanes in each direction with a 40-foot median and intermittent frontage roads occurring within a ROW width of approximately 400 feet. For purposes of this re-evaluation, the ROW footprint area is approximately 818 acres, including the Selected Alternative ROW, ROW for the direct connectors at IH 45 and US 59, minor construction impacts to arterial roadways along the Segment G, and the additional ROW needed based on the detailed drainage analysis as described below. The crossing of Woodson's Gully, Spring Creek, the San Jacinto River, and White Oak Creek would be accomplished by bridges (one in each direction).

As described in the ROD and at the time the ROD was issued, the FEIS' Preferred Alternative Alignment had only undergone preliminary design. This re-evaluation is necessary because of minor design modifications that have occurred subsequent to the ROD as a result of detailed design analysis. Additionally, this re-evaluation presents a more detailed floodplain analysis with the engineering design of drainage structures along the Segment G Selected Alternative that has occurred subsequent to the ROD. (A complete description and evaluation of each design modification and facility are provided in **Section 5.0** of this re-evaluation.) The project revisions include two minor design modifications, five outfall channels, ten stormwater detention basins, and one floodplain fill mitigation basins. Additionally, this re-evaluation describes the design for the project's stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins that are proposed for Segment G, and the anticipated environmental impacts associated with the additional ROW and easements that are required, based on drainage study calculations. The remainder of the project as discussed in the ROD, including

the 400-foot ROW (with exception to minor reductions in the ROW width as part of the detail design process discussed in **Section 5.0**), remain unchanged.

As part of the detailed design process and per the project-specific commitments and conditions of approval as stated in the FEIS and the ROD, the project requirements for stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins were identified. The purpose of this re-evaluation is to describe these requirements and the evaluations that have occurred since the issuance of the ROD. Furthermore, this re-evaluation will assess how the additional ROW required for the proposed detention facilities would affect the previous environmental impacts analysis, and determine whether a new and comprehensive analysis of the entire project is needed. This re-evaluation complies with FHWA regulations (23 Code of Federal Regulations [CFR] 771.129) and includes updates to regulations or guidance and progress with commitments and permits presented in the ROD.

The need for and purpose of the project remain as stated and explained in the ROD. To summarize, this project is needed because there are inefficient connections between suburban communities and major radial roadways (system linkage), the current and future transportation demand exceeds capacity, many roadways in the study area have a high accident rate, and there is an increasing strain on transportation infrastructure from population and economic growth. The purpose of the transportation improvements is to efficiently link the suburban communities and major roadways, enhance mobility and safety, and respond to economic growth. See FEIS, Volume II, Section 1.1 for further details regarding need for and purpose of the project.

2.0 PROJECT HISTORY

The Grand Parkway corridor was placed on city maps in 1968, but funds were not available to advance the project. With the development of the Houston metropolitan area, the Katy area, and other residential and corporate facilities in West Houston, the need for additional transportation facilities increased. County officials and landowners mapped a proposed corridor for the Grand Parkway and submitted the plan to the Texas Transportation Commission (TTC).

In 1984, the Texas Legislature authorized the creation and organization of a nonprofit transportation corporation to act on behalf of TxDOT in the development of public transportation facilities and systems within the state. The Grand Parkway Association (GPA), the first of these corporations created, was charged with assisting the TTC in obtaining land and funding to meet the planning, legal, engineering, and ROW requirements of the Grand Parkway. Since its

inception, the GPA has worked directly with landowners, local and state government agencies, elected officials, and the public to complete the Grand Parkway.

The proposed SH 99, Grand Parkway, is planned as an approximate 184-mile circumferential facility (a roadway loop such as Beltway 8) around the Houston metropolitan area. The entire proposed facility traverses Harris, Montgomery, Liberty, Chambers, Galveston, Brazoria, and Fort Bend Counties, Texas, provides access to radial highways (such as IH 45 and US 59); and would serve as a third loop around the Houston metropolitan area. The Segment G study area is generally bounded by IH 45 to the west, US 59 to the east, Farm-to-Market Road (FM) 1960 to the south, and just beyond the proposed Grand Parkway to the north in Montgomery County.

The current status of each segment of the Grand Parkway is shown in **Table 1**. Locations of these segments are illustrated in **Exhibit 3**.

TABLE 1
GRAND PARKWAY SEGMENTS: STATUS OF ENVIRONMENTAL DOCUMENTS

Segment	Proposed Location	Approx. Length (mi)	Counties	Status
A	SH 146 west to IH 45	6.5	Galveston	Corridor Feasibility Study completed 2010
B	IH 45 west to SH 288	28.2	Galveston, Brazoria	FEIS anticipated publication in Spring 2013
C	SH 288 west to US 59	26.9	Brazoria, Fort Bend	FEIS anticipated publication in Spring 2012
D	US 59 north to IH 10	18.2	Fort Bend, Harris	re-evaluation for tolling approved in September 2008
E	IH 10 north to US 290	15.2	Harris	Under construction; Open to traffic in 2013
F-1	US 290 east to SH 249	11.9	Harris	ROD issued in June 2009
F-2	SH 249 east to IH 45	12.1	Harris	ROD issued in December 2009
G	**IH 45 east to US 59**	**13.6**	**Harris, Montgomery**	**ROD issued in December 2010**
H & I-1	US 59 south to US 90/ US 90 south to IH 10	37.3	Montgomery, Harris, Liberty, Chambers	FEIS anticipated publication in Fall 2012
I-2	IH 10 south to SH 146	14.5	Chambers, Harris	Open to traffic in 2008

Note: Bold/Shaded text indicates the segment included in this study; Source: GPA, 2012

In August 1993, TxDOT and FHWA filed a Notice of Intent (NOI) to prepare an Environmental Impact Statement (EIS) for Segment G of the Grand Parkway. Formal public scoping meetings were held in September 1993 and February 2000.

Following the publication of Segment G's DEIS in January 2007, a Public Hearing was held on March 7 and 8, 2007. The Public Hearing consisted of an exhibit viewing session, a formal presentation, and a public commenting session. After careful consideration of comments received on the DEIS and updates to the environmental resource mapping, inventory of potential direct impacts, and indirect and cumulative effects assessment, a Preferred Alternative Alignment was selected (see FEIS, Volume II, Section 6 [Agency and Public Coordination] for a detailed discussion of agency and public involvement). The selection of the Preferred Alternative Alignment is in compliance with regulations issued by the Council on Environmental Quality (CEQ) (40 CFR 1500-1508), FHWA (23 CFR 771), and the state of Texas (43 TAC Section 2.43), as well as in accord with the FHWA Technical Advisory T 6640.8A.

Following publication of the FEIS, the public comment period was open from February 6, 2009 to March 16, 2009. During this time, the public was invited to submit comments in written format or by e-mail. After careful consideration of comments received on the FEIS a Selected Alternative was determined. The Selected Alternative, as set forth in the ROD, best serves the need for and purpose of this project.

The April 2003 Texas Transportation Commission Minute Order 109226 (**Appendix B**) states, "The completion of the Grand Parkway is essential and urgent, as construction of the projects would alleviate congestion and improve traffic flow in the Houston metropolitan area and the surrounding region..." and "The commission has determined that constructing and operating the Grand Parkway as a toll facility is the most efficient and expeditious means of ensuring its development, and encourages the development of partnerships and the employment of innovative methods for its financing and construction." The Houston-Galveston Area Council's (H-GAC) 2025 Regional Transportation Plan (RTP) identifies the addition of tolled facilities, including the Grand Parkway, as necessary to address current congestion and future growth in the Houston region (H-GAC, 2005). H-GAC has been designated by the state of Texas as the metropolitan planning organization (MPO) charged with coordinating transportation planning for the eight-county area around Houston, including Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller Counties.

3.0 STATUS OF ROW ACQUISITION AND CONSTRUCTION SCHEDULE

Maps and surveys for ROW acquisition are being prepared. None of the ROW for the project has been acquired. Construction activities for this project are expected to commence in early 2013. It is anticipated that all ROW will be acquired by start of construction.

4.0 PUBLIC INVOLVEMENT SINCE FHWA ROD

Since issuance of the ROD on December 29, 2010, a continuous effort for public involvement has occurred. The GPA continues to respond to questions from the public and address all appropriate comments regarding the Grand Parkway. Additionally, the H-GAC performs quarterly outreach efforts to engage the public in regional transportation issues. The focus of these meetings is to discuss various topics, including updates on Grand Parkway Segments E, F-1, F-2, and G. Since issuance of the ROD, meetings with affected property owners have been held to discuss direct impacts to their properties and the various alternatives that have been evaluated.

5.0 CHANGES TO PROJECT SINCE FHWA ROD

The issuance of the ROD approved the Selected Alternative for a four-lane, controlled access toll road with intermittent frontage roads within a 400-foot ROW. As described in the ROD, the Preferred Alternative Alignment, as presented in the FEIS, had only undergone preliminary design.

As part of the detailed design process, two minor design modifications have been evaluated. These minor design modifications include providing additional vertical clearance, or increasing the height of the bridge at the Union Pacific Railroad (UPRR) and additional ROW for proposed modifications at the intersections of SH 99 with IH 45 and US 59.

At each of the general locations where minor roadway design modifications are required, a desktop survey was performed to analyze possible environmental impacts. The desktop exercise included, but was not limited to, waters of the U.S., cultural resources, floodplains, threatened and endangered species habitat, and conformity with Harris and Montgomery County's planning. Based on this desktop analysis, preliminary design was prepared. The areas for each of the design modifications were then field surveyed to verify impacts, or the lack thereof. The design modifications were then modified, as necessary, based on the results of the field surveys to avoid and minimize where possible

<u>Increased Elevation of Bridge at UPRR</u>: In response to development and coordination with the UPRR, vertical clearance of the bridge crossing at the UPRR near the existing Hardy Toll Road, east of IH 45, has been increased to a 23.5-foot clearance, spanning the entire UPRR ROW

(**Exhibit 4)**. There would be no new access provided for this bridge location. The design modification does not add any additional ROW than was evaluated in the FEIS and the ROD. The noise analysis for this section of the roadway was re-evaluated and is described in Section 6.2 of this document. The design modification has been evaluated and no potential environmental impacts were identified. The analysis in the FEIS and ROD remains valid for this additional ROW.

Additional ROW at the intersections of SH 99 with IH 45 and US 59: As part of the final design for the roadway, additional ROW is required to cover the construction impacts for roadway tapers from the ultimate intersections at SH 99 to existing roadway networks in the project area. The additional ROW at the intersections of SH 99 with IH 45 and US 59 would provide sufficient ROW needed to taper the direct connectors to the intersecting freeways (**Exhibit 5)**. The additional ROW has been evaluated and no potential environmental impacts were identified for the intersection of SH 99 with IH 45. During field survey, it was determined that additional impacts to White Oak Creek would occur. These impacts would result in approximately 37 linear feet of stream impact, totaling approximately 0.04 acres of Waters of the U.S. Environmental analysis has been performed for the proposed additional ROW and no additional potential environmental impacts were identified.

Also, as part of the detail design process and per the project-specific commitments and conditions of approval stated in the FEIS and the ROD, the project requirements for stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins were identified. Each of these design issues were evaluated independently and locations for each facility were selected based on engineering requirements, while avoiding and minimizing environmental impacts. To accomplish these requirements, additional ROW and easements are required beyond the 400-foot ROW evaluated in the FEIS and presented in the ROD. The selected locations for the offsite drainage improvements would require approximately 179 acres of new ROW. During detailed design and construction of the proposed drainage facilities, reductions in ROW for the proposed drainage facilities will be reviewed.

Each of the proposed drainage facilities is in a location that conforms to the regional planning performed by the Harris County Flood Control District (HCFCD) for future improvements in northeastern Harris County (**Exhibit 7**). HCFCD devises flood damage reduction plans for the county and coordinates with the U.S. Army Corps of Engineers (USACE), as well as other federal partners, in implementing those plans and maintaining associated infrastructure for Harris County. HCFCD was consulted to ensure that potential project plans were in conformance with what HCFCD is planning for Harris County. Additionally, Montgomery County

Engineering was consulted to ensure that potential project plans were in conformance with what is being planned for Montgomery County. The meeting concluded that all plans were in conformance with future plans for Montgomery County; however, continued coordination was requested. Coordination with Harris and Montgomery Counties are a continuous process and will be throughout construction of SH 99.

The following sections describe the designs for the proposed stormwater outfall channels (**Section 0**), stormwater detention basins (**Section 5.2**), and floodplain fill mitigation basins (**Section 5.3**) in order from west to east within each subsection. The designs are summarized in **Table 2**, and the proposed location for each facility along the full length of the Segment G Selected Alternative is shown on **Exhibit 2**. Various basins are depicted as two separate basins with an "a" and "b" basin on **Exhibit 2**; however, the calculations for surface area and mitigation volume are provided as a combined surface area and mitigation volume for split basins in **Table 2** to remain consistent with the drainage analysis. These calculations are combined to show the total amount of mitigation volume needed in a particular topographic region or drainage pattern. Additionally, various basins were split where applicable to reduce the amount of additional ROW required.

TABLE 2 SUMMARY OF PROPOSED DRAINAGE FACILITY DESIGNS

Proposed Drainage Facility*	Surface Area of Facility (ac)	Impact Mitigation Volume (ac-ft)	Fill Mitigation Volume (ac-ft)	Overall Length of Facility (LF)
SJ-A[1]	n/a	n/a	23	3,750
SJ-H	n/a	n/a	n/a	2,600
OC-1	n/a	n/a	n/a	550
OC-WO 1	n/a	n/a	n/a	500
WO-C 2	n/a	n/a	0.25	1,700
J-Basin 3	2.8	23.6	0	n/a
J-Basin 4	5.6	40.2	0	n/a
WG-Basin 1	5.2	8.5	0	n/a
WG-Basin 2	7.5	0	12.6	n/a
SJ-Basin 1	12.3	31.6	14.5	n/a
SJ-Basin 2	17.3	6.6	0	n/a
SJ-Basin 3	39.7	108.7	0	n/a
WO-Basin 1	47.2	92.9	19.5	n/a

TABLE 2: SUMMARY OF PROPOSED DRAINAGE FACILITY DESIGNS (Cont.)

WO-Basin 3	5.0	3.6	0	n/a
WO-Basin 4	3.8	3.9	0	n/a
WO-Basin 5	n/a	1.0	0	n/a

Source: AECOM, January 2012; ac = acres; ft = feet; LF = Linear Feet
1 – Impacts mitigated as part of ROW drainage system
* An Independent analysis has been performed for a detailed description of each basin, "*Hydrologic and Hydraulic Analysis for State Highway 99 Grand Parkway Segments F-1, F-2, and G.*

5.1 Stormwater Outfall Channels

While the Grand Parkway crosses seven existing channels, the hydraulic analysis indicated that five additional outfall locations would be required to adequately drain the project stormwater runoff.

At each of the five general locations where drainage improvements were required, a desktop survey was performed to analyze possible environmental impacts. The desktop exercise included, but was not limited to, waters of the U.S., cultural resources, floodplains, threatened and endangered species habitat, and conformity with HCFCD planning. Based on this desktop analysis, preliminary locations were determined for each of the channels. The areas for each of the channels were then field surveyed to verify impacts, or the lack thereof. The channel locations were then modified, as necessary, based on the results of the field surveys.

SJ-A Outfall Channel

This channel is proposed to run in an east-west orientation within the Selected Alternative ROW, located approximately 1,700 feet west of the San Jacinto River and leads to the San Jacinto River (**Exhibit 2, Sheet 4 of 8**). This outfall channel and the associated stormwater detention basin, SJ-Basin 1 (described below) were originally designed east of this location. Field surveys determined the original design would have interrupted a future planned development and tied to an existing remnant sand pit. The impacts associated with the original design would have increased the number of future planned residential lot displacements, impacted approximately 1,900 linear feet of stream, and adversely impacted forested habitat. Based on the field surveys for the original design, this outfall channel and the associated basin were re-designed to the current proposed location (see **Table 2** for channel dimensions). Outfall channel SJ-A is needed to bring runoff from the Grand Parkway and provide floodplain fill mitigation. To reduce the amount of additional ROW required this outfall channel was

designed within the Selected Alternative ROW, utilizing ROW that would inherently be impacted by the construction of the Selected Alternative. Field surveys determined no additional impacts to wetlands or streams, than those identified by the Selected Alternative, would occur as a result of the proposed detention basin. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

SJ-H Outfall Channel

This channel is needed to bring stormwater runoff from the Grand Parkway. This channel would be utilized as a large roadside ditch from FM 1314 to culverts that cross the Grand Parkway (**Exhibit 2, Sheet 6 of 8**) to stormwater detention basin SJ-Basin 3 as described below. This channel was designed based on coordination with Montgomery County and a large future planned development in this area. A majority of this channel, with the exception of a small stretch adjacent to the intersection of SH 99 with FM 1314, is designed within the Selected Alternative ROW to reduce any additional ROW required (see **Table 2** for channel dimensions). Field surveys determined no additional impacts to wetlands or streams, than those identified in the Selected Alternative, would occur as a result of the proposed detention basin. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

OC 1 Outfall Channel

This channel is needed to bring stormwater runoff from the Grand Parkway to tie into the existing roadside ditch along FM 1314 (**Exhibit 2, Sheet 6 of 8**). Field surveys determined no impacts to wetlands or streams would occur as a result of the proposed outfall channel (see **Table 2** for channel dimensions). Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

OC-WO 1 Outfall Channel

This channel is needed to bring stormwater runoff from the Grand Parkway. It is located east of Timberland Boulevard and south of Stewart Street (**Exhibit 2, Sheet 8 of 8**). The desktop analysis showed no NWI wetlands throughout the analysis area, however photo-interpreted wetlands were identified for of providing a base resource inventory to guide preliminary design of this outfall channel. Additionally, based on a review of topographic maps, the design location

of this outfall channel would follow a natural drainage pattern and existing channel (tributary of White Oak Creek). Field surveys determined no additional impacts to wetlands or the existing tributary of White Oak Creek would occur as a result of the proposed outfall channel (**Appendix C**). This outfall channel would provide an outlet for stormwater runoff into the existing White Oak Creek (see **Table 2** for channel dimensions). No modifications to White Oak Creek are proposed in this location, with the exception of a tie-in to the existing channel. This channel is proposed in forested habitat that has been highly disturbed by vehicular and SUV disturbance as well as adjacent development. Environmental analysis has been performed for the proposed outfall channel as described above and no additional potential environmental impacts were identified.

WO-C 2 Outfall Channel

The channel is proposed to be located approximately 0.6-mile west of US 59 adjacent to the southern edge of SH 99 (**Exhibit 2, Sheet 8 of 8**). This outfall channel is needed to carry runoff from the roadway during large rainfall events, provide floodplain fill mitigation, and mitigate impacts associated with the White Oak Creek bridges. The desktop analysis showed NWI wetlands throughout the analysis area. Additionally, desktop analysis and field surveys identified an existing in-line detention feature for Valley Ranch Subdivision. After minimization and avoidance during the design process to avoid impacts to natural channels throughout the floodplain as identified on **Appendix C**, field surveys of the analysis area confirmed the presence of wetlands. Approximately 0.75 acres of unavoidable impacts to wetlands (**Appendix C**) would occur as a result of the proposed outfall channel (see **Table 2** for channel dimensions). This channel is proposed in forested habitat adjacent to existing subdivision development. Future plans in this area do include development which would potentially disturb the existing habitat. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

5.2 Stormwater Detention Basins

State and local drainage guidelines require that stormwater runoff from roadway projects be detained such that flow rates downstream of the project do not exceed the pre-project construction flow rates at each of the stormwater outfall locations. To achieve this goal, the project detention needs were analyzed. Along the entire length of the project, where possible, the area between the mainlanes and ROW was used for detention. These “in-line” detention

facilities take the form of oversized roadside ditches with outfall restrictors that only allow pre-project construction flows to exit the system. However, in eight locations the area within the project ROW was insufficient to support the project detention needs.

The eight proposed locations are discussed in the following section and summarized in **Table 2**. At each of the eight locations where stormwater detention was required, a desktop survey was performed to analyze possible environmental impacts, including, but not limited to, waters of the U.S., cultural resources, floodplains, threatened and endangered species habitat, and conformity with HCFCD planning. Based on this desktop analysis, preliminary locations were determined for each of the detention basins. The areas for each of the detention basins have been field surveyed to verify impacts. The detention sites were then modified, as necessary, based on the results of the field surveys to avoid or minimize environmental impacts to the extent practicable.

J-Basin 3

This basin is proposed to be located at the southwest corner of the intersection of SH 99 and Hardy Road/UPRR, partially within the proposed ROW of SH 99 (**Exhibit 2, Sheet 1 of 8)**. This basin was originally designed as three separate basins on the east side of the UPRR, between the Hardy Toll Road and the UPRR. The original design impacted multiple residents and would have required displacements. The basin was then re-designed to the current location. Based on preliminary desktop analysis, NWI wetlands identified were to the south of the basin; therefore, the basin was shifted north and is now partially within the proposed ROW of the Selected Alternative. Shifting the basin to the north reduced the additional acreage required and avoided impacts to potential wetlands to the south. This basin is located on a previously disturbed field that has been used for farming purposes (**Exhibit 2, Sheet 1 of 8**).

Field surveys of the area determined no presence of wetlands. This basin would outfall into HCFCD Unit J114-00-00, located southwest of the SH 99/Hardy Road intersection (see **Table 2** for basin dimensions). Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

J-Basin 4

This basin is proposed to be located north of the intersection of SH 99 and existing Riley Fuzzel Road (**Exhibit 2, Sheet 1 & 2 of 8**). A preliminary desktop survey determined existing

mitigation areas to the southwest of the proposed basin location. This basin was designed to avoid the identified Montgomery County mitigation areas as well as wetlands identified on Montgomery County property to the southwest. Field surveys of the area identified the presence of wetlands in the southern portion of the basin, adjacent to the ROW. The basin was shaped to avoid residential impacts to the northeast and wetland impacts to the southwest (see **Table 2** for basin dimensions). This basin would outfall into Spring Creek to the southwest of the basin. There are deep wetland storage areas adjacent and to the east of Spring Creek, between the basin and Spring Creek. Due to these deep wetlands, the proposed storm sewer would not have enough soil cover if it continues along the Selected Alternative ROW through the large wetlands. Therefore, to avoid impacts to the wetlands, an outfall pipe is proposed to be routed along an existing storm sewer along Riley Fuzzel Road south of the proposed alignment. The desktop review indicated a small NWI wetland area to the south of the basin, adjacent to the roadway ROW.

After minimization and avoidance during the design process, approximately 0.13 acres of additional unavoidable impacts to wetlands (**Appendix C**) from the proposed detention basin would occur. This basin would impact forested habitat; however, the proposed basin would provide habitat for emergent vegetation to grow as well as provide habitat for species that forage in wetland environment. This basin would be adjacent to a protected linear park, the Spring Creek Greenway, along Spring Creek, developed by Harris and Montgomery Counties. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

WG-Basin 1

This basin is proposed to be located approximately 1,400 feet northeast of Benders Landing Boulevard, adjacent to and on the north side of the roadway ROW (**Exhibit 2, Sheet 3 of 8**). In order to offset runoff, this basin would receive inflow from the roadway's storm sewer system and outfall into Stokes Gully.

The proposed general location of the detention basin was determined based on the location of the existing Stokes Gully channel identified during the desktop survey. Field surveys identified a stream channel the north, Stokes Gully to the northeast, and wetlands along the channel. Following the field surveys, the basin was sized to avoid additional impacts to the potentially jurisdictional channels and avoid impacts to identified wetlands. After minimization and

avoidance during the design process, field surveys determined approximately 1.32 acres of unavoidable impacts to wetlands (**Appendix C**) would occur as a result of the proposed detention basin (see **Table 2** for basin dimensions). Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

SJ-Basin 1

This basin is proposed to be located approximately 3,700 feet west of the San Jacinto River, adjacent to and on the north side of the roadway ROW (**Exhibit 2, Sheet 4 of 8**). This basin was designed in coordination with Outfall Channel SJ-A as described in Section 5.1 above. This basin was originally located on an existing remnant sand pit to the northwest of the current proposed location. The original design would have impacted existing lakes developed as a result of the remnant sand pits and interrupted a flow system that ties to the San Jacinto River from the sand pits. Additionally, the outfall channel that was designed to flow to the originally designed basin location would have impacted future planned residential development, forested habitat, and natural stream. Based on the field investigations and coordination with the property owner and Montgomery County, the location was re-designed to its current location. The Segment G Alignment was approved to bridge the north corner of an existing sand pit located just south of SJ-Basin 1. Haul roads that have been developed for the sand pit have created an embankment north of the SH 99. This basin is designed and shaped to utilize the natural embankment area, increasing the function of stormwater storage. Field surveys determined wetlands were present in the proposed location of this basin, however the detention basin would not destroy the function of these wetlands. Instead the basin would provide greater stormwater and sheet flow storage capacity while also providing mitigation of roadway impacts. After minimization and avoidance during the design process, field surveys determined approximately 1.09 acres of unavoidable impacts to wetlands (**Appendix C**) would occur as a result of the proposed detention basin. In addition to providing stormwater detention, this basin would provide floodplain fill mitigation as well (see **Table 2** for basin dimensions). Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

SJ-Basin 2

This basin is proposed to be located approximately 2 miles east of the San Jacinto River, running in a north-south direction from the south edge of the Selected Alternative ROW to the San Jacinto River (**Exhibit 2, Sheet 5 of 8**). This basin would provide stormwater mitigation of roadway impacts through a linear detention channel (see **Table 2** for basin dimensions). The desktop surveys did indicate NWI wetlands and potential stream impacts between the roadway ROW and the San Jacinto River; however, given the volume of wetlands and streams within this area east of the river, it was determined that impacts to wetlands and streams would occur regardless of the alternative alignment location. Field surveys confirmed the presence of wetlands and streams in the area. To avoid impacts to Phillips Lake and to follow an existing drainage pattern, the current alternative was chosen. The design meanders from the roadway ROW along an existing drainage pattern determined by review of topographic maps and was ground-truthed during field surveys. This basin has been designed to provide linear detention and flow to the San Jacinto River. Additionally, through coordination with Montgomery County and the affected property owners, this alignment best matches the ultimate flow for future development planned north of SH 99. After field surveys were performed this basin was redesigned to the south of Philips Lake to avoid approximately 1,402 linear feet of stream impact and reduce wetland impacts by approximately 0.64 acres.

After minimization and avoidance during the design process, field surveys determined that approximately 7.89 acres of unavoidable impacts to wetlands and approximately 235 linear feet of stream impact would occur as a result of the proposed detention basin (**Appendix C**). Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

SJ-Basin 3

This site is proposed to be located west of FM 1314 and south of SH 99 (**Exhibit 2, Sheet 6 of 8**). SJ-Basin 3 was initially designed closer to FM 1314; however, based on coordination with Montgomery County and the affected property owner, the basin was shifted away from FM 1314. Based on this shift, additional acreage was required to the west that wrapped around the northwest edge of the Cumberland Subdivision. The existing development south of SH 99 has created an embankment that results in a natural storage area between the approved SH 99

ROW and development to the south. SJ-Basin 3 is designed to use this natural embankment and wetland storage area to continue its existing function while providing stormwater detention.

Field surveys determined wetlands were present in the proposed location of this basin; however, the detention basin would not destroy the function of these wetlands. Instead, the basin would provide greater stormwater and sheet flow storage capacity while also providing mitigation of roadway impacts (see **Table 2** for basin dimensions). After minimization and avoidance during the design process, field surveys determined approximately 23.5 acres of unavoidable impacts to wetlands would occur as a result of the proposed detention basin (**Appendix C**). This basin would impact forested habitat; however, the proposed basin would remove invasive species, such as Chinese Tallow, and provide habitat for emergent vegetation to grow as well as provide habitat for species that forage in wetland environment. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

WO-Basin 1

This basin is proposed to be located east of Timberland Boulevard and north of Hillcrest Drive, south of SH 99 (**Exhibit 2, Sheet 7 & 8 of 8**). This basin is needed to offset runoff from adjacent drainage areas and SH 99. This basin includes compensation storage that is required due to the removal of the existing Timberland Estates detention pond facility within the roadway ROW. Runoff from the roadway would be directed to the basin via a proposed storm sewer system into the proposed basin along with re-routing from the existing Timberland Estate Subdivision drainage ditch. In addition to providing stormwater detention, this basin would provide floodplain fill mitigation (see **Table 2** for basin dimensions). This basin was designed to avoid impacts to existing ponds identified adjacent to the proposed basin. Additionally, this basin was designed to avoid direct and indirect impacts to Timberland Estates.

After minimization and avoidance during the design process, field surveys determined approximately 0.49 acres of unavoidable impacts to wetlands would occur as a result of the proposed detention basin (**Appendix C**). This basin would impact forested habitat; however, the proposed basin would provide habitat for emergent vegetation to grow as well as provide habitat for species that forage in wetland environment. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

WO-Basin 3

This basin will be located immediately west of the interchange of US 59 and SH 99. Currently there are four existing basins (two on the east and two on the west side of US 59) located entirely within the US 59 interchange at Community Drive, as describe below as WO-Basin 5 (**Exhibit 2, Sheet 8 of 8**). As construction of the ultimate build-out for the intersection of SH 99 and US 59 is phased (constructing two direct connectors under Segment H of the Grand Parkway at a later date), this basin will be constructed for an interim basin to offset additional runoff volume of SH 99 (see **Table 2** for basin dimensions).

Impacts to White Oak Creek would occur as a direct result of the roadway and this basin will be constructed under the roadway to avoid any additional impacts. Field surveys of the area determined no presence of wetlands. Since the proposed basin is located within the roadway ROW, no additional ROW is required. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

WO-Basin 4

This basin will be located immediately west of the interchange of US 59 and SH 99 and is designed in conjunction with WO-Basin 3 (described above). Currently there are four existing basins (two on the east and two on the west side of US 59) located entirely within the US 59 interchange at Community Drive, as describe below as WO-Basin 5 (**Exhibit 2, Sheet 8 of 8**). As construction of the ultimate build-out for the intersection of SH 99 and US 59 is phased (constructing two direct connectors under Segment H of the Grand Parkway at a later date), this basin will be constructed for an interim basin to offset additional runoff volume of SH 99 (see **Table 2** for basin dimensions).

Field surveys of the area determined no presence of wetlands and no impact to White Oak Creek. Since the proposed basin is located within the roadway ROW, no additional ROW is required. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

WO-Basin 5

This basin is located within the interchange of US 59 and SH 99. Currently there are four existing basins (two on the east and two on the west side of US 59) located entirely within the

US 59 interchange at Community Drive (**Exhibit 2, Sheet 8 of 8**). The existing basins provide mitigation of volume impact associated with recent US 59 improvements. All four basins are interconnected and outfall into White Oak Creek southwest of the interchange. To offset additional runoff volume of SH 99, the banks of each of the four existing basins will be re-sloped to handle additional capacity of runoff (see **Table 2** for basin dimensions). Since the basins would be interconnected and are to serve as one mitigation facility, all four chambers are shown as one basin.

Field surveys of the area determined no presence of wetlands. Since the proposed basin is located within the existing ROW of US 59 and the proposed SH 99, no additional ROW is required. Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

5.3 Floodplain Fill Mitigation Basins

Local regulations require that any fill from construction projects within the effective floodplain area must be offset by the excavation of an equal amount of fill within the same floodplain. The preference is for these excavation sites to be as close as practicable to the area where the fill is occurring. The floodplain fill quantities from the construction of the Grand Parkway are offset, in part, by the excavation of material for the roadside ditch system within the limits of the project ROW. However, at two locations, this excavation does not equal or exceed the amount of fill being placed within the floodplain limits. In order to meet the floodplain fill mitigation requirements, it was necessary to identify offsite locations where the additional excavation could occur.

Floodplain fill mitigation is most effective when it is located adjacent to the area being filled. Locating floodplain fill mitigation basins away from the project ROW may have adverse impacts to the flow characteristics of the stream and may possibly alter the floodplain boundary. Therefore, the floodplain fill mitigation sites are proposed to be located adjacent to the project ROW.

At both of the general locations, a desktop survey was performed to analyze possible environmental impacts, including, but not limited to, waters of the U.S., cultural resources, floodplains, threatened and endangered species habitat, and conformity with local and regional planning. Based on this desktop analysis, preliminary locations were determined for each of the floodplain fill mitigation basins. The areas for each of the mitigation basins have been field

surveyed to verify impacts. The mitigation sites were then modified, as necessary, based on the results of the field surveys.

WG-Basin 2

This basin is proposed to be located approximately 875 feet southwest of Brazos River Boulevard, north of SH 99 ROW (**Exhibit 2, Sheet 3 of 8**). This basin is situated between Stokes and Woodson Gullies and would serve as floodplain fill mitigation to offset floodplain fill volume within the Stokes and Woodson Gullies floodplains. The proposed facility would be designed as a shelf cut with two side weirs (west and east side of basin) to both Stokes and Woodson Gullies. Based on review of NWI wetland maps, no NWI wetlands were identified within the proposed area. NWI wetlands were identified to the north of the proposed basin, and Woodsons Gully was immediately to the east of the proposed basin. The desktop analysis did not indicate any other potential environmental impacts.

Field surveys of the area determined no presence of wetlands; therefore, the location of the detention basin was based on avoidance of Woodsons Gully impacts and to offset floodplain fill volume between Stokes and Woodson Gullies (see **Table 2** for basin dimensions). Environmental analysis has been performed for the proposed basin as described above and no additional potential environmental impacts were identified.

5.4 Conclusion

Since issuance of the ROD for the Grand Parkway Segment G, TxDOT and the FHWA have evaluated stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins for the Selected Alternative. After a thorough review of potential environmental impacts and alternative locations for these drainage facilities to best serve the purpose of the project, it was determined that ROW beyond that fully analyzed in the FEIS would be required. The alternatives analysis for the potential detention facilities has been reviewed and revised to avoid and minimize impacts. Based on field investigations and detailed design, the number of proposed drainage facility locations has been reduced from more than 19 potential locations totaling approximately 257 acres of additional ROW to the proposed revised locations (as described in Section 5.1-5.3 above) totaling approximately 179 acres of additional ROW.

6.0 UPDATE REVIEW AND CONTINUING COMMITMENTS SINCE ISSUANCE OF ROD

This re-evaluation examines all the environmental issues that were originally investigated and reported in the ROD. This examination has determined that the stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins would result in no substantive change in project impacts to the natural resources and environmental issues shown in **Table 3**, for the primary reasons noted in the "Explanation" column. Issues and resources not presented in **Table 3** are discussed in detail in **Sections 6.1** through **6.10** of this re-evaluation. These issues and resources include: Geology and Soils; Noise; Water Quality; Waters of the U.S., including Wetlands; Vegetation; Waterbody Modifications and Floodplains; Threatened and Endangered Species, Cultural Resources, Hazardous Materials, and Indirect and Cumulative Impacts. The additional ROW, as well as specific locations of the drainage facilities, are shown in **Exhibit 2**. The additional ROW is that portion of the current detailed design that extends beyond the 400-foot Selected Alternative ROW analyzed in the FEIS and ROD.

TABLE 3
RESOURCES/ISSUES DETERMINED TO HAVE NO SUBSTANTIVE CHANGE

Resource/Environmental Issue Studied in the ROD	Explanation
Land Use and Transportation Planning	• After additional review of the affected environment for land use and transportation planning, there have been minor changes that have occurred in the project area.* These minor changes include new homes built in developments previously discussed in the FEIS and ROD as well as continued progress on transportation projects that were discussed in the FEIS and the ROD. There are no developments that have not been previously recognized in the FEIS or ROD. The re-evaluation drainage facilities would be consistent with state and local government plans and policies on land use and growth that are relevant within the project area. With regard to regional and community growth, the analysis reported in the ROD remains valid.
Social Characteristics	• After additional review of the affected environment for social characteristics, there are no changes to relocations, displacements, or impacts to public facilities and services. With regard to public facilities and services, the analysis reported in the ROD remains valid. • After additional review of the affected environment for social characteristics, there are no changes to the project area that would affect, separate, or isolate any distinct neighborhoods, ethnic group, or other specific group. With regard to community cohesion, the analysis reported in the ROD remains valid. • After additional review of the affected environment for social characteristics, there are no changes to the project area that would involve any populations of racial minorities, low-income, or limited English proficiency that would be in addition to the populations previously examined in the ROD. With regard to Environmental Justice (EJ), the ROD analysis remains valid and in compliance with Executive Order (EO) 12898 on EJ and Title VI of the Civil Rights Act of 1964, 42 U.S.C. § 2000d et seq.
Economics	• After additional review of the affected environment for economics, there is no change in the number or types of employers in the area, nor any new appreciable effect on the labor force in the area. The additional ROW required since issuance of the ROD does not involve any new Census tracts or neighborhoods that were not previously recognized and evaluated in the FEIS or ROD. With regard to the affected environment for economic impacts, the demographic data, analysis, and conclusion reported, the analysis reported in the ROD remains valid.
Bicyclists and Pedestrians	• After additional review of the affected environment for bicyclists and pedestrians, there is no new effect regarding relocating, displacing, or impacting bicyclists or pedestrian facilities. With regard to the affected environment for bicyclist and pedestrian facilities, the analysis reported in the ROD remains valid.

TABLE 3 (CONT)
RESOURCES/ISSUES DETERMINED TO HAVE NO SUBSTANTIVE CHANGE

Resource/Environmental Issue Studied in the ROD	Explanation
Air Quality	• Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are: acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority MSATs, the list is subject to change and may be adjusted in consideration of future EPA rules. Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA. Nonetheless, air toxics concerns continue to be raised on highway projects during the NEPA process. Even as the science emerges, we are duly expected by the public and other agencies to address MSAT impacts in our environmental documents. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field. • FHWA's Guidance on Air Toxic Analysis in NEPA Documents (updated September 30th, 2009), the State's Air Quality Guidelines of June 2006, and FHWA's Mobile Source Air Toxics (MSAT) Analysis Quick-Start Guide has been approved since issuance of the ROD. After additional review of the affected environment for air quality, it was determined that there is no new added capacity to the roadway; therefore, the project does not warrant updating per new guidelines as part of this re-evaluation. Modeled air quality impact levels would be the same as reported in the ROD. Therefore, the air quality analysis remains valid.

TABLE 3 (CONT)
RESOURCES/ISSUES DETERMINED TO HAVE NO SUBSTANTIVE CHANGE

Resource/Environmental Issue Studied in the ROD	Explanation
Air Quality (Cont.)	• Carbon dioxide (CO_2) is a naturally occurring greenhouse gas and is not currently regulated by the U.S. Environmental Protection Agency (EPA). Greenhouse gases may contribute to global warming. On December 7, 2009, the EPA Administrator signed two distinct findings regarding greenhouse gases under section 202(a) of the Clean Air Act: • Endangerment Finding: The Administrator finds that the current and projected concentrations of the six key well-mixed greenhouse gases — carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons (HFCs), perfluorocarbons (PFCs), and sulfur hexafluoride (SF_6) — in the atmosphere threaten the public health and welfare of current and future generations. • Cause or Contribute Finding: The Administrator finds that the combined emissions of these well-mixed greenhouse gases from new motor vehicles and new motor vehicle engines contribute to the greenhouse gas pollution which threatens public health and welfare. These findings do not themselves impose any requirements on industry or other entities. However, this action was a prerequisite for implementing greenhouse gas emissions standards for vehicles. On December 15, 2009, the final findings were published in the *Federal Register* under Docket ID No. EPA-HQ-OAR-2009-0171. The final rule was effective January 14, 2010. Although a CMP has not yet been adopted by the H-GAC, the new plan is in development following FHWA guidance to integrate the area's CMS into the CMP. The CMP would incorporate all commitments within the 2035 RTP and the 2011-2014 TIP. Until H-GAC adopts the CMP, the proposed project reflects the most recently adopted CMS and its provisions.
Noise Analysis	• Based on updated guidelines (April 2011), the noise analysis was reviewed and the findings of this update are described in Section 6.2. • On the date of approval of this re-evaluation, FHWA, TxDOT, or any entity that takes responsibility of the construction of Segment G are no longer responsible for providing noise abatement for new development adjacent to the project.
Permits	• The re-evaluation drainage facilities would not trigger any new permits for the Grand Parkway Segment G not previously discussed in the FEIS or ROD. The appropriate Section 404 permit and Texas Pollutant Discharge Elimination System (TPDES) permit would be obtained from USACE and the Texas Commission on Environmental Quality (TCEQ), respectively, prior to construction. The Section 404 Individual Permit Application is anticipated to be submitted to the USACE in May 2012 and to go out on public notice in April 2012. Any comments received will be reviewed and responses provided as appropriate. With regard to required permits, the analysis reported in the ROD remains valid.

TABLE 3 (CONT)
RESOURCES/ISSUES DETERMINED TO HAVE NO SUBSTANTIVE CHANGE

Resource/Environmental Issue Studied in the ROD	Explanation
Wildlife	• While temporary impacts may occur during construction from increased construction noise and increased turbidity, no long-term impacts to terrestrial or aquatic species are expected. Although complete vegetation removal is anticipated to create the proposed detention basins, it is anticipated that the additional detention facilities would provide a defined easement that would be maintained as a drainage facility allowing emergent vegetation to grow back in the proposed basins. This easement for drainage would prevent any hardened structures, concrete overlay, or immediate use for anything other than a detention basin. This easement would inherently provide habitat for terrestrial and aquatic species by providing designated detention ponds and outfall channels. Additionally, various entities are working with TxDOT to design and create detention basins with natural borders to merge with existing landscape and provide a functional ecosystem. With regard to wildlife impacts, the analysis reported in the ROD remains valid.
Wild and Scenic Rivers	• The proposed action and the Segment G project area are not situated near any river segment on the National Inventory of River Segments included in the National Wild and Scenic River System list or on the Nationwide Rivers Inventory list. Consequently, there are no new effects to wild and scenic rivers. With regard to the affected environment for wild and scenic rivers, the analysis reported in the ROD remains valid.
Coastal Zone Management	• After additional review of the affected environment for coastal zone management, the additional ROW required since issuance of the ROD is not within the Coastal Management Program boundary. Consequently, there are no new effects to coastal zone management. With regard to the affected environment for coastal zone management, the analysis reported in the ROD remains valid.
Essential Fish Habitat (EFH)	• The project does not intersect tidally influenced waters and would have no impact to EFH. With regard to EFH, the analysis reported in the ROD remains valid.
Visual and Aesthetic Qualities	• There are two groups potentially affected visually by the proposed action: those who use the roadway for travel, and those who live and work in proximity to the roadway. Highly scenic, sensitive views are generally not present within Segment G. The re-evaluation ponds, basins, and channels would not alter the aesthetic characteristics of the roadway or surrounding area beyond what was described in the ROD. With regard to aesthetic considerations, the analysis reported in the ROD remains valid.

TABLE 3 (CONT)
RESOURCES/ISSUES DETERMINED TO HAVE NO SUBSTANTIVE CHANGE

Resource/Environmental Issue Studied in the ROD	Explanation
Regional and Project Specific Toll Analysis	• As presented in the ROD, H-GAC prepared a planning-level assessment, *Regional Cumulative and Indirect Effects of Toll Facilities*[1] report, to determine how the 2035 RTP regional toll roadway network could indirectly or cumulatively affect socioeconomic and natural resources. Resources evaluated in this planning study included EJ populations (low-income and/or minority populations as defined in EO 12898[2]), air quality, water resources, vegetation, and land use. However, the majority of the H-GAC analysis focused on the potential impact of the regional toll roadway network on EJ populations in the region. For more information on the resources evaluated and for more detail on the EJ analysis, please see the H-GAC *Regional Cumulative and Indirect Effects of Toll Facilities* report. Changes to the H-GAC assessment are discussed in Appendix D of this document. Additionally, a Project Specific Toll Analysis has been performed and is described in detail in Section 6.11 of this document. With regard to the Regional Toll Analysis, the analysis in the ROD remains valid.

*Project area is the area within the Selected Alternative Corridor as defined in the FEIS and the ROD.

6.1 Geology and Soils

No substantial impacts to the project area's topography, soils, or geologic resources are anticipated because of the proposed project. The Selected Alternative crosses soils and geologic features consisting of broad, flat plains on clayey and sandy substrate of the Lissie and Willis formations. Therefore, other than the localized cut and fill areas that would be required, no further impacts to Geology and Soils are expected.

The impacts to farmland soils protected under the Farmland Protection Policy Act (FPPA) does not include non-FPPA protected soils that are in existing agricultural use or any soil already converted for, or platted to, any development project. Bisection of farms would not only convert existing farmland or prime farmland soils (potential farmland) to transportation land use, but also would result in the disruption of some operations. The proposed project may result in positive impacts to local farming operations as well. Grand Parkway Segment G would increase efficiency of accessibility to Farm-to-Market (FM) roads. An improved transportation system in Harris County would improve highway safety for the transport of farm products and equipment.

As stated in the ROD and FEIS, the Selected Alternative impacts to farmland soils in Harris and Montgomery Counties have been determined to be minimal according to a final evaluation and site assessment scoring conducted by the Natural Resource Conservation Service (NRCS) using Form CPA-106, Part VII. The NRCS scores on farmland are based upon a possible 260

[1] HGAC, Regional Cumulative and Indirect Effects of Toll Facilities April 2009.
[2] EO 12898: Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations.

points, meaning that the farmland requires the maximum possible protection. A score totaling less than 160 points is afforded a minimal level of consideration for protection. The Selected Alternative received a score of 91 points during a formal evaluation conducted by the NRCS. The additional acres of proposed impacts to farmland soils in Harris and Montgomery Counties as a result of the stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins have been evaluated and determined, in addition to the total proposed project acres of prime farmland soils impacts, to be minimal according to a final land evaluation and site assessment scoring conducted by the NRCS using Form CPA-106, Part VII (see **Appendix B**). Further consultation has taken place with the NRCS for the Selected Alternative and additional ROW, and a revised impact rating score of 105 was received on February 22, 2012 (**Appendix B**). Because this score is less than the threshold of 160, no further consideration is required to mitigate farmland impacts.

As indicated in the ROD and the FEIS, farmland soils would be avoided where practicable; however, because of the large acreage of this resource in Harris and Montgomery Counties, the Selected Alternative would have an unavoidable effect on some farmland soils. With regard to the affected environment for Geology and Prime Farmland Soils and based on the evaluation conducted by the NRCS and receiving a total score less than 160, the ROD analysis remains valid.

6.2 Noise

Existing Environment

This analysis conforms to FHWA Regulation 23 CFR 772, “Procedures for Abatement of Highway Traffic Noise and Construction Noise,” and TxDOT’s 2011 Guidelines for Analysis and Abatement of Highway Traffic Noise (April 2011).

Sound from highway traffic is generated primarily from a vehicle’s tires, engine, and exhaust. It is commonly measured in decibels and is expressed as "dB." Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dBA." Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

- Identification of land use activity areas that might be impacted by traffic noise;
- Determination of existing noise levels;
- Prediction of future noise levels;
- Identification of possible noise impacts; and
- Consideration and evaluation of measures to reduce noise impacts.

Noise Abatement Criteria (NAC)

The FHWA has established the following NAC for various land use activity areas that are used as one of two means to determine when a traffic noise impact will occur. These criteria are outlined in **Table 4**.

TABLE 4 FHWA NAC

Activity Category	dBA Leq	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Residential
C	67 (exterior)	Active sports areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools, television studios, trails, and trail crossings
D	52 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios
E	72 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties or activities not included in categories A-D or F.
F	--	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	Undeveloped lands that are not permitted.

A noise impact occurs when either the absolute or relative criterion is met:

- Absolute Criterion: the predicted noise level at a receiver approaches, equals, or exceeds the NAC. "Approach" is defined as one dBA below the NAC. For example: a

noise impact would occur at a Category B residence if the noise level is predicted to be 66 dBA or above.

- Relative Criterion: one of two criteria used to determine when a noise impact occurs. Under this criterion, a noise impact occurs when the predicted noise level "substantially exceeds" (more than 10 dB(A)) the existing level even if it does not approach, equal or exceed the FHWA Noise Abatement Criteria.

When a traffic noise impact occurs, noise abatement measures must be considered. A noise abatement measure is any positive action taken to reduce the impact of traffic noise on an activity area.

Noise Analysis Summary

The FHWA Traffic Noise Modeling software was used in the analysis. The model primarily considers the number, type, and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise.

Predicted traffic noise levels were modeled at receiver locations (**Table 5** and **Exhibit 2**) that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement. All of the original data from the original FEIS was retained. The NAC categories in TxDOT's 2011 Guidelines for Analysis and Abatement of Highway Traffic Noise remained the same for most of the receivers analyzed in the FEIS. All receivers modeled in the FEIS were NAC category B or C. One receivers' NAC category has changed. Receiver 28 NAC category was changed from category B to C. This receiver and the new category are listed in **Table 5**. Receivers 1 through 28 were modeled to re-evaluate noise impact changes due to changes in elevation at the UPRR, near the existing Hardy Toll Road, east of IH 45, grade separation. All models were completed using the same traffic volumes and speed that were used in the FEIS. Traffic data from 2025 was maintained for this re-evaluation to remain consistent with 2025 with data used for other sections of the re-evaluation.

TABLE 5: TRAFFIC NOISE LEVELS (DBA LEQ)

Receiver #	Description	NAC Category	NAC Level (dBA)	Existing 2000 (dBA)	Predicted 2025 (dBA)	Change (+/-) (dBA)	Absolute*/ Relative** Impact	No. of impacted Receivers
1	Residential	B	67	50	61	+11	Yes	3
2	Residential	B	67	50	58	+8	No	0
3	Residential	B	67	50	57	+7	No	0
4	Residential	B	67	50	61	+11	Yes	4
5	Residential	B	67	50	60	+10	No	0
6	Residential	B	67	50	62	+12	Yes	2
7	Residential	B	67	50	60	+10	No	0
8	Residential	B	67	50	59	+9	No	0
9	Residential	B	67	50	59	+9	No	0
10	Residential	B	67	50	59	+9	No	0
11	Residential	B	67	50	60	+10	No	0
12	Residential	B	67	50	60	+10	No	0
13	Residential	B	67	50	67	+17	Yes	1
14	Residential	B	67	50	69	+19	Yes	1
15	Residential	B	67	49	61	+12	Yes	3
16	Residential	B	67	49	61	+11	Yes	3
17	Residential	B	67	49	58	+9	No	0
18	Residential	B	67	49	63	+14	Yes	3
19	Residential	B	67	49	63	+14	Yes	3
20	Residential	B	67	49	57	+8	No	0
21	Residential	B	67	49	62	+13	Yes	3
22	Residential	B	67	49	56	+7	No	0
23	Residential	B	67	49	61	+12	Yes	3
24	Residential	B	67	49	63	+14	Yes	3
25	Residential	B	67	49	64	+15	Yes	3
26	Residential	B	67	49	65	+16	Yes	1
27	Residential	B	67	49	61	+12	Yes	1
28	Recreation	C	67	49	64	+14	No	0

Source: Study Team 2012. * Absolute Impact- when predicted noise level approaches, equals, or exceeds the FHWA Noise Abatement Criteria. ** Relative Impact- predicted noise level "substantially exceeds" (more than 10 dB(A)) the existing level even if it does not approach, equal, or exceed the FHWA Noise Abatement Criteria.

Environmental Consequences

As indicated in **Table 5**, the proposed project would result in traffic noise impacts, and the following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers. The No-Build Alternative as described in the FEIS and ROD would not directly result in impacts to noise receivers throughout the project study

area. For the Selected Alternative, as projected traffic on the proposed tollway increases, noise levels would also increase.

Before any abatement measure can be incorporated into the project, it must be both feasible and reasonable. In order to be feasible, the measure must reduce noise levels at one first row receiver by at least seven dBA; and to be reasonable it must not exceed $25,000 for each benefited receiver.

Traffic management – control devices could be used to reduce the speed of the traffic; however, the minor benefit of one dBA per five mph reduction in speed does not outweigh the associated increase in congestion and air pollution. Other measures such as time or use restrictions for certain vehicles are prohibited on state highways.

Alteration of horizontal and/or vertical alignments – any alteration of the existing alignment would displace existing businesses and residences, require additional ROW, and not be cost effective/reasonable.

Buffer zone – the acquisition of sufficient undeveloped land adjacent to the highway project to preclude future development that could be impacted by highway traffic noise would not be cost effective/reasonable.

Noise barriers – this is the most commonly used noise abatement measure. Noise barriers were evaluated for each of the impacted receiver locations. Results of the evaluation for the Build Alternative are discussed below.

- Receiver 27: This receiver represents one residence. A noise barrier would not be sufficient to achieve the minimum, feasible reduction of seven dBA. A noise barrier for a single residence would not be reasonable and feasible.
- Receiver 28: This receiver represents a recreation area. A noise barrier would not be sufficient to achieve the minimum, feasible reduction of seven dBA. Additionally, a noise barrier would hinder the aesthetics of the recreational fields.

None of the noise abatement measures presented would be both feasible and reasonable for any of the impacted receivers discussed above. However, noise barriers were determined to be both feasible and reasonable for the impacted receivers described below and are proposed for incorporation into the project (**Exhibit 2**).

- Receivers 1, 4, 6, 13 through 16, 18, 19, 21, and 23 through 25: These receivers represent a total of 36 residences. Based on preliminary calculations, a noise barrier 5,547 feet in length and 16 feet in height would reduce noise levels by at least seven dBA at nine receivers and at least five for 59 benefited receivers at an estimated total cost of $1,597,536 or $23,493 for each benefited receiver (**Table 6**). The noise barrier provides a substantial reduction of at least seven dBA in the first row of receptors.

TABLE 6 Proposed Noise Barriers

Location	Length (feet)	Height (feet)	Cost of Barrier ($18 /sq. ft)	Number of Benefitted Receptors	Total Cost for Each Benefitted Receptor
Northgate Crossing	5,547	16	$1,597,536	68	$23,493

Any subsequent project design changes may require a reevaluation of this preliminary noise barrier proposal. The final decision to construct the proposed noise barrier would not be made until after completion of the project design, utility evaluation, and polling of adjacent property owners.

Noise Contours

Many of the land use activity areas between IH 45 and US 59 are currently Category G, undeveloped land. Noise impact contours were calculated in the FEIS. These noise impact calculations are still valid. Only the NAC category for undeveloped land has changed from Category D to Category G.

Local Coordination

A copy of this traffic noise analysis will be made available to local officials to ensure, to the maximum extent possible, future developments are planned, designed, and programmed in a manner that will avoid traffic noise impacts. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

Summary

With the exception of the noise abatement model revisions near Northgate Crossing and near the Union Pacific Railroad grade separation, the findings of the ROD remain valid for the remaining ROW as described in the FEIS and ROD. The construction noise discussion from the FEIS remains valid.

6.3 Water Quality

The TCEQ Permanent Rules Chapter 307, Texas Surface Water Quality Standards (TSWQS) Subsections 307.1 – 307.10, dated January 29, 2010, present surface water quality standards that apply to all surface waters in the state. The major surface waters of the state are classified in the TSWQS as "segments" for the purposes of water quality management and designation of site-specific standards. This examination has determined that no substantive change in project impacts to the water quality concerns listed in **Table 7** have occurred since the issuance of the ROD. The resources and issues discussed in the ROD have been updated and are discussed in detail in the following section.

There are four major streams within the Segment G project area: Spring Creek, West Fork San Jacinto River, Woodsons Gully, and White Oak Creek. Woodsons Gully and White Oak Creek do not have a segment classification since they are technically tributaries and not major bodies of water as classified by TSWQS. Spring Creek is classified as Segment 1004 and the West Fork San Jacinto River is classified as Segment 1008. All four streams are located within the San Jacinto River Basin. The San Jacinto River Basin has a drainage area of over 3,400 square miles. The State of Texas Water Quality Inventory states that the water quality for the streams, rivers, and bayous within the San Jacinto River Basin varies widely depending on the land use within the sub-basins (TCEQ, 1998).

Chapter 26.023 of the Texas Water Code gives authority to the TCEQ to establish water quality standards for all state waters. Each designated stream or river segment has specific desired water uses and numerical criteria developed by the TCEQ. Two streams within the project area are a designated segment listed on TCEQ's 2010 303(d) list of impaired waters (stream segments, lakes) that the Clean Water Act requires all states to submit for EPA approval and has site-specific standards. Each designated stream or river segment has specific desired water uses and numerical criteria developed by the TCEQ. The 2008 303(d) List (TCEQ, 2007) was the most recent data available at the time of the issuance of the ROD. For purposes of this Re-Evaluation, the 2008 303(d) List was compared to the 2010 303(d) List (TCEQ, 2011), approved November 18, 2011 and there are no changes in the water quality concerns for water crossings that traverse the project area. The 2010 303(d) (TCEQ, 2011), indicates water quality concerns for Spring Creek, Segment 1008, and West Fork San Jacinto, Segment 1004 Water quality concerns for the above-mentioned stream segments are summarized in **Table 7**.

TABLE 7
Summary of Water Quality Concerns for Segment G

TSWQS Segment	Streams	Water Quality Concerns
1008	Spring Creek	This segment was identified as impaired on the 2010 303(d) List due to: Bacteria levels in the following areas: From Field Store Road to SH 249; SH 249 to IH 45; and IH 45 to confluence with Lake Houston. Depressed dissolved oxygen levels in the following area: Field Store Road to SH 249. These levels are the result of both point and non-point sources. Total Maximum Daily Loads (TMDLs) for this segment are presented in Fifteen TMDLs for Indicator Bacteria in Watersheds Upstream of Lake Houston, adopted April 6, 2011. An update to the TMDL was published September 2011. The TMDLs presented aid in obtaining new or amended permits for wastewater discharge facilities.
1004	West Fork San Jacinto	This segment was identified as impaired on the 2010 303(d) List due to: Bacteria levels in the following areas: From the Spring Creek confluence upstream to the Stewart Creek confluence, and from the Stewart Creek confluence upstream to the Lake Conroe Dam. A TMDL is underway, scheduled, or will be scheduled.

Source: TCEQ, 2010 303(d)

Additionally, TCEQ regulates water quality through Storm Water Pollution Prevention Plans (SWP3s), Municipal Separate Storm Sewer Systems (MS4s), and Best Management Practices (BMPs). In accordance with the Clean Water Act, Section 402, all construction would follow these water quality regulations, which would aid in preventing further pollution to these impaired waters and to waters that are not already impaired. Additionally, any land use development that would occur from the construction of the proposed additional ROW would be required to follow TCEQ's regulations for water quality through an SWP3 and MS4. Prior to construction, MS4 operators would be notified.

As presented in the ROD, the project would affect more than five acres of land; therefore, TxDOT or the developer of the facility would be required to comply with the TCEQ TPDES General Permit for Construction Activity. This would be accomplished by developing an SWP3, filing an NOI prior to construction, and complying with the SWP3 throughout construction activities.

To minimize the short-term and long-term turbidity and suspended solids in the jurisdictional waters, the project would incorporate the following BMPs at appropriate stages during construction. For short-term erosion control, temporary vegetation, silt fence, mulch, and rock berms would be utilized and remain in place until the area has been stabilized. For long-term, block sod, permanent seeding and vegetation, concrete, and flexible slope protection would be used. Mostly clay material would be used for fill. Dredging is not anticipated.

Post-construction stormwater runoff water quality would be maintained through the use of vegetation-lined roadside ditches and detention ponds. All stormwater runoff would pass through a detention pond and/or a roadside ditch prior to entering the receiving stream/channel. Site-specific standards would be taken into consideration for each downstream segment of the receiving stream/channel as listed on TCEQ's 2010 303(d) list as appropriate. The roadside ditches and detention ponds would be maintained with a regular mowing and trash clean-up cycle.

The BMPs listed above and noted in the ROD would be incorporated into final design. With regard to the affected environment for water quality, the ROD analysis remains valid.

6.4 Groundwater

Potential impacts to water supply wells were assessed using data gathered from the United States Geological Survey National Water Information System, Submitted Drillers Report Database, TCEQ, Texas Water Development Board, Water Utility Database, and the Harris Galveston Subsidence District Water Wells Database. The database review indicated there are twenty-one water supply wells located within the proposed project, including the additional ROW.

Avoidance and minimization of impacts to public and private water supply wells have been incorporated into the preliminary design of the Selected Alternative and would be continued during construction of the facility. Measures would include minor alignment shifts to minimize the impact to source water protection areas and/or avoid direct impacts to the public and private water supply wells. Any water supply wells affected by construction would be mitigated using measures such as providing a new well or connection to the public or private water system, if feasible. Wells taken out of service would be sealed in accordance with the specifications outlined by the Water Well Drillers Board of the Texas Department of Licensing and Regulation (TDLR).

A stormwater management plan would be developed according to FHWA and TxDOT criteria to reduce the risk of contaminating local aquifers. The stormwater management basins would

collect and control spills of hazardous materials, sediments, and other particulates found in highway runoff. The use of established BMPs would be employed to prevent highway stormwater runoff from entering the aquifer at wellheads.

An emergency spill control pollution prevention plan would be developed and coordinated with local officials. Special stormwater management measures would be designed to isolate potentially hazardous spills, for treatment and removal before entering an aquifer.

6.5 Waters of the U.S., including Wetlands

A wetland delineation was conducted for Segment G in 2007 using two different methods of wetland assessment for the ROW of the Selected Alternative: field survey delineations for approximately 40 percent of the ROW where access was granted, and photo interpretation of wetlands for approximately 60 percent of the ROW. Based on updates to ROE and recent updates to the USACE Wetlands Delineation Manual in 2008, the wetland delineation for the proposed ROW as described in the ROD has been updated. Wetland delineations were completed in October, November, and December 2011 and January and February 2012 for the Selected Alternative ROW as described in the ROD, and the proposed additional ROW needed for the detention/ mitigation basins and outfall easements. Delineations were conducted in accordance with the *USACE 1987 Wetlands Delineation Manual* (1987 Manual) (Environmental Laboratory, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Region* (Regional Supplement) (USACE, 2008). As required by existing regulations, the presence of three essential wetland characteristics (i.e., hydrophytic vegetation, hydrology, and hydric soils) was evaluated. Characteristics for waters of the U.S., including wetlands, were evaluated for intermittent and perennial streams, navigable and non-navigable waterways, deep-water habitats, wetlands, and other special aquatic sites.

During the field surveys, ecologists established data point locations, transects, and methodology based on guidance from the 1987 Manual and the Regional Supplement. Vegetation, hydrology, and soils were evaluated and recorded in the field at each data point in accordance with the Regional Supplement. All areas that were dominated by hydrophytic vegetation, exhibited a minimum of one primary or two secondary hydrology indicators, and contained hydric soils were mapped as potential wetlands.

During the field surveys, the data point locations, the boundaries of potential wetlands, and the ordinary high water mark (OHWM) limits of creeks were mapped using a Trimble Pro XRS or a Trimble Geo XH differentially corrected global positioning system (DGPS). The DGPS allows wetland features to be mapped at sub-meter accuracy. The data point locations, wetland boundaries, and OHWM limits are depicted on the Wetland Delineation Maps in **Appendix C**.

Results of the wetland delineation and a preliminary jurisdictional determination (PJD) are being prepared for submittal to the USACE Galveston District in March 2012. A request for verification and approval of the PJD will be requested with the submittal of the wetland delineation. A Section 404 Individual Permit application is being prepared for submittal to the USACE Galveston District immediately following confirmation that the USACE Galveston District has received the wetland delineation and PJD request.

The wetland delineation conducted identified, after minimization and avoidance, seven waters and fifteen wetlands within the additional ROW, avoiding approximately 4.9 acres of wetlands. Additionally, the wetland delineation conducted for the Selected Alternative ROW identified fifteen waters and twenty-nine wetlands. Within the project ROW, including the additional ROW, forested wetlands include palustrine-forested wetlands (PFO), and non-forested wetlands include palustrine emergent (PEM) wetlands. **Table 8** presents the acreage of wetlands identified within the approved ROW and additional ROW needed for detention/mitigation basins and outfall easements. With regard to the affected environment for waters of the U.S., including wetlands, the ROD analysis remains valid.

Stream Condition Assessment

On June 9, 2008 the (USACE) and the Environmental Protection Agency (EPA) issued a joint ruling to amend current regulations outlined by the Clean Water Act (33 C.F.R. § 332 / 40 C.F.R. § 230). The amendment continues to require compensatory mitigation for regulated impacts to aquatic resources resulting in no net loss of those resources. However, it also requires mitigation to be implemented using a holistic approach while considering the functional capacity of the entire watershed, therefore maintaining the watershed's ability to support a diverse aquatic community comparable to reference systems within the region. As this new rule is implemented across the country through Standard Operating Procedures developed by Interagency Review Teams, which are chaired by the USACE, compensatory stream mitigation is required.

In October and November 2011, a rapid visual field assessment in accordance with USACE-Galveston District Interim SWG Stream Condition Assessment Standard Operating Procedure (SOP) was performed for the Segment G roadway ROW and proposed detention facilities. During this assessment, field surveys qualitatively evaluated stream habitat within the riparian corridor of each stream assessment reach (SAR) with respect to causes of habitat degradation and constraints to constructing improvements.

Aquatic habitat is a function of the interaction between channel geomorphology, water quality, and riparian vegetation, and thus serves as a general indicator of stream corridor health.

Therefore, the field assessment consisted of a biologic and geomorphic component. Characteristics of biologic condition assessed included riparian vegetation, bed form diversity, and the presence and frequency of habitat structures. Vegetation was evaluated based on the native or exotic/invasive dominance and diversity/richness evaluations. Bed form diversity is a qualitative measure of the amount and distribution of bed facet variation (steps, riffles, runs, pools, and glides). The presence and frequency of habitat structures was evaluated based on the existence or potential for benthic and aquatic diversity and richness.

Characteristics of geomorphic condition were qualitatively assessed and include erosion and vertical/horizontal stability. Erosion, identified by indicators of recent loss of soil/earth substrate, was evaluated based on active erosional processes. Vertical and horizontal stability was characterized by the potential of the channel to scour the existing bed and banks.

The rapid stream assessment conducted identified, after minimization and avoidance, seven waters within the additional ROW, avoiding approximately 5,000 linear feet of stream impact. Additionally, the rapid stream assessment conducted for the Selected Alternative ROW identified fifteen waters/streams. **Table 8** presents the acreage and linear feet of waters/streams identified within the proposed ROW and additional ROW needed for detention/mitigation basins and outfall easements.

TABLE 8
WATERS OF THE U.S., INCLUDING WETLANDS

Location	Waters/Stream (Linear Feet)*	Non-Forested Wetland (acres)	Forested Wetland (acres)	Total Impacted (acres/LF)
Selected Alignment ROW	6,251	17.24	23.50	40.74/ 6,251
Detention/Mitigation Basins and Outfall Easements	2,582	3.86	37.37	41.23/ 2,582
Total	8,883	21.1	60.87	81.14/ 8,883

Note: *- Waters of the U.S. in associated streams are calculated/mitigated per linear foot of impact in accordance with the USACE-Gal Interim SWG Stream Condition SOP

6.6 Vegetation

As growth and development are part of the region's future, it is not feasible that every undeveloped parcel be preserved. However, it is feasible that the region identifies and works to conserve those areas that are most ecologically sensitive. H-GAC identified areas that have sensitive environmental resources for special consideration in the transportation planning process. However, the identification is not intended to be used for project-level screening. The

results are intended to be used for long-range planning purposes and screening to identify areas in which future transportation projects or development may potentially impact these sensitive resources. In addition, the identified environmental resources are areas where mitigation efforts may be focused.

In some instances, disturbing natural resources may be unavoidable for regionally significant projects or projects located on facilities that are multiple-lane, limited access facilities, such as highways and toll roads. Because of their scale, regionally significant projects potentially have a larger impact on the environment than a local project and, therefore, were closely examined.

Currently, projects within the 2035 RTP are individually subject to environmental requirements but have no mechanism for cumulatively identifying or mitigating environmental impacts. At the project level, the TxDOT Houston District can mitigate for loss of vegetation with the Texas Parks and Wildlife Department (TPWD), and wetlands mitigation would occur through the permitting process under the jurisdiction of the USACE. Locally, cities can also curb vegetation loss by implementing measures to protect vegetation areas.

Vegetation Findings

Vegetative communities located within the additional project ROW were identified through field investigations conducted in October, November, and December 2011 and a supplemental review of 2010 aerial photography. Vegetation communities identified within the additional ROW include upland pasture, upland scrub-shrub, upland forest, non-forested wetland, and forested wetland. Common species found within the upland pasture community include Bermuda grass (*Cynodon dactylon*), Bahia grass (*Paspalum notatum*), wooly croton (*Croton capitatus*), southern carpet grass (*Axonopus affinis),* and naked-spike ragweed (*Ambrosia psilostachya*). Species commonly found in the upland scrub-shrub community of the additional ROW include eastern baccharis (*Baccharis halimifolia*), Chinese tallow tree, yaupon (*Ilex vomitoria*), wax myrtle (*Myrica cerifera*), and naked-spike ragweed. The upland forest communities located within the additional ROW include overstory species such as loblolly pine (*Pinus taeda*), water oak (*Quercus nigra*), sugarberry (*Celtis laevigata*), and Chinese tallow tree, in addition to under story species such as yaupon and Chinese privet (*Ligustrum sinense*). Common species identified within the non-forested wetland communities include floating seedbox (*Ludwigia peploides*), swamp smartweed (*Polygonum hydropiperoides*), soft rush (*Juncus effusus*), spikerushes maiden-cane (*Panicum hemitomon*), (*Eleocharis* spp.), and flatsedges (*Cyperus* spp). Species identified within the forested wetland communities of the additional ROW include black willow (*Salix nigra*), Chinese tallow tree, and sweetgum

(*Liquidambar styraciflua*), in addition to understory species such as slender woodoats (*Chasmanthium laxum)* and dwarf palmetto *(Sabel minor)*.

Table 9 presents the acreage of each vegetation type within the additional ROW. The additional ROW is that portion of the current detailed design that extends beyond the 400-foot ROW analyzed in the FEIS and ROD. Anticipated impacts were calculated based on current design of the stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins. Design of the proposed drainage facilities as described in Section 5.0 of this document were given a contingency factor in some locations to determine the actual footprint of a proposed basin. During final design and construction of Segment G and the proposed detention basins, if determined applicable based on field conditions, allowable depth, and other considerations for flow, the proposed basins footprints will be reduced. Complete vegetation removal within the drainage structures is anticipated; however, complete vegetation removal may not be required and impacts would be minimized where possible. With regard to the affected environment for vegetation, the ROD analysis remains valid.

TABLE 9
VEGETATION COMMUNITY IMPACTS
WITHIN THE ADDITIONAL ROW

Vegetation Type	Acres Within Additional ROW
Upland Pasture	9.02
Upland Forest	126.72
Upland Scrub-Shrub	2.21
Non-Forested Wetland	3.86
Forested Wetland	37.38
Total	179.19*

*Calculations may vary from actual ROW acquisition due to finalization of offsite drainage design

6.7 Waterbody Modifications and Floodplains

Following the approval of the FEIS, detailed design work was performed to identify the specific drainage facility requirements for the project. After the requirements were identified, an alternative analysis was performed to identify the most suitable locations for each of these drainage facilities. As a part of the alternative analysis, impacts to the effective FEMA floodplains and floodways were examined.

Each of the drainage facilities would be constructed through the excavation of material from the facility site; no impacts to the floodplain are anticipated since they are solely excavation sites.

The final hydraulic design for the roadway will be completed in accordance with the applicable federal, state, and local policies. Policy III, in Section 1.3.3 of the *HCFCD Policy Criteria and Procedure Manual*, October 2010, states that "projects by others shall avoid increasing flood risks or flood hazards or creating new flood hazard areas." Section 6.1.1 states that infrastructure improvements with detention requirements are to be designed such that "flood levels downstream of the project do not increase." Adherence to this policy dictates that the project will not cause any downstream impacts to the flood levels along the watercourses traversed by the project. With regard to the affected environment for waterbody modification and floodplains, the ROD analysis remains valid.

As stated in the FEIS and ROD, final design would consider further minimization of impacts through bridging. Since publication of the ROD, the crossing of Woodsons Gully has been modified to include a bridge instead of an embankment with box culverts. With incorporation of the bridge, direct disturbance to the floodway and floodplain of Woodsons Gully has been reduced as compared to the impacts presented in the ROD. The ROD accounted for all floodway and floodplain acreage inside the 400-foot ROW, regardless of bridging, and so the evaluation remains valid.

6.8 Threatened and Endangered Species

Analysis of potential effects to threatened and endangered species protected under the Endangered Species Act (ESA) is a continuous process. This section provides an update to information presented in the FEIS and the ROD for the proposed stormwater outfall channels, stormwater detention basins, and floodplain fill mitigation basins. Additionally, a review of the entire proposed ROW and field survey for threatened or endangered species was updated. Both the U.S. Fish and Wildlife Service (USFWS) and TPWD maintain species lists for Harris and Montgomery Counties. As of August 2010, the USFWS online list for Harris and Montgomery Counties listed only the Texas prairie dawn and Red-cockaded woodpecker (RCW) as endangered and the Bald Eagle as threatened and delisted due to recovery. In October 2011 and again in February 2012, a review of TPWD's online Annotated County List of Rare Species for Harris and Montgomery Counties was also conducted, and the status of the state- and federal-listed species is reflected in **Table 10**. Additionally, a review of TPWD's Natural Diversity Database (NDD) was conducted in February 2012 for any documented occurrences of threatened or endangered species that may occur within or adjacent to the

additional ROW. The listed status of each threatened and endangered species for Harris and Montgomery Counties is presented in **Table 10.**

TABLE 10 STATE AND FEDERAL THREATENED OR ENDANGERED SPECIES OF HARRIS AND MONTGOMERY COUNTIES, TEXAS

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present	Effect/ Impact
AMPHIBIANS						
Houston Toad[1]	*Anaxyrus houstonensis*	E	E†	Sandy soil, breeds in ephemeral pools	No	No
BIRDS						
American Peregrine Falcon	*Falco peregrinus anatum*	T	DM†	Potential migrant, nest in west Texas	Migrant	No
Arctic Peregrine Falcon	*Falco peregrinus tundrius*	SOC	DM†	Potential migrant	Migrant	No
Bald Eagle	*Haliaeetus leucocephalus*	T	DM	Near water areas, in tall trees	No	No
Black Rail[1]	*Laterallus jamaicensis*	SOC		Marshes, pond borders, wet meadows, and grassy swamps	No	No
Brown Pelican[1]	*Pelecanus occidentalis*	E	DM†	Island near coastal areas	No	No
Henslow Sparrow (wintering)	*Ammodramus henslowii*	SOC		weedy fields, fields with bunch grass, vines, and brambles, need bare ground	No	No
Mountain Plover	*Charadrius montanus*	SOC		Short grass plains and bare dirt (plowed fields)	No	No
Piping Plover[2]	*Charadrius melodus*	T	T†	Beaches, bayside mud or salt flats	No	No
Red-cockaded Woodpecker	*Picoides borealis*	E	E†(1)	Nest in 60+ year pine, forages in 30+ pine	No	No
Snowy Plover[1]	*Charadrius alexandrinus*	SOC		Coastal winter migrant	No	No
Southeastern Snowy Plover[1]	*Charadrius alexandrinus tenuirostris*	SOC		Winter migrant on Texas coast beaches, bayside mud or salt flats	No	No
Sprague's Pipit	*Anthus spragueii*		C†	Migrant, upland prairie, coastal grasslands	No	No
White-faced Ibis	*Plegadis chihi*	T	*†[2]	Freshwater marshes, but some brackish or salt marshes	Yes	No
White-tailed Hawk[1]	*Buteo albicaudatus*	T	*	Coastal Prairies	Yes	No
Whooping Crane	*Grus americana*	E	E†	Winters in Aransas National Wildlife Refuge	Yes	No
Wood Stork	*Mycteria americana*	T	* E†[2]	Prairie ponds and flooded pastures	Yes	No
FISHES						
American Eel[1]	*Anguilla rostrata*	SOC		Coastal waterways below reservoirs to gulf	No	No
Creek Chubsucker	*Erimyzon oblongus*	T	*	Variety of small rivers and creeks, prefers headwaters	Yes	No

TABLE 10 (CONT.)
STATE AND FEDERAL THREATENED OR ENDANGERED SPECIES
OF HARRIS AND MONTGOMERY COUNTIES, TEXAS

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present	Effect/ Impact
FISHES (cont.)						
Smalltooth sawfish	*Pristis pectinata*	E	E†	Sheltered bays, shallow banks, estuaries and river mouths	No	No
Paddlefish[2]	*Polydon spathula*	T	*	Large, free-flowing rivers	Yes	No
INSECTS						
A Mayfly[2]	*Tricorythodes curvatus*	SOC		Aquatic larval phase, adults in bankside vegetation	No	No
A Mayfly[2]	*Plauditus gloveri*	SOC		Aquatic larval phase, adults in bankside vegetation	No	No
Gulf Coast Clubtail[2]	*Comphus modestus*	SOC		Medium river, moderate gradient, and streams, silty sand or rock bottoms	No	No
Texas Emerald Dragonfly[2]	*Somatochlora margarita*	SOC		Spring-fed creeks and bogs, small sandy forested streams with moderate current	Yes	No
MAMMALS						
Louisiana Black Bear	*Ursus americanus luteolus*	T	T†	Bottomland hardwoods; large, undisturbed forested areas	No	No
Plains Spotted Skunk	*Spilogale putoria interrupta*	SOC	*†[2]	Open fields, prairies, croplands, fence rows, farm yards, brushy areas, and tall grass prairies	Yes	No
Rafinesque's Big-Eared Bat	*Corynorhinus rafinesquii*	T	*	Cavity trees in hardwood forest, concrete culverts, abandoned buildings	No	No
Red Wolf	*Canis rufus*	E	E†	Extirpated, brushy, forested areas, coastal prairies	No	No
Southeastern Myotis Bat	*Myotis austroriparius*	SOC		Cavity trees in hardwood forest, concrete culverts, abandon buildings	Yes	No
MOLLUSKS						
Creeper (Squawfoot)	*Strophitus undulates*	SOC		Small to large streams, gravel to gravel and mud bottoms, silt and cobble,	No	No
Fawnsfoot	*Truncilla donaciformis*	SOC		Small to large rivers, sand, mud, rocky mud, sand & mud, silt & cobble	No	No
Little Spectaclecase	*Villosa lienosa*	SOC		creeks, rivers, and reservoirs, sandy substrates, slight to moderate currents, along banks in slower currents	Yes	No
Louisiana Pigtoe	*Pleurobema riddellii*	T	*[1]	Streams & moderate-sized rivers, mud, sand, and gravel	No	No
Sandbank Pocketbook	*Lampsilis satura*	T	*[1]	Rivers with moderate to swift flows, gravel-sand, and sand	No	No
Texas Pigtoe	*Fusconaia askewi*	T	*[1]	Rivers with mixed mud, sand, and fine gravel in protected areas.	No	No
Wabash Pigtoe	*Fusconaia flava*	SOC		Creeks to rivers, mud, sand, and gravel, moderate to swift currents	No	No
REPTILES						
Alligator Snapping Turtle	*Macroclemys temminckii*	T	*	Deep water of rivers and canals	Yes	No

TABLE 10 (CONT.)
STATE AND FEDERAL THREATENED OR ENDANGERED SPECIES
OF HARRIS AND MONTGOMERY COUNTIES, TEXAS

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present	Effect/ Impact
REPTILES (cont.)						
Green Sea Turtle[1]	*Chelonia mydas*	T	E, T†	Gulf and bay system	No	No
Gulf Saltmarsh Snake[1]	*Nerodia clarkia*	SOC		Saline flats, coastal bays, brackish river mouth	No	No
Kemp's Ridley Sea[1] Turtle	*Lepidochelys kempii*	E	E†	Gulf and bay system	No	No
Louisiana Pine Snake[2]	*Pituophis melanoleucus ruthveni*	T	C†	Sandy, longleaf piney woods	Yes	No
Leatherback Sea Turtle[1]	*Dermochelys coriacea*	E	E†	Gulf and bay system	No	No
Loggerhead Sea Turtle[1]	*Caretta caretta*	T	T†	Gulf and bay system	No	No
Smooth Green Snake	*Liochlorophis vernalis*	T	*	Gulf coastal prairies, prefers dense vegetation	Yes	No
Texas Horned Lizard	*Phrynosoma cornutum*	T	*	Open, semi-arid regions, with bunch grass	No	No
Timber/Canebrake Rattlesnake	*Crotalus horridus*	T	*	Swamps/floodplains of hardwood/upland pine	Yes	No
VASCULAR PLANTS						
Coastal Gay-feather[1]	*Liatris bracteata*	SOC		Coastal prairie grasslands	No	No
Correll's False Dragon-head[2]	*Physostegia correllii*	SOC	†	Wet, silty clay on streamsides, creek beds, irrigation ditches, roadside ditches, etc.	No	No
Giant Sharpstem Umbrella-sedge	*Cyperus cephalanthus*	SOC		on saturated, fine sandy loam soils or on heavy black clay	No	No
Houston Daisy	*Rayjacksonia aurea*	SOC		barren, sparsely vegetated saline slicks, pimple mounds, on sandy to sandy loam.	No	No
Texas Meadow-rue	*Thalictrum texanum*	SOC		woodlands and woodland margins on sandy loam, on pimple mounds, clay pan savannahs	No	No
Texas prairie dawn	*Hymenoxys texana*	E	E	Poorly drained areas in open grasslands; pimple mounds	Yes	No
Texas Windmill Grass	*Chloris texensis*	SOC		Sandy to sandy loam soils in bare areas	Yes	No
Threeflower Broomweed	*Thurovia triflora*	SOC		low vegetation, on light colored silt or fine sand over saline clay.	Yes	No

(1) Species only listed for Harris County; (2) Species only listed for Montgomery County

* 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 (2011).

† 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 (2011).

E = endangered T = threatened C = candidate species SOC = species of concern DM = delisted taxon, recovered, being monitored first five years

State and/or Federally Listed Threatened and Endangered Species

Review of the additional ROW and an updated review of the proposed roadway ROW has resulted in a determination that no substantive change in project impacts to the species listed in

Table 10 has occurred since the issuance of the ROD. Based on commitments in the ROD to further evaluate resources and issues discussed in the ROD have been updated and are discussed in detail in the following section. With regard to threatened and endangered species, the ROD analysis determined a "not likely to adversely affect" call for the Texas prairie dawn. Based on the updates described below, a determination of "no effect" was concluded within the additional ROW and the ROW discussed in the FEIS and ROD. This “no effect” determination is in regards to the federally listed endangered Texas prairie dawn, the RCW and any other federally listed species under USFWS jurisdiction. Several threatened, endangered, or rare bird species may potentially occur within the additional ROW at various times throughout the year. None of the state and/or federally listed species have any known documented nest sites within the additional ROW (TPWD, 2012). Listed bird species would likely occur within the additional ROW to forage, roost, or migrate through the region. Direct mortality impacts are not anticipated to any threatened, endangered, or rare bird species.

Adverse impacts to other state-listed species in **Table 10** (White-faced Ibis, White-tailed Hawk, Wood Stork, creek chubsucker, Rafinesque's big-eared bat, alligator snapping turtle, smooth green snake, and timber rattlesnake) are not expected to occur because of the lack of recorded occurrences within the additional ROW (TPWD, 2012). Additionally, multiple field surveys within the additional ROW did not indicate the presence of state-listed species. During project development, TxDOT or the developer of the facility would design, use, and promote construction practices that minimize adverse effects to both regulated and unregulated wildlife habitat. Existing vegetation (especially native trees) would be avoided and preserved wherever practicable.

Bald Eagle

As of August 9, 2007, the bald eagle is no longer a federally threatened species; however, it will be monitored closely for at least the first five years after delisting (USFWS, 2009). The bald eagle is still afforded special protection under the Bald and Golden Eagle Protection Act. The bald eagle is an uncommon to rare migrant and winter resident throughout Texas (Texas Ornithological Society, 1995). It is generally found in coastal areas and around large bodies of water, such as reservoirs, lakes, and rivers. Nesting in Texas is largely restricted to the eastern one-third of the state and to the coastal prairies region. The bald eagle prefers habitat in deciduous forests with large hardwoods or pine trees for roosting and nesting (K. Lad, 2008). In Texas, wintering and migrating bald eagles frequently stop-over along water body shores and large rivers, which provide the eagle with the bulk of its dietary requirements (Campbell, 1995).

During October, November, and December 2011 and January 2012, field surveys were conducted in conjunction with wetland delineation surveys within the right-of-way and the additional project area. During the surveys no presence of bald eagles, or their protected critical habitat was observed within the 400-foot ROW or the additional project areas. Based on a review of TPWD's Annotated County Lists of Rare Species for Harris County, Texas (revised September 28, 2011), TPWD's NDD (accessed February 2012), USFWS list, and on-site evaluations, it has been determined that the proposed project will have no effect on bald eagles, or their designated critical habitats.

The Bald Eagle may still occur within the additional ROW. Should Bald Eagles be noted foraging and/or roosting within the additional ROW, steps would be taken to minimize potentially disruptive activities per the *USFWS National Bald Eagle Management Guidelines* (USFWS, 2007).

Texas Prairie Dawn

In the FEIS, TxDOT concluded that the project is not likely to adversely affect any federally listed species, its habitat, or designated critical habitat within the Segment G ROW. A conclusion of "no effect" could not be made for the Texas prairie dawn because of lack of access to one property within the Segment G ROW identified as potential Texas prairie dawn habitat, as presented in the ROD. The remaining portion of the ROW contained upland forest, unmaintained, disturbed pasture, urban development, and wetlands. As a result, TxDOT committed in the FEIS and ROD to continue coordination with the USFWS and to perform additional surveys for Texas prairie dawn as access was granted to additional properties.

The Texas prairie dawn flower, a federal and state listed endangered plant, is an annual sunflower (Asteraceae) that ranges in height from 1.5 to 7 inches. The bracts conceal the minute ray flowers; the yellow disk flowers are 0.1 to 0.2 inch long. Texas prairie dawn habitat consists of small, sparsely-vegetated areas of fine-sandy saline soil. These sparsely-vegetated areas commonly occur on the lower sloping portion of pimple (mima) mounds or on the level to slightly concave area around the mound's base. Texas prairie dawn prefers native prairies that have not been disturbed by agricultural activities such as plowing (Brown, 2009). Prairie remnants are often characterized by this unusual microrelief topography (Smeins, 1994). Texas prairie dawn flower blooms and fruits from mid~March to mid-April and senescence is usually complete by May (Poole and Riskind, 1987).

Ground surveys conducted for Texas prairie dawn during the flowering period (April 2000 and April 2001) found no populations within the alternative alignments in properties granted

landowner access. Although the April 2000 surveys were conducted during drought conditions, a local population of Texas prairie dawn was identifiable during the survey period near Addicks, Texas. The portion of the Segment G project area traversed by the alternative alignments consists primarily of upland forest, unmaintained, disturbed pasture, urban development, and wetlands and therefore is unlikely to include the viable habitat (i.e., remnant prairie topography) preferred by Texas prairie dawn. Using aerial photography, only one small area was determined to potentially contain Texas prairie dawn habitat in the vicinity of proposed alignments. Access was not granted to this parcel, therefore a determination of not likely to adversely affect was concluded. Additionally, during the surveys conducted of the Preferred Alternative Alignment in December 2006, March-April 2007, no Texas prairie dawn was identified.

In April 2009, additional surveys were completed by reviewing habitats on recent (2008) high-resolution aerial photography. Landowner access was not granted for the one property containing potential Texas Prairie dawn habitat (Site 1 identified in the March 2010 Biological Assessment [BA]); therefore, ground surveys were not completed. Additionally, approximately 60 percent of the ROW that had not been ground –surveyed (although not identified as potential habitat through aerial photography) still remained unsurveyed due to lack of access or visibility from public roads. Based on a commitment in the BA, additional surveys were to be completed for the remaining unsurveyed property within the ROW

During October, November, and December 2011 and January 2012, field surveys were conducted in conjunction with wetland delineation surveys within the 400-foot ROW and the additional project area. During these field surveys, ecologists performed an evaluation of soil characteristics, habitat types, presence or absence of wetland and wetland features, identification of waterbodies, and previous disturbances. Additionally, access was granted to the remaining parcel from the 2009 surveys identified as potential habitat for Texas prairie dawn. Site 1 was field surveyed and vegetation observed consisted of disturbed urban and herbaceous upland surrounded by forested uplands. Species included dallisgrass (*Paspalum dilatatum*), St. Augustine Grass (*Stenotaphrum secundatum*), and West Indian Panicgrass (*Panicum diffusum*). The upland forested community included species such as loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), and yaupon (*Ilex vomitoria*). Soils observed consisted of clay with sandy layers. A small manmade pond and small forested wetland was observed on the property as well. The soils and vegetation were not consistent with the potential habitat for prairie dawn habitat. Approximately nine percent of the parcels remain to be surveyed based on lack of access. Of the remaining properties, none were identified as

potential habitat for Texas prairie dawn. The remaining parcels are upland forest, unmaintained, disturbed pasture, or urban development, and were surveyed from public access roads and no potential habitat was observed. During the surveys, no presence of Texas prairie dawn or its viable habitat was observed within the 400-foot ROW or the additional project areas.

Based on a review of TPWD's Annotated County Lists of Rare Species for Harris County (revised September 28, 2011), Texas, TPWD's NDD (2012) , USFWS list (2012), and on-site evaluations, it has been determined that the proposed project will have no effect on Texas prairie dawn or its designated critical habitats.

Red-cockaded Woodpecker

In April 2009, surveys were completed for properties that were granted landowner access. Two area of potential Red-cockaded woodpecker (RCW) foraging habitat were identified during the 2009 roadside survey and aerial review. No RCW or nesting habitat were identified within the Preferred Alignment ROW (FEIS) during the 200/2001, 2007, and 2009 surveys. Additionally, approximately 60 percent of the ROW that had not been ground –surveyed (although not identified as potential habitat through aerial photography) still remained unsurveyed due to lack of access or visibility from public roads. Based on a commitment in the BA, additional surveys were to be completed for the remaining unsurveyed property within the ROW

During October, November, and December 2011 and January 2012, field surveys were conducted in conjunction with wetland delineation surveys within the 400-foot ROW and the additional project area. During these field surveys, ecologists performed an evaluation of soil characteristics, habitat types, presence or absence of wetland and wetland features, identification of waterbodies, and previous disturbances. Additionally, access was granted to the remaining parcels from the 2009 surveys identified as potential habitat for RCW. The sites identified in the 2010 BA were field surveyed and vegetation observed consisted of forested uplands. Species included water oak (*Quercus nigra*), loblolly pine (*Pinus taeda*), American elm (*Ulmus americana*), southern red oak (*Quercus falcate*), yaupon (*Ilex vomitoria*), Chinese privet (*Ligustrum sinense*), American beautyberry (*Callicarpe americana*), and slender woodoats (*Chasmanthium laxum*). Soils observed consisted of loamy sand. Various wetlands and stream crossings were observed on the property as well. Species composition, forest structure, and stand age were not consistent with the potential habitat for RCW. Approximately nine percent of the parcels remain to be surveyed based on lack of access. Of the remaining properties, none were identified as potential habitat for RCW. The remaining parcels are upland forest,

unmaintained, disturbed pasture, or urban development, and were surveyed from public access roads and no potential habitat was observed. During the surveys, no presence of RCW or its viable habitat was observed within the 400-foot ROW or the additional project areas.

Based on a review of TPWD's Annotated County Lists of Rare Species for Harris and Montgomery Counties (revised September 28, 2011), Texas, TPWD's NDD (2012) , USFWS list (2012), and on-site evaluations, it has been determined that the proposed project will have no effect on RCW or its designated critical habitats.

Little Spectaclecase

Since issuance of the ROD, mollusks have been incorporated into the State and Federal Threatened and Endangered lists. The little spectaclecase is primarily found along the banks of large creeks, rivers, and reservoirs underlain by sandy substrates with slight to moderate currents. This species has been historically recorded within several regional watersheds, including the San Jacinto, Sabine, Trinity, and Red River basins (Howells, 1996). No individuals were observed during field surveys and no NDD records exist for this species within ten miles of the project site. Many of the stream segments within the project area are classified as intermittent streams or perennial based on release from municipal utility districts, typically only providing flow of water during rain events. This species has been in a rapid decline over the last 50 years and due to development upstream and downstream of the project, it is highly unlikely this species would be observed.

Based on a review of TPWD's Annotated County Lists of Rare Species for Harris County (revised September 28, 2011), Texas, TPWD's NDD (2012) , USFWS list (2012), and on-site evaluations, it has been determined that the proposed project will have no impact on the little spectaclecase or its designated critical habitats.

Based on the above-mentioned studies for the 400-foot ROW and additional project area (**Exhibit 2**), a determination of "no effect" was concluded. The proposed additional ROW impacts are not anticipated to risk the continued existence of any federally threatened and endangered species or their preferred habitat. Coordination with USFWS to request a review of the continued evaluation of federally listed threatened or endangered species or their habitats within proposed project area was submitted in a letter dated March 2012 (**Appendix B**). Additionally, once access is granted to the unsurveyed properties within the mainlanes and prior to construction, field surveys will be performed and an update of this evaluation will be forwarded to the USFWS for review.

The proposed additional project area impacts are not anticipated to risk the continued existence of any federally threatened and endangered species or their preferred habitat.

6.9 Cultural Resources

The following sections detail both the results of investigations done in compliance with applicable cultural resource laws and regulations and the findings based on the investigations. The laws and regulations require consideration of the impacts of the proposed project on cultural resources such as archeological sites and non-archeological historic structures. TxDOT operates under several formal agreements that expedite its compliance with these laws and regulations.

Not all cultural resources are afforded equal treatment in the planning process under applicable cultural resources laws. Historic properties and State Archeological Landmarks (SALs) are those objects, sites, and structures, which have characteristics that require those resources to be given further consideration in the project planning process. Projects should avoid and minimize impacts to historic properties and SALs when possible. They should resolve the effects of impacts, usually through some mitigation measures, when avoidance is not possible.

Previous studies of the approved SH 99, Segment G project ROW have documented no archeological or historic resources that would be impacted by the undertaking. In regards to this re-evaluation, additional studies are ongoing and to date have identified no archeological historic properties that would be affected by the proposed undertaking. The following sections provide a formal account of the investigations and findings with appropriate citations to regulations and agreements. With regard to the affected environment for cultural resources, the ROD analysis remains valid.

Archeological Resources

A TxDOT archeologist is currently evaluating the potential for the proposed undertaking to affect cultural resources (36 CFR 800.16(l)) or SALs (13 TAC 26.12) in the Area of Potential Effects (APE). The APE comprises areas of road ROW that were not originally surveyed due to lack of access, and the additional ROW required for the stormwater outfall channels, stormwater detention basins, and floodplain mitigation basins detailed in **Section 5.0**. The depth of the APE would be approximately 1.2 m (4 ft) below the modern ground surface for the detention ponds and mitigation basins, and approximately 1.5 m (5 ft) for the outfall easements.

Section 106 consultation proceeded in compliance with the first Amended Programmatic Agreement among TxDOT, the THC, and the Advisory Council on Historic Preservation as well as the Memorandum of Understanding between the Texas Historical Commission and TxDOT. In 2011 and 2012, under Texas Antiquities Permit No. 6102, an intensive archeological survey of remaining roadway ROW, the proposed stormwater outfall channels, detention basins, and floodplain fill mitigation basins was performed. To date approximately 95 percent of the proposed ROW has been evaluated for archeological resources, and this survey revealed no archeological deposits within the proposed undertaking's APE. TxDOT will initiate additional consultation with federally recognized Native American tribes with a demonstrated historic interest in the area. This consultation will provide exhibits of the new proposed ROW as a result of the detailed drainage analysis. No objections or expressions of concern are anticipated within the comment period.

If unanticipated archeological deposits are encountered during construction, work in the immediate area would cease, and TxDOT archeological staff would be contacted to initiate post-review discovery procedures under the provisions of the PA-TU and MOU. With regard to the affected environment for archeological resources, the ROD analysis remains valid.

Historic Resources

An evaluation of the historic-age resources was conducted in February 2012 for the presence of non-archeological historic-age resources built before 1958. This evaluation was conducted for the 300-foot wide APE of the proposed detention ponds, floodplain mitigation basins, and outfall channel locations. Historic maps and aerials, including a 1920 soils map, a 1930 topographic map, a 1955 topographic map, a 1964 aerial photograph, and a 1975 topographic map were compared to current maps, aerials, and the 2003 Historic Resource Survey Report maps that were included in the FEIS to determine whether a formal field survey would be required. The evaluation that has occurred since the ROD has concluded that no non-archeological historic resources or non-archeological historic-age resources are within the APE of Grand Parkway Segment G and is revised to include the detention and mitigation ponds and outfall easements. Two of the properties mentioned in the approved FEIS, G-2 (a circa 1920 Residential Dwelling) and G-14 (a circa 1920 Agricultural Farmstead) are within the approved ROW and are now partially or completely in the footprint of two of the detention ponds. No other historic-age properties are within the 300-foot APE of the proposed design change. Furthermore, the proposed design change poses no indirect or cumulative effects to historic properties. The results of this updated evaluation are being prepared for submittal to TxDOT's Environmental

Affairs Division (ENV) for consideration and review under TxDOT's PA-TU. With regard to the affected environment for historic resources, the ROD analysis remains valid.

6.10 Hazardous Materials

Analysis of potential effects from hazardous materials was previously conducted in December 2006 and again in October 2010. Information in this section provides an update to information presented in the FEIS and the ROD.

Visual Observation

A visual survey was performed in October, November, and December 2011 and January 2012 for evidence of hazardous substances and/or other contamination. The survey consisted of a visual observation of properties located within and immediately outside the boundaries of the additional ROW to identify released or potential releases of petroleum products or hazardous materials.

Regulatory Records Review

A regulatory database review was conducted on March 9, 2012. Databases reviewed include the National Priorities List (NPL), Texas State Superfund, Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS), Resource Conservation and Recovery Act (RCRA) facilities, municipal solid waste landfills (MSWLF), registered petroleum storage tank facilities (PST), leaking petroleum storage tank (LPST) facilities, Emergency Response Notification System (ERNS), Facility Registry System (FRSTX), Toxic Release Inventory (TRI), Spills Listing (SPILLS), Industrial and Hazardous Waste Sites (IHW), TIER II Chemical Reporting Program Facilities (TIER II), and Closed and Abandoned Landfill Inventory (CALF). The database review indicated that there are three recorded Hazardous Materials sites identified within the roadway ROW and the additional ROW. The potential of environmental impact to the project from the operation of these facilities appears to be minimal. The findings in the ROD remain valid. However, for informational purposes, sites located in the general vicinity of the proposed project and outside of the project ROW are discussed in the following sections and summarized in **Table 11**. The entire regulatory database review including hazardous material sites, oil and gas wells, and water wells is available in the project files.

TABLE 11
SUMMARY OF REGULATORY RECORDS REVIEW

ID#	Facility Name/Address	Regulatory Database	Summary	Distance from Project
1	Flo-Lok Valve Spring Bird Environmental Services Northgate Outdoor Power HD Construction Supply 22820 Interstate 45	IHW, PST, LPST,FRSTX	Inactive small quantity generator LPST Final Concurrence Issued, Case Closed Five USTs removed from the ground	Proposed ROW
2	Riley Express 1827 Riley Fuzzel	PST, FRSTX	One in-use 20,000 gallon UST One in-use 16,000 gallon UST	0.001 miles northeast
3	Sunbelt Rentals PC #385 23510 IH-45 North	TIER II	Facility passed all validation checks	Proposed ROW
10	Trunkline Gas Company	FRSTX	Natural Gas Pipeline	Proposed ROW
17	Arvie Bass 2 miles north of Spring on Riley Fuzzel	IHW, CALF	In-active Re-claimed Sand-Pit	0.01 miles northeast
18	Time Mart 20 2113 Riley Fuzzel	PST	One in-use 15,000 gallon UST One in-use 20,000 gallon UST	0.02 miles northeast
18	Spring Sand Solid Waste Processing Facility	MSWLF, FTRSTX	Closed Sanitary landfill for brush and/or construction-demolition material	0.01 miles northeast
19	Riley Fuzzel @ Loddington	NOV	Resolved Dust Nusiance	0.01 miles northeast
20	Fuel Stop Ashley's at Valley Ranch 22510 Highway 59	PST	One in-use 12,000 gallon UST One in-use 20,000 gallon UST	0.01 miles east
22	Sundance Fuels 27528 East Hardy	PST	One in-use 2000 gallon AST One in-use 3000 gallon AST One in-use 10000 gallon AST Three in-use 12600 gallon ASTs	0.02 miles northeast
24	Parcel 359 KP 22426 IH 45	PST	Four USTs removed from the ground	0.03 miles north
25	Dings and Dents 22303 North IH 45	IHW	In-active Conditionally Exempt Small Quantity Generator	0.05 miles north
26	Hanson Aggregates Spring Plant 5810 Riley Fuzzel	0.09 miles northeast	In-active Conditionally Exempt Small Quantity Generator	0.09 miles northeast
27	B&W Sand Co. 2 miles north of Spring on Riley Fuzzel	CALF	Closed and Abandoned Landfill	0.09 miles northeast

TABLE 11 SUMMARY OF REGULATORY RECORDS REVIEW (CONT.)

ID#	Facility Name/Address	Regulatory Database	Summary	Distance from Project
28	Sutherland Lumber Company 22411 Hwy 75 N	PST	One UST removed from the ground	0.12 miles northwest
29	Plant 12 22021 Interstate 45	PST	One out-of-use AST	0.13 miles west
30	Star Plumbing 299 Riley Fuzzel	PST	Three USTs removed from the ground	0.16 miles west
31	Parker Bros. & Co. Cemex Construction Materials South 1115 Spring Stuebner	PST, TIER II	Two in-use 10,000 gallon ASTs Five out-of-use ASTs	0.17 miles southeast
32	Porter Special Utility District 18669 Ferne	TIER II	Facility passed all validation checks	0.27 miles northeast
33	Montgomery County MUD 56 18700 New Forest	TIER II	No reported validation report	0.34 miles east
34	Rusche Chevron 21615 IH 45	PST, LPST	One UST removed from the ground Final Concurrence Issued Case Closed	0.41 miles south
35	Montgomery County MUD 119 321 Powell	TIER II	Facility passed all validation checks	0.42 miles northeast
37	Living Earth Technology Co. 20611 Hwy 59	MSWLF	Active Resource Recovery/Recycling Facility	0.44 miles east
38	Maintenance Dept. Spring ISD 950 Wunsche Loop	LPST	One UST removed from the ground Final Concurrence Issued, Case Closed	0.46 miles southeast
39	New Caney ISD 21026 Loop 494	LPST, TIER II	Final Concurrence Pending Documentation of Well Plugging	0.47 miles east
40	City of Spring Abandoned Dump About 27830 Hardy	CALF	Abandoned Possible former community dump	0.48 miles northeast
41	Johnny Jelks Landfill W. of 28000 Block E. Hardy	CALF	Permanent Injunction of J.B. Jelks and William Knowlenberg, Wylie Harris-Trustee of Property Inspected by HCPCD	0.48 miles northeast
42	Ferrell Glass One block south of Keith Road on West Road	TIER II	Facility passed all validation checks	0.5 miles east
43	Duplicate 621 Spring Stuebner	TIER II	Facility passed all validation checks	0.5 miles east
44	Northgate Crossing Mud #2 23902 Northgate Blvd.	TIER II	Facility passed all validation checks	0.51 miles north

Source: Study Team 2012, Environmental Data Resources Inc. (EDR) Datamap Study Area

Oil/Gas Wells

A review of the Railroad Commission of Texas (RRC) Well Bore database was reviewed in March 2012 and indicated there are no oil/gas wells located within the roadway ROW and the additional ROW **(Exhibit 2)**. The roadway ROW and additional ROW would not impact oil/gas wells. The potential impacts typically associated with the production of oil and gas include surface soil contamination and Naturally Occurring Radioactive Material (NORM) issues. Elevated NORM issues may be an environmental concern in oil fields, especially where water injection has been used as a secondary recovery technique, or water disposal has occurred. However, if determined during construction, wells within the ROW would be plugged and abandoned per regulations stipulated in the RRC Statewide Rule 14; therefore, NORM hazards would likely not impact the project. Based on the presence of no producing wells within the roadway ROW and additional ROW, the proposed project would have a minimal risk of NORM issues. The approved procedures for the proper abandonment of oil/gas or exploration wells require that the surface casing be cemented and cut to a minimum depth of six feet below natural elevation.

Summary

Upon review of the information gathered during the hazardous materials site assessment, it has been concluded that no known hazardous materials impacts are anticipated. RRC records indicate, with regards to the proposed and additional ROW, the Selected Alternative would impact no oil/gas wells. The proposed project includes the demolition and/or relocation of building structures. The buildings may contain asbestos or lead paint containing materials. Asbestos and lead paint inspections, specifications, notification, license, accreditation, abatement, and disposal, as applicable, would comply with federal and state regulations. Asbestos issues would be addressed during the ROW acquisition process prior to construction.

The contractor would take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction area. The use of construction equipment within sensitive areas should be minimized or eliminated. All construction materials used for this project should be removed as soon as the work schedule permits. Any unanticipated hazardous materials and/or petroleum contamination encountered during construction should be handled according to applicable federal and state regulations and TxDOT standard specifications. Additionally, per the commitments in the FEIS and ROD, a Phase 1 Environmental Site Assessment (ESA) would be conducted at each site that may cause or

already has caused a hazardous materials impact to the environment. Based on the results of the Phase 1 ESA, a plan would be developed to mitigate any impacts. During final Plan, Specification, and Estimation, and evaluation of oil and gas wells would be performed to determine any relocation or avoidance of active oil and gas well prior to construction. Any affected wells would be handled per the Texas Administrative Code, Title 16, Part 1, Chapter 3, Section 3.14, under supervision of the Texas Railroad Commission (RRC), and any arrangements with the well operator for plugging wells would be coordinated during the ROW acquisition process. Additionally, any abandoned dry holes would be flagged to avoid accidental disturbance as well as evaluated per the final design to determine and ensure that the abandoned well is below any proposed subsurface impacts from the proposed project. With regard to the affected environment for hazardous materials, including oil/gas wells, the ROD analysis remains valid.

6.11 Indirect and Cumulative Impacts

This re-evaluation does not involve any new resource features that were not examined in the ROD and would not introduce any new indirect or cumulative impacts to them (including, but not limited to those resources listed in **Table 3** and evaluated in Section 6.0 of this document) beyond what was reported in the ROD. The Grand Parkway Area of Influence (AOI) is undergoing rapid population and employment growth and is anticipated to continue through the year 2025 and beyond, regardless of when or if the Grand Parkway is constructed. However, the Segment G Selected Alternative, as presented in the ROD, will compliment and reinforce the development pattern and effects. The Grand Parkway, combined with other local/regional development efforts, would serve to accommodate growth and development, either present or planned. In addition, a number of regulatory mechanisms are in place to offset or minimize the adverse effects of social and economic growth. Efforts have been made to avoid and minimize project effects to all resources at both the corridor and alignment development phases of the project, and measures would be implemented to mitigate the loss of resources, where practicable.

The alternative evaluation process was based on the philosophy of avoidance first, minimization second, and mitigation last. In regards to threatened and endangered species, surveys for additional ROW have determined no presence of threatened or endangered species or habitat to support threatened or endangered species. For a detailed discussion of threatened and endangered species, refer to Section 6.8 of this document. In regards to Waters of the U.S., including wetlands, the wetland delineation conducted of the additional detention areas

identified, after minimization and avoidance, seven waters and fifteen wetlands within the additional ROW. All project-specific commitments and conditions of approval, including resource agency permitting, compliance, and monitoring requirements, are stated in the FEIS and the ROD. With regard to the affected environment for indirect and cumulative impacts, the ROD analysis remains valid.

6.12 Project Level Environmental Justice of Tolled Facilities and Managed Lanes

A project-level toll analysis was conducted to determine the potential impact that tolling would have on the Environmental Justice community within the project area. To complete this study, HGAC utilized a travel demand model to identify potential toll road users and to conduct a travel time analysis for persons residing in Environmental Justice traffic analysis zones (TAZs) and Non-Environmental Justice TAZs. In addition, an evaluation of toll policies, toll rates, and available free facilities was conducted to fully evaluate the potential for disproportionate impacts to environmental justice communities.

6.13 Non-Toll Facilities

The new location 13.6-mile toll road with intermittent frontage roads would extend from IH 45 (North Freeway) to US 59 (Eastex Freeway) through Harris and Montgomery Counties. The main lanes are proposed to be tolled. The location of the San Jacinto River West fork between IH 45 and US 59 acts as a barrier within the study area and as such, there are no existing parallel arterials (**Exhibit 1**). The free roadway network that connects IH 45 to US 59 entails traveling south along IH 45 to FM 1960, FM 1960 east to US 59 north, a distance of approximately 23.8 miles. There is no transit service within the study area.

6.14 Toll Policies

The Harris County Toll Road Authority (HCTRA) sets the toll policies for all toll roads within their jurisdiction. HCTRA's toll policies have identified various circumstances for which free passage on area toll roads is allowed to individuals, certain types of vehicles, and under special circumstances. The categories of free passage for toll roads are explained in **Table 12**.

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TABLE 12 CATEGORIES OF FREE PASSAGE ON TOLL ROADS

Category	Description
Vehicles	1. Marked police vehicles, fire department vehicles, and ambulances.
	2. Authorized emergency vehicles identified in Texas Transportation Code §541.201
	3. Vehicles designated by the Department of Public Safety as emergency vehicles during disasters declared by the governor of Texas (Texas Transportation Code §546.006).
	4. Individual military vehicles and convoys (considering the technological and personnel limitations of operating the toll project) (Texas Transportation Code §362.901). • Clearly identifiable military vehicles may use the electronic tolling lanes. • Military vehicles that are not clearly identifiable should use the collector lane and "sign through" on a log maintained by the collector. • Military vehicles that are not clearly identifiable will not be allowed free passage on toll roads where there are no collector lanes.
	5. Vehicles that are part of a funeral procession, provided that: • HCTRA is notified at least 24 hours in advance; • HCTRA's Director determines that it is in the interest of public safety that the procession be routed onto the toll road system; • the procession is escorted by certified peace officers; and • the procession enters and exits the toll road system outside of these hours: Monday through Friday – 6:00 AM to 9:00 AM. and 4:00 PM to 7:00 PM
	6. Processions and motorcades for heads-of-state and dignitaries (if the procession/motorcade is escorted by the United States Secret Service, Texas Department of Public Safety, or other law enforcement agency responsible for safety and security).
	7. Harris County owned/leased vehicles while used in the performance of County business.
Individuals	1. Current federal and state military members with Military ID are permitted free passage through collector lanes. • Requires presenting valid military ID and signing a non-revenue sheet. • Free passage not available on Toll Roads with no collector lanes or through combination collector/electronic tolling lanes if vehicle is equipped with an EZ TAG device.
	2. HCTRA employees who must incur a toll to access or depart their duty stations at Hardy North Toll Plaza, Hardy South Toll Plaza, Sam Houston North Toll Plaza, and Sam Houston South Toll Plaza.
	3. HCTRA employees assigned to the Sam Houston Toll Bridge or Sam Houston East Plaza, whose route to work includes crossing the Toll Bridge are permitted sign through privileges for the Toll Bridge.
	4. HCTRA employees who must use the Toll Roads on HCTRA-related business (during working hours) in their private vehicles are permitted sign-through privileges upon presentation of proper authorization.

TABLE 12 (CONT.)
CATEGORIES OF FREE PASSAGE ON TOLL ROADS

Category	Description
Circumstances	The Commissioners Court authorizes free passage on the Toll Roads when there is sufficient notice of an impending catastrophic event. When the emergency or event is unexpected or unforeseen, authority is delegated to persons in the best position to exercise informed judgment as outlined below: • Large-scale emergency or calamity: The County Judge is authorized to permit free passage on part or all of the Toll Roads when a large-scale emergency or calamity (natural or man-made) threatens public safety and necessitates the immediate evacuation or relocation of large numbers of people that may obstruct or impede rapid movement on the Toll Roads. • Localized emergency or condition: In the event of a localized emergency or condition (such as refinery explosions, gas leaks, hazardous material spills, flooding, traffic accidents, lane closures, etc.) that substantially threatens public safety and mobility, an on-site Incident Management certified peace officer may permit limited free passage for a period of no more than one hour. Approval of the County Judge, Executive Director of Harris County Public Infrastructure, or the Director of HCTRA must be obtained to extend free passage beyond the initial one-hour period. • Lane and/or road closures: When closures required for construction and maintenance of the Toll Roads are expected to substantially and adversely affect traffic flow and/or threaten public safety, free passage may be permitted by the Director of HCTRA, the Executive Director of Harris County Public Infrastructure, or their designee. • Ramp tolls: HCTRA may elect to not collect tolls at ramps on dates or during hours where the Director concludes that the amount of vehicle traffic at those ramps and the tolls likely to be collected do not justify the cost of assigning collectors during those times. • Opening a new road project or segment: HCTRA's Director may designate a time period where free passage may be permitted to allow for testing of the infrastructure supporting the toll collection process. If the test period needs to exceed 45 days, HCTRA's Director should obtain authorization from Commissioners Court to extend the test period.

Source: HCTRA, no date.

In addition, consistent with Texas Transportation Commission Minute Order No. 82325 signed October 25, 1984, the entire Grand Parkway would serve as an additional hurricane and emergency evacuation route for the Houston metroplex. In order to alleviate congestion during mass evacuations and create safer, more efficient evacuation conditions, tolls on the Grand Parkway would be suspended during hurricane evacuation.

6.15 Anticipated Toll Rate

The anticipated toll rate for the Grand Parkway project would be a schedule of rates that would not exceed the average per mile toll rates for electronic toll transactions in force and effect for

the HCTRA operated toll road system. The toll rates identified in **Table 13** were in effect on October 1, 2011. Toll rate increases would need to be approved by the Commissioners Court.

TABLE 13 HCTRA TOLL RATES

Vehicle Axles	Mainline Plaza
2 axle	$1.30 EZ Tag $1.50 Cash
3 axle	$3.00
4 axle	$4.50
5 axle	$6.00
6 axle	$7.50

Source: https://www.hctra.org/tollroads_rates and http://www.gpprocurement.com/systems/file_download.ashx?pg=148&ver=3

6.16 Methods of Toll Collection

Tolls would be collected using a completely electronic toll collection (ETC) system. No toll booths are proposed and therefore no cash payment would be accepted. The ETC system requires that users of the roadway have a toll tag that registers on the ETC system as the vehicles pass under the toll gantry. The ETC equipment would be placed on toll gantries positioned at specific locations along the mainlanes and at certain ramps.

The ETC allows participating motorists to prepay their tolls using a major credit/debit card or direct debit payment option. A small adhesive transponder (toll tag) that communicates electronically with a computer via radio frequencies is affixed to the inside of the windshield. As motorists use the facility, tolls are electronically deducted from their pre-paid account. When an account reaches the minimum balance level, it automatically charges (debits) the customer's credit card or bank account to bring it back to the original deposit amount.

Motorists using the toll road without a toll tag would be charged via the video tolling system. The ETC video records a photograph of the vehicle's license plate and a (monthly) invoice would be mailed to the registered owner of the vehicle. The assessed toll fee for these motorists is higher than that for toll tag users, and an additional collection fee is included on the monthly invoices. This tolling program allows infrequent users without a transponder/toll tag to travel the toll road without having to stop and pay. The video tolling method is more expensive for users who do not have an active toll account because fees associated with billing and handling of the periodic billing statements are added to the costs.

Any EZ TAG account set up with a toll facility operator in Texas would be able to access toll roads or managed lanes in any of the toll authority areas while having the tolls charged to the user's home account. To achieve this objective, toll tags or transponders issued by a toll authority in one area of the state would be capable of registering toll transactions to the user's home toll account. Users from other states or international drivers would be billed similarly to users without toll tags.

The EZ TAG program requires an initial prepayment of $40 for credit/debit card payment and $80 for funds directly deducted from a bank, plus a $15 per-tag activation fee for the first three TAGs, and $10 per tag thereafter. Monthly statements for the previous eighteen months of an account usage are available at no charge with an online account, or printed statements may be mailed. The associated fees for enrolling in the EZ TAG program are shown in **Table 14**.

TABLE 14 EZ TAG FEES

Number of Vehicle(s)	Pre-Paid Deposit	Balance at which Replenishment Required (¼ of Deposit)	Activation Fee (per EZ TAG)
1 - 3	$40	$10	$15
4 - 6	$80	$20	$10
7 - 9	$120	$30	$10
etc	Maximum $600 (or optional higher balance)	Maximum $150 (or ¼ of optional higher balance)	$10

The user would be required to set up a prepaid account that would automatically transfer funds from their credit card or bank account to the toll account. The minimum account balance is determined by the type of payment used for the account as well as the number of EZ TAGs on the account. The typical credit card-backed account with one to three EZ TAGs has a required replenishment amount of $40 and a low balance amount of $10. This means that as a motorist travels through the EZ TAG lanes and the account goes to $10 or below, the credit/debit card will automatically be charged $40 per the EZ Agreement.

The typical bank account EZ account with one to three EZ TAGs has a required replenishment amount of $80 and a low balance amount of $20. Similarly, if the balance falls below $20, the system will automatically replenish the EZ TAG account to the $80 minimum. Frequent toll road users would therefore see multiple replenishment charges on their bank account in a month. A $25.00 fee is applied to each rejected withdraw from the bank account. If a bank charge fails

after three consecutive attempts or three times in a twelve month period, a credit card would be required as the primary form of payment. Currently, cash accounts are not accepted to maintain an EZ TAG. Toll accounts issued by other Texas transportation entities such as the TxTag and Texas Toll Tag are accepted on the EZ TAG system.

6.17 Toll Booths Locations

Since the Grand Parkway is proposed as an all electronic toll road with no cash payments, no toll booths are proposed. The mainlane toll gantries would span both directions of travel on a structure similar to a typical sign bridge. The gantry would support ETC reader units, video enforcement system cameras, illumination devices, automatic vehicle identification antennae, communications gear, and other necessary equipment. This equipment would be supported approximately 20 feet above the roadway surface and would be used to collect electronic toll data. Similar, smaller gantries would be needed at some ramps as well, except these would only span the width of the particular entrance or exit ramp. The exact location of toll gantry locations (ramps and mainlane) would be determined during final design. Advantages of the ETC system include the following:

- Minimizes the amount of right-of-way needed for the proposed toll collection facilities because additional lanes for cash toll booths and parking and other facilities for toll attendants would not be required.
- The gantry minimizes the acceleration and deceleration of traffic that usually accompanies toll booth collections because cash would not be accepted.
- Last-minute lane changes between toll and cash lanes would not occur, providing smoother traffic conditions at toll collection locations.
- Lighting impacts would be minimized because the gantries would not require any lighting beyond typical roadway-specific lighting for the video enforcement cameras.

Since the ETC system does not require the installation of toll booths, there would be no disproportionate impact to EJ communities regarding toll booth placement.

6.18 Environmental Justice

The H-GAC evaluation to determine the effects of the Grand Parkway Segment G on Environmental Justice (EJ) populations utilized the travel demand model in conjunction with those 2000 Census block groups, which contained 51 percent or more of minority and/or low income populations. Once the EJ block groups were identified, EJ Traffic Analysis Zones

(TAZs) were identified if 50 percent or more of its area was identified as an EJ population. Within the proposed Segment G Study Area, there are three EJ TAZs (**Exhibit 8**). None of the proposed 11.9-mile Segment G alignment traverses through an EJ area.

Following the identification of the EJ TAZs, two regional roadway network scenarios were utilized, the 2035 RTP Build Scenario and the 2035 RTP No-Build Scenario, to conduct an analysis on travel time for persons within the EJ TAZs and non-EJ TAZs. The Build Scenario includes the new tolled lanes, managed lanes, and high occupancy tolled lanes (HOT) projects identified in the 2035 RTP. The No Build Scenario includes the current roadway network, the fiscally constrained 2035 RTP roadway network along with the existing plus the committed managed lane system (e.g. BW 8) but excludes the Grand Parkway Segment G project.

Travel Demand Assumptions and Methodology

The region's travel demand model does not provide a means for tracking travel at an individual household level, but does provide a means for tracking travel at a zonal level. For purposes of the analyses, the zones are specified as either EJ zones or non-EJ zones based on the socioeconomic characteristics of the zonal populations. Some regional travel models employ a generalized cost assignment procedure for toll analyses. The H-GAC models perform toll analyses at the mode choice level. Hence, the H-GAC travel model uses a multi-class assignment procedure rather than a generalized cost procedure.

The mode choice models are applied by trip purpose. For the mode choice toll analyses, two travel time estimates are developed from each zone to all other zones: 1) the travel time using both toll and non-toll links (commonly referred to as "toll path" travel times), and 2) the travel time using only non-toll links (commonly referred to as the "free path" travel time). In the mode choice model, if the toll path does not offer a shorter travel time between two zones than the free path travel time, the trip is not considered a "candidate" for the toll facility. If a trip can save travel time using a toll path over a free path then it is considered a "candidate" trip. Of course, not all candidate trips will choose to use a tolled path. The probability of a candidate trip using a tolled path is a function of a number of variables such as the magnitude of the potential travel time savings, the toll costs and the income characteristics of the zones' residents. Aspects of this approach are employed in the analyses presented.

In mode choice model applications, there is a single highway network which is used to estimate the travel times for toll paths and free paths. For the regional toll analyses, there are two

networks: the “Build” network (i.e., the forecasted roadway network containing the subject toll facilities) and the “No-Build” network (i.e., the network containing all the forecasted roadways except the Grand Parkway Segment G). Existing and committed toll facilities are contained in both networks. In this analytical setting, simply comparing the toll path versus free path option will not identify the candidate trips for only the new toll facilities being studied. Indeed, such a grouping would include trips using both existing and proposed toll facilities.

To focus on candidate trips for the new toll facility, the travel time for toll paths in the Build network is compared to the toll path travel time in the No-Build network. Trips that have a shorter toll path travel time in the Build network than the toll path travel time in the No-Build network are defined as candidate trips for the new toll facilities. The trips for a given trip purpose are segmented into four groups:

- Trips produced by EJ zones that are classified as “Candidate” trips;
- The remaining trips produced by EJ zones are classified as non-“Candidate” trips;
- Trips produced by non-EJ zones that are classified as “Candidate” trips; and
- The remaining trips produced by non-EJ zones are classified as non-“Candidate” trips.

In summary, assumptions and limitations specifically for the Grand Parkway Segment G project-level toll analysis are as follows:

1. The model is based on the latest adopted H-GAC 2035 household and employment forecast as of November 2011 (Household and employment numbers are used for Trip Generation only, not population).
2. The model was validated to 2005 traffic counts within acceptable industry and H-GAC standards.
3. The model includes all system expansions as listed in the Houston 2035 RTP; the “No-Build” scenario removes only the segment being tested.
4. The model uses the same H-GAC 2035 household and employment forecast for all scenarios, both “Build” and No-build”.
5. For this analysis, an EJ zone is any TAZ that meets the minimum criteria as defined under Title VI. The model does not use separate individual households. All travels in the model from households in an EJ zone are assumed to be EJ, regardless of their individual income levels or composition. The model’s Trip Generation step does

consider household's income level as a factor for trip generation. (The general assumption is that higher income households tend to make more trips.)

6. This modeling analysis includes only direct Home-Based Work and Home-Based Non-Work trips. Non-home-based trips, i.e. "trip chains", are not included in this analysis. (The H-GAC model includes Non-home-based trips for travel demand forecasting; however, for the project level EJ analysis, only HBW and HBNW trips are used).

Results

To determine the time analysis for the different types of trip scenarios, trips were divided into home based work trips (HBW) and home based non-work trips (HBNW) for both tolled and free facilities. The number of HBW trips and HBNW trips for the Grand Parkway Segment G project is depicted in **Table 15**.

TABLE 15 POTENTIAL PERSON TRIPS IN THE EJ AND NON-EJ ZONES

	2035 HBW Person Trips			2035 HBNW Person Trips		
	Toll Candidate	Non-Candidate	Total	Toll Candidate	Non-Candidate	Total
EJ Zone	619,785	2,031,194	2,650,979	324,819	6,086,204	6,411,023
Percent of Total	23.4%	76.6%		5.1%	94.9%	
Non-EJ Zone	866,315	2,240,783	3,107,098	513,908	6,316,291	6,830,199
Percent of Total	27.9%	72.1%		7.5%	92.5%	

Source: HGAC 2011.

Using toll path travel times and free path travel times from the Build and the No-Build networks, there are four travel times for each type of trip (e.g. HBW, HBNW): 1) Build network-toll path option, 2) Build network-free path option, 3) No-Build network-toll path option, and 4) No-Build network – free path option). By computing the average trip lengths for each of the options, the impacts of the two networks on the choice options can be quantified, compared, and analyzed.

As shown in **Table 15**, approximately 23.4 percent of the HBW trips identified within EJ zones were toll candidates. Additionally, nearly 27.9 percent of the HBW trips identified within non-EJ zones were toll candidates. Of the HBNW trips, approximately 5.1 percent of the trips identified within EJ zones were toll candidates and 7.5 percent of the HBNW trips identified within non-EJ zones were toll candidates

Utilizing this data, further evaluation was conducted to determine the free path travel and tolled travel path for both the Build and No-Build Network Scenarios. The average trip length (ATL) in minutes was the measure used in this evaluation for both types of trips within the EJ and non-EJ zones.

The results of the HBW and HBNW trips analysis for the Grand Parkway Segment G are presented in **Table 16** and **Table 17**, respectively.

TABLE 16 AM PEAK HOME BASE WORK TRIPS

			AM Peak Average Trip Length (ATL) in minutes for Free and Tolled Facilities under the Build and No-Build Network Scenarios				Difference in AM Peak ATL in minutes	
			Build Network Scenario		No-Build Network Scenario			
Zones	2035 HBW Trip Scenarios	Number of 2035 HBW Person Trips	ATL Using Tolled Facility	ATL Using Free Facility	ATL Using Tolled Facility	ATL using Free Facility	Difference in ATL for the Tolled Facility (No-Build – Build)	Difference in ATL for Free Facility (No-Build – Build)
EJ Zone	Trips that save 0+ minutes using a new tolled facility	619,785	46.24	52.26	46.98	52.25	0.74	-0.01
	Trips that cannot save 0+ minutes using a new tolled facility	2,031,194	27.89	28.44	27.89	28.45	0.0	0.01
Non-EJ Zone	Trips that save 0+ minutes using a new tolled facility	866,315	63.19	71.40	66.32	71.44	3.13	0.04
	Trips that cannot save 0+ minutes using a new tolled facility	2,240,783	33.95	34.74	34.05	34.89	0.1	0.15

Source: HGAC 2011.

TABLE 17 AM PEAK HOME BASE NON-WORK TRIPS

			AM Peak Average Trip Length (ATL) in minutes for Free and Tolled Facilities under the Build and No-Build Network Scenarios				Difference in AM Peak ATL in minutes	
			Build Network Scenario		No-Build Network Scenario			
Zones	2035 HBNW Trip Scenarios	Number of 2035 HBNW Person Trips	ATL Using Tolled Facility	ATL Using Free Facility	ATL Using Tolled Facility	ATL using Free Facility	Difference in ATL for the Tolled Facility (No-Build – Build)	Difference in ATL for Free Facility (No-Build – Build)
EJ Zone	Trips that save 0+ minutes using a new tolled facility	324,819	36.23	38.12	36.62	38.40	0.39	0.28
	Trips that cannot save 0+ minutes using a new tolled facility	6,086,204	15.64	15.71	15.69	15.76	0.05	0.05
Non-EJ Zone	Trips that save 0+ minutes using a new tolled facility	513,908	48.64	52.08	52.33	54.05	3.69	1.97
	Trips that cannot save 0+ minutes using a new tolled facility	6,316,291	24.76	24.89	24.83	24.96	0.07	0.07

Source: HGAC. 2011.

The results for the HBW and HBNW trips analysis indicate:

- The addition of the Grand Parkway Segment G project to the regional roadway network under the Build Scenario results in a minor reduction of travel time in the EJ and Non-EJ Zones (0.74 and 3.13 minutes respectively for HBW trips and 0.39 and 3.69 minutes for HBNW respectively).

- While the users of the toll facility in the Build Network Scenario within the EJ Zones would receive a greater time savings benefit than the users on the free network, there is no appreciable change in travel time on the free network in the EJ and Non-EJ Zones. As a result, there is no potential for a disproportionate negative effect to the Environmental Justice populations from the Grand Parkway Segment G project. In fact, the entire region, including the EJ Zones, would recognize a benefit in travel time savings because of the added capacity the of the entire toll roadway network facilities provide to the regional roadway network (See Section 6.12 of this document).

6.19 Potential Economic Impact

Potential economic impacts to individuals using the Grand Parkway Segment G can be illustrated using the 2010 HCTRA toll rates and the median household income for the study area. Currently, the low, mid range, and high toll rates are 12.3, 20.0, and 33.6 cents per mile. The potential cost per household calculations assumes that a toll road user makes 500 trips (250 round-trips) per year along the 11.9-mile tollway from US 290 (Northwest Freeway) to SH 249 (Tomball Parkway). As shown in **Table 18**, the annual cost for low, mid range, and high toll rates would be approximately $842.55, $1,370, and $2,301.60, respectively.

A user with an annual household income that equals the Harris County 2009 median household income of $50,567 would spend 1.5, 2.4, and 4.0 percent of their household income on tolls. Users with an annual household income that falls within the HHS poverty level of $22,350 would spend 3.3, 5.4, and 9.0 percent of their household income on tolls.

TABLE 18 POTENTIAL ECONOMIC IMPACT

					Harris County	
Toll Range	Toll Rate Per Mile[1]	Trips Per Year	Miles Per Trip	Total Cost Per Year	Percent of Median HH Income[2]	Percent of Poverty Level Income[3]
Low	$0.123	500	13.7	$842.55	1.7	1.3
Mid-range	$0.20	500	13.7	$1,370.00	2.7	2.1
High	$0.336	500	13.7	$2,301.60	4.6	3.6

1. Per HCTRA 2010 toll rates
2. 2009 median household income for Harris County is $50,567
3. 2011 Health and Human Services poverty guideline level is $22,350 for a family of four

Assuming the same level of use, low-income populations would pay a larger percentage of their income in tolls when compared to the general population. If toll costs are beyond the affordability of low-income travelers, they have the alternative of using the existing non-tolled transportation network. As a result, potential users who are unable to afford the toll or maintain a toll tag would be denied the travel benefit (reduced travel time) associated with using the tolled facility.

6.20 Availability of Tolling Information

The HCTRA website provides information regarding the EZ TAG, toll road network, toll charges or violations, and safety on the toll roads. Currently this information is available in English and no information is provided regarding the availability of translation services or hearing impaired assistance.

7.0 CONCLUSION

In accordance with 23 CFR 771.129 and the FHWA Technical Advisory T 6640.8A, Section XI, TxDOT, in coordination with FHWA, has prepared this re-evaluation of the Grand Parkway Segment G project as it proceeds with "major approvals," e.g., the USACE Section 404 permit. As stated in the ROD (December 29, 2010), a more detailed floodplain analysis with regard to the engineering design of drainage structures along the Segment G Selected Alternative was required subsequent to the ROD. This detailed design has proceeded, and the environmental documentation for the project has been reviewed. Overall, there would be a increase in wetland and stream impacts as compared to the ROD evaluation. However, because the ROD stipulated that further design work was necessary for the drainage facilities and because of the mitigation that would take place for these impacts, as with any direct impacts due to the roadway construction, it has been determined that the ROD analysis remains valid.

The final hydraulic design of the roadway will be produced with the most recent floodplain data that is available for use and will be conducted in accordance with the applicable federal, state, and local policies. There will be a "no net rise" effect on the flood levels along the watercourses traversed by the project. Surveys for additional ROW have determined no presence of threatened or endangered species or habitat to support threatened or endangered species. Coordination with the USFWS has continued since the issuance of the ROD. A letter report dated March 2012 was sent to USFWS requesting their review of the updated project data determination of "no effect". The Section 404 Individual Permit Application is being prepared to submit to the USACE for review and the public notice is anticipated in April 2012. Comments received on the Section 404 Permit Application will be responded to and appropriate revisions will be applied.

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APPENDIX A

EXHIBITS

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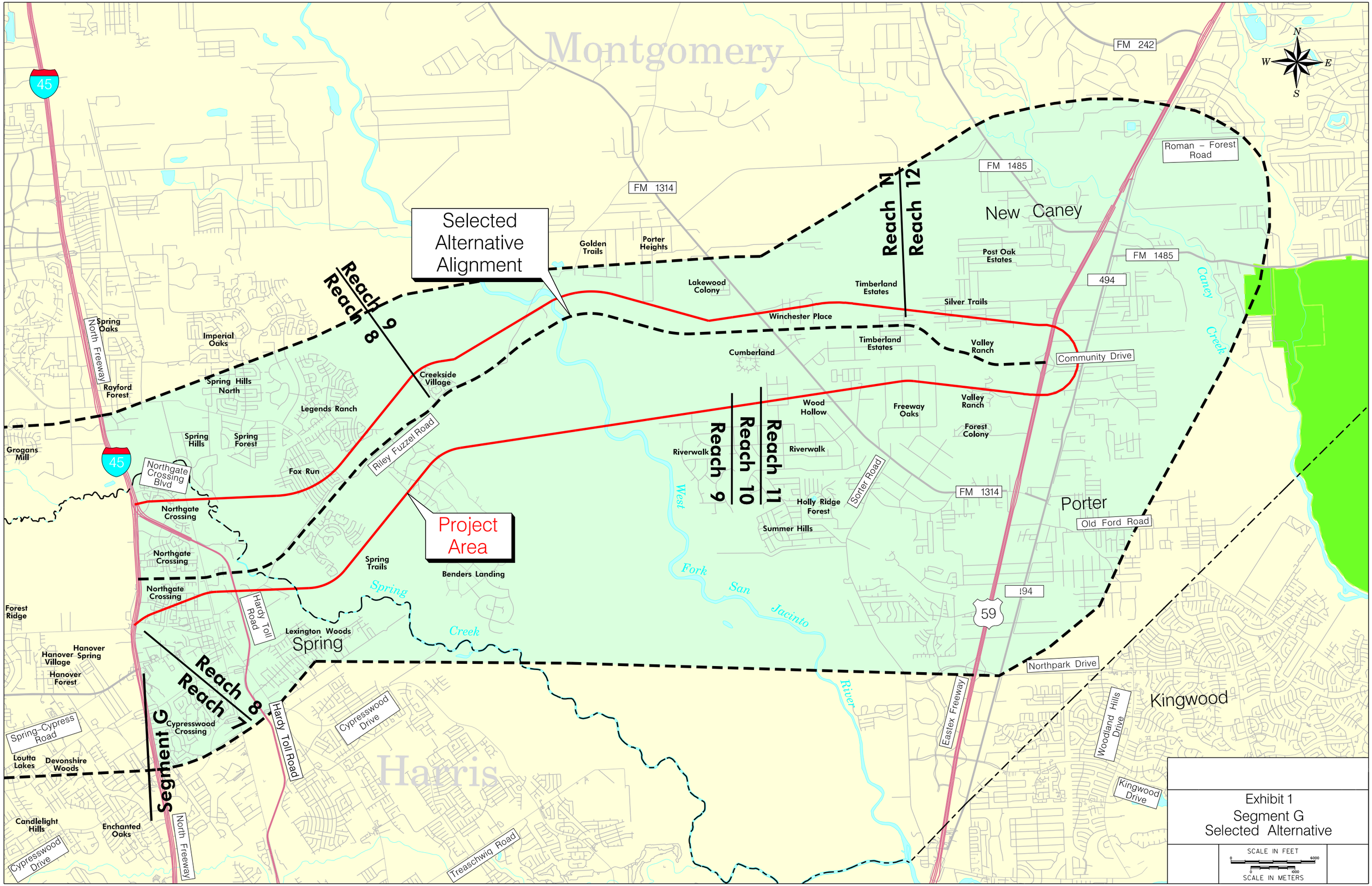

Exhibit 1
Segment G
Selected Alternative

SCALE IN FEET
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SCALE IN METERS

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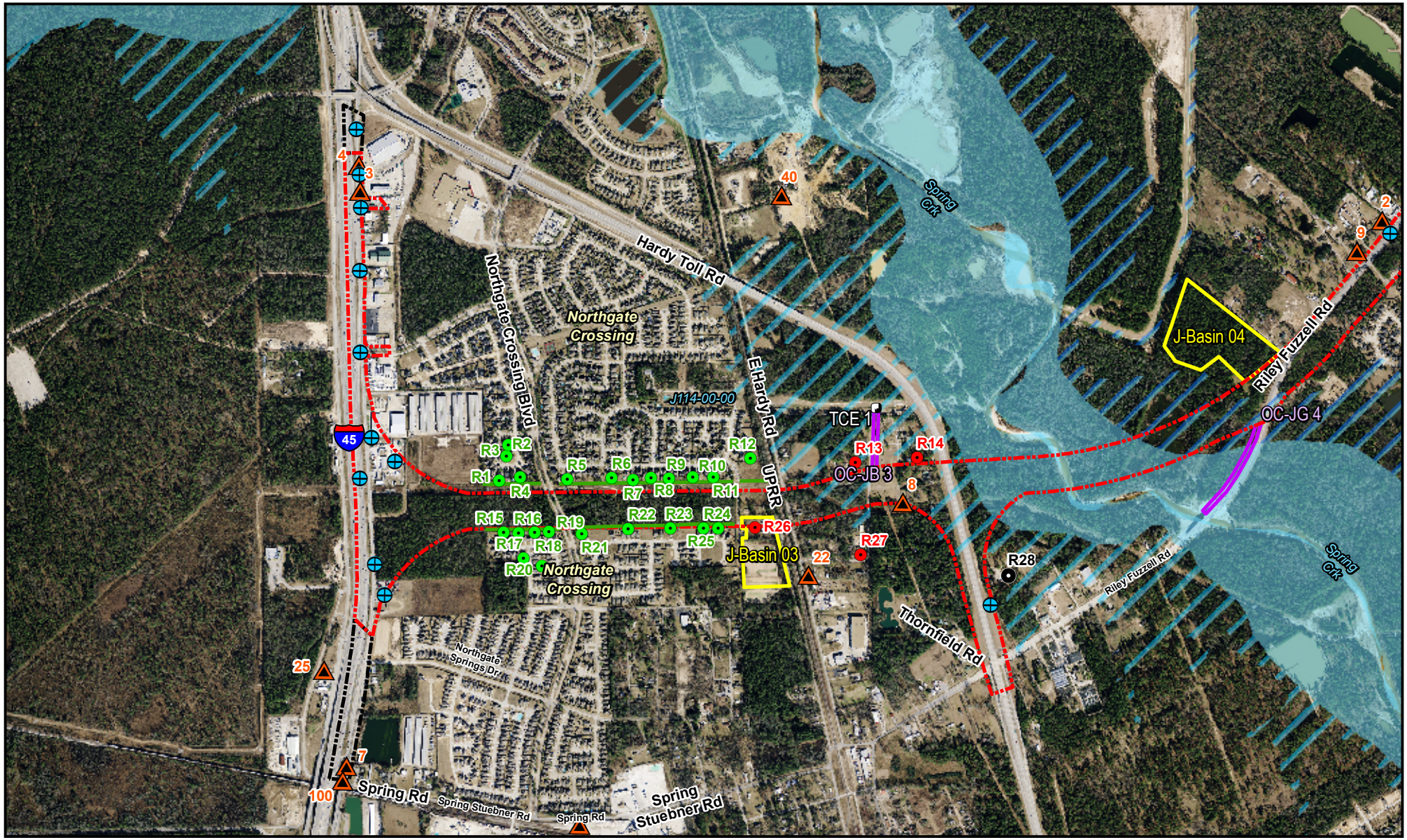


Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain
- Identified HazMAT sites

Noise Related

- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

Exhibit 2:
SH 99, Grand Parkway
Segment G

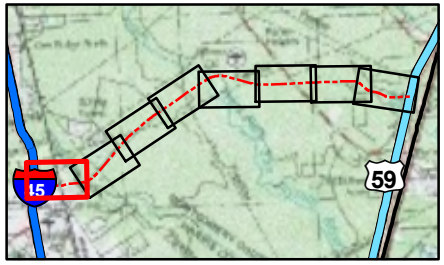
Page 1 of 8

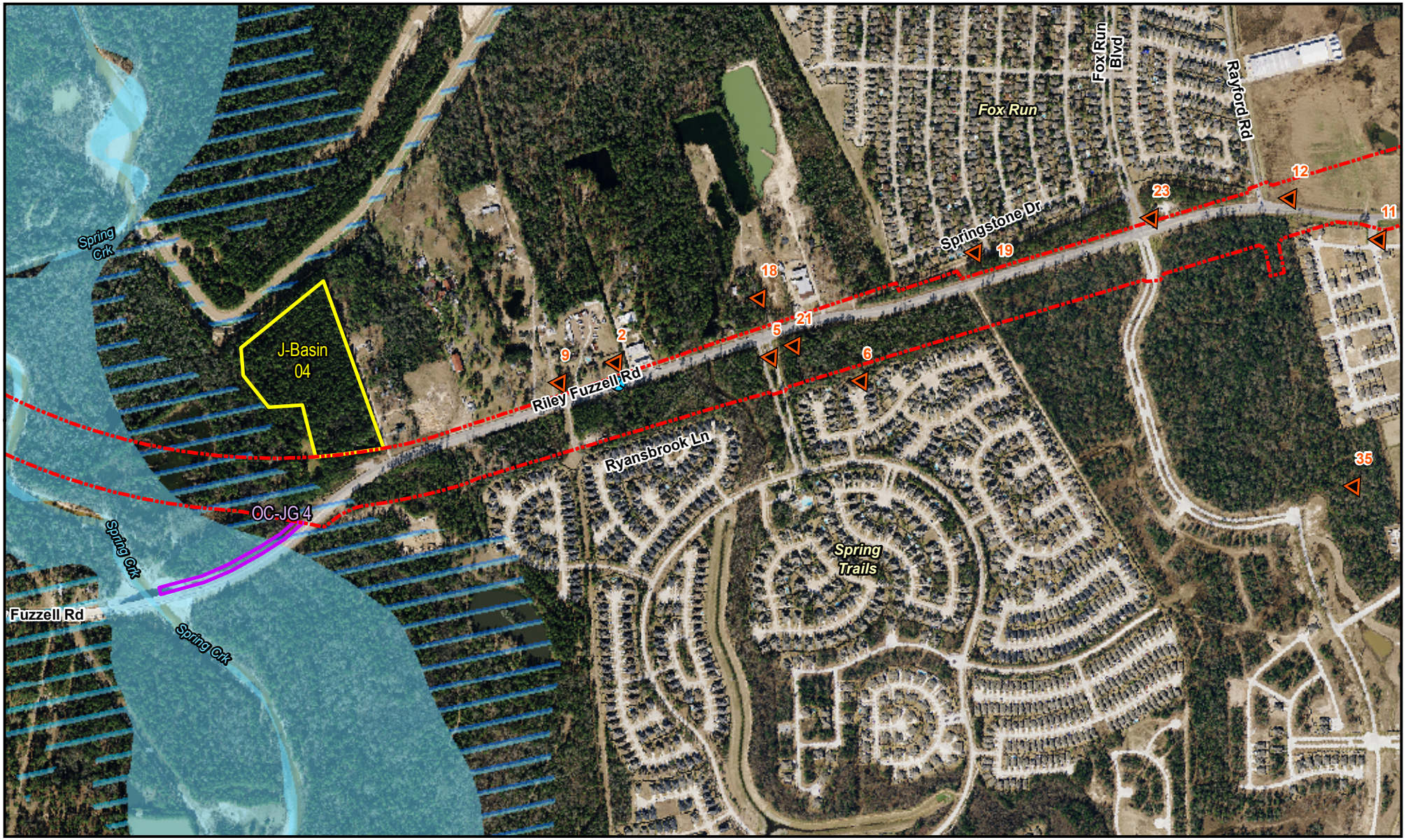
SH 99, The Grand Parkway
Segment G

N
W E
S

0 500 1,000
Feet

H-GAC 2010 Aerials





Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain
- Identified HazMAT sites

Noise Related

- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

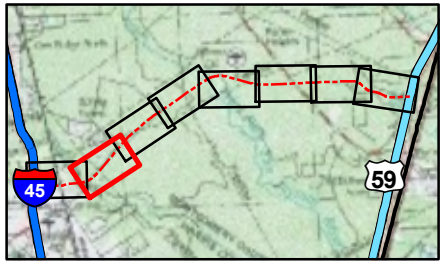
Exhibit 2:
SH 99, Grand Parkway
Segment G

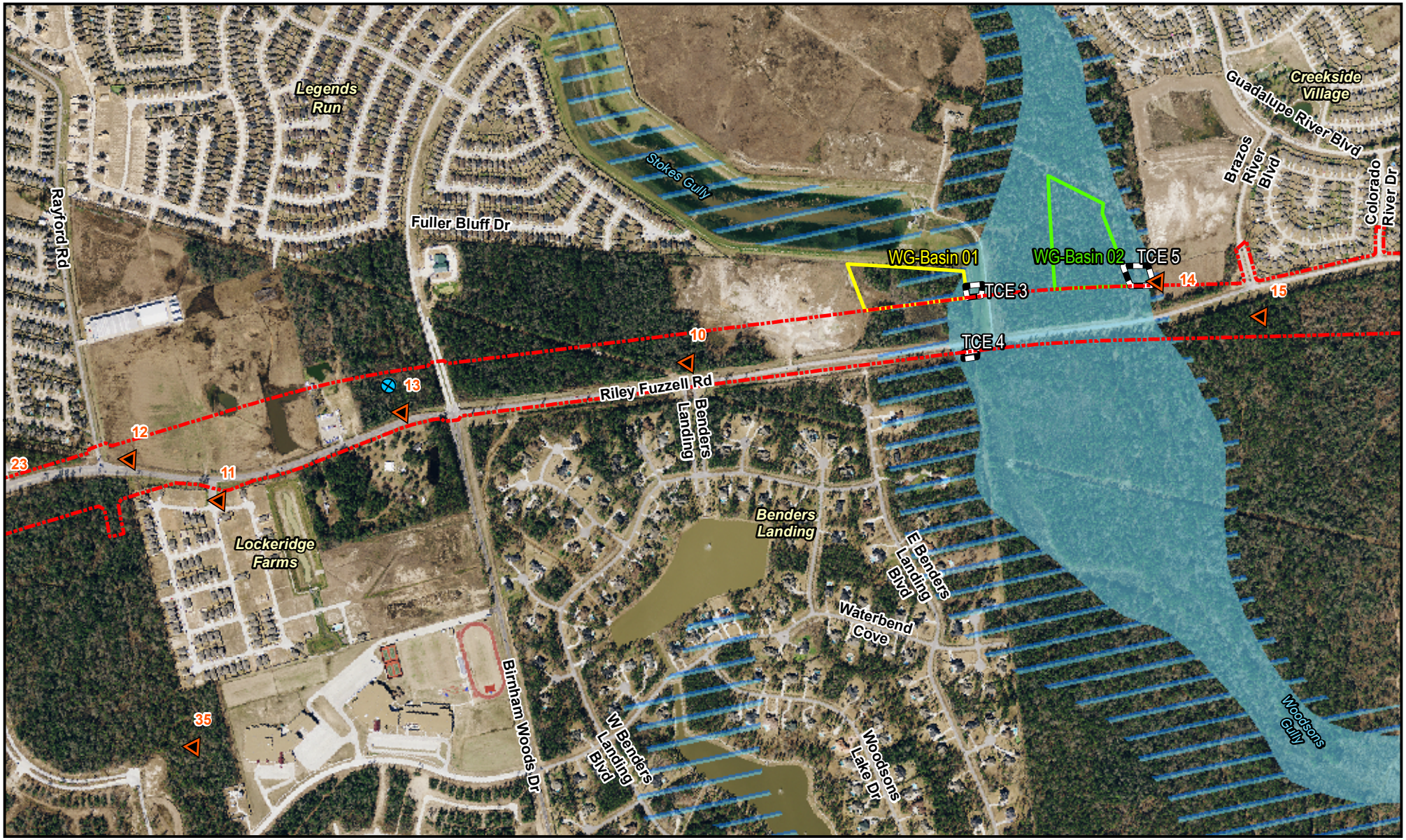
Page 2 of 8

SH 99, The Grand Parkway
Segment G

0 500 1,000 Feet

H-GAC 2010 Aerials





Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain
- Identified HazMAT sites

Noise Related

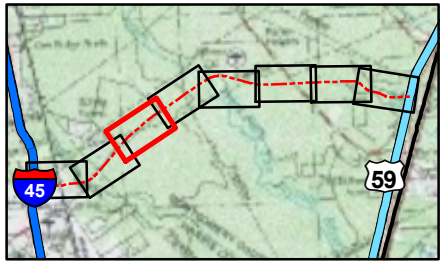
- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

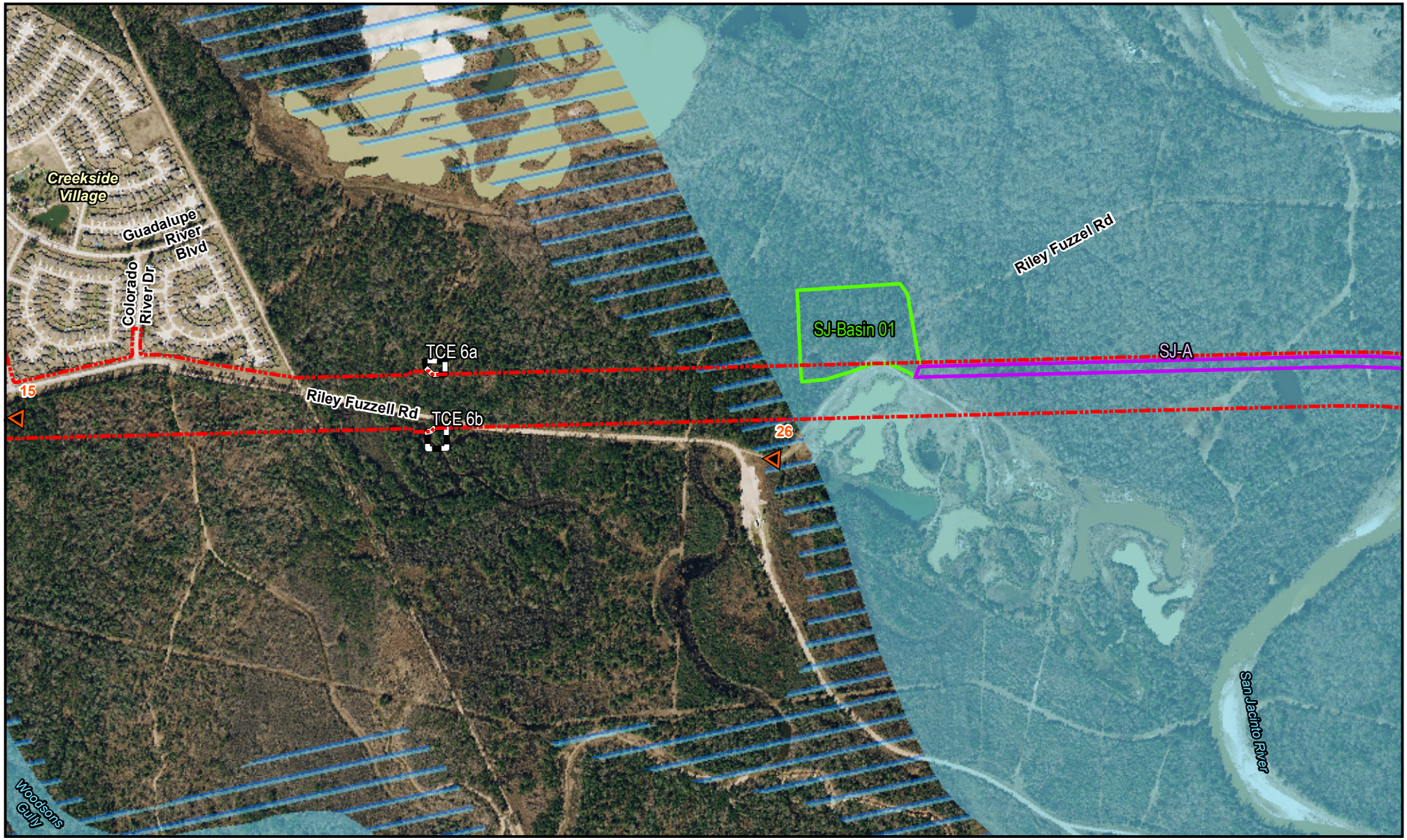
Exhibit 2:
SH 99, Grand Parkway
Segment G

SH 99, The Grand Parkway
Segment G

0 500 1,000 Feet

H-GAC 2010 Aerials





Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain
- Identified HazMAT sites

Noise Related

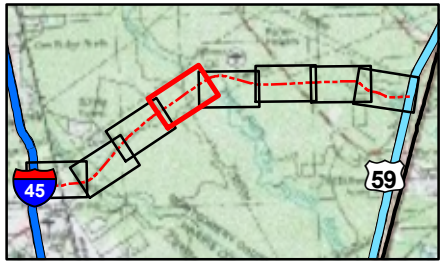
- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

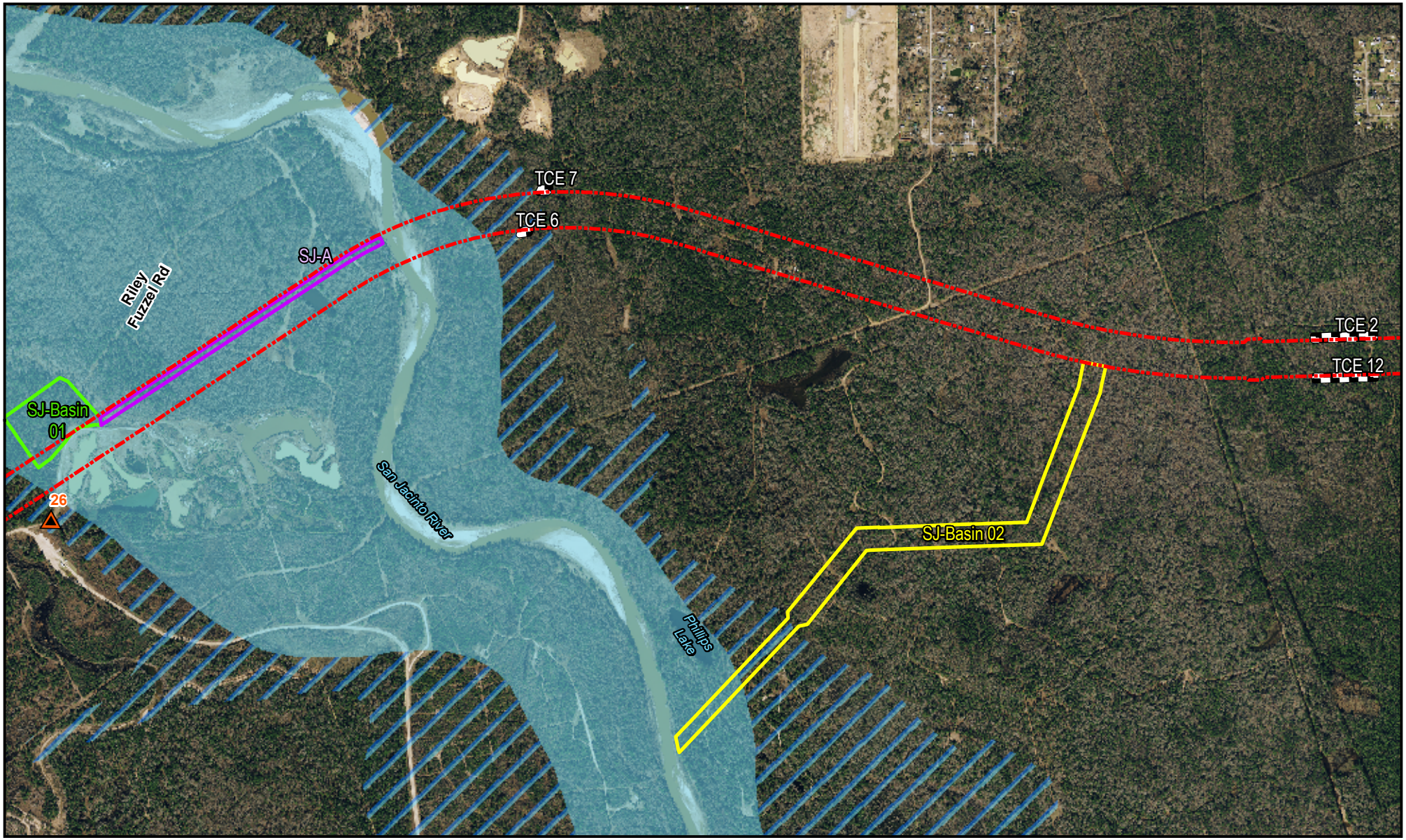
Exhibit 2: SH 99, Grand Parkway Segment G

SH 99, The Grand Parkway Segment G

0 500 1,000 Feet

H-GAC 2010 Aerials





Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain

- Identified HazMAT sites

Noise Related

- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

Exhibit 2:
SH 99, Grand Parkway
Segment G

Page 5 of 8

SH 99, The Grand Parkway
Segment G

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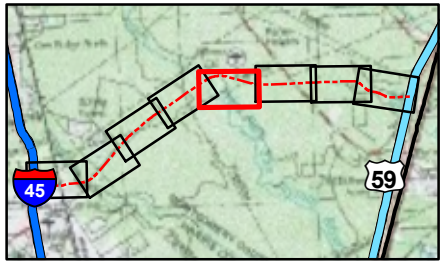
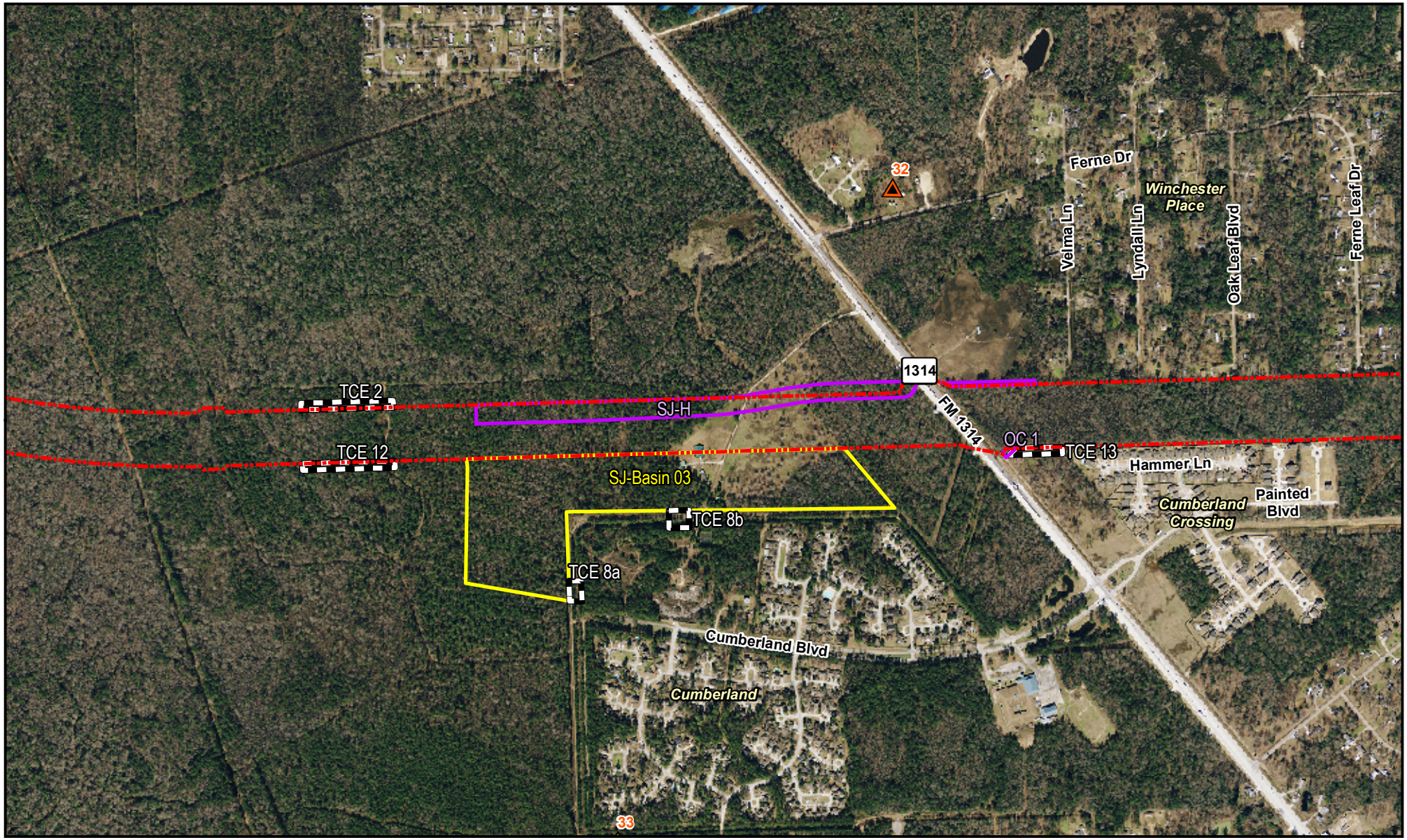
Feet

H-GAC 2010 Aerials





Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain

- Identified HazMAT sites

Noise Related

- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

Exhibit 2:
SH 99, Grand Parkway
Segment G

SH 99, The Grand Parkway
Segment G

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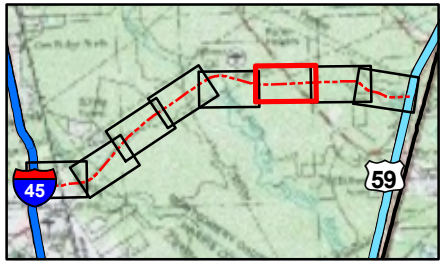
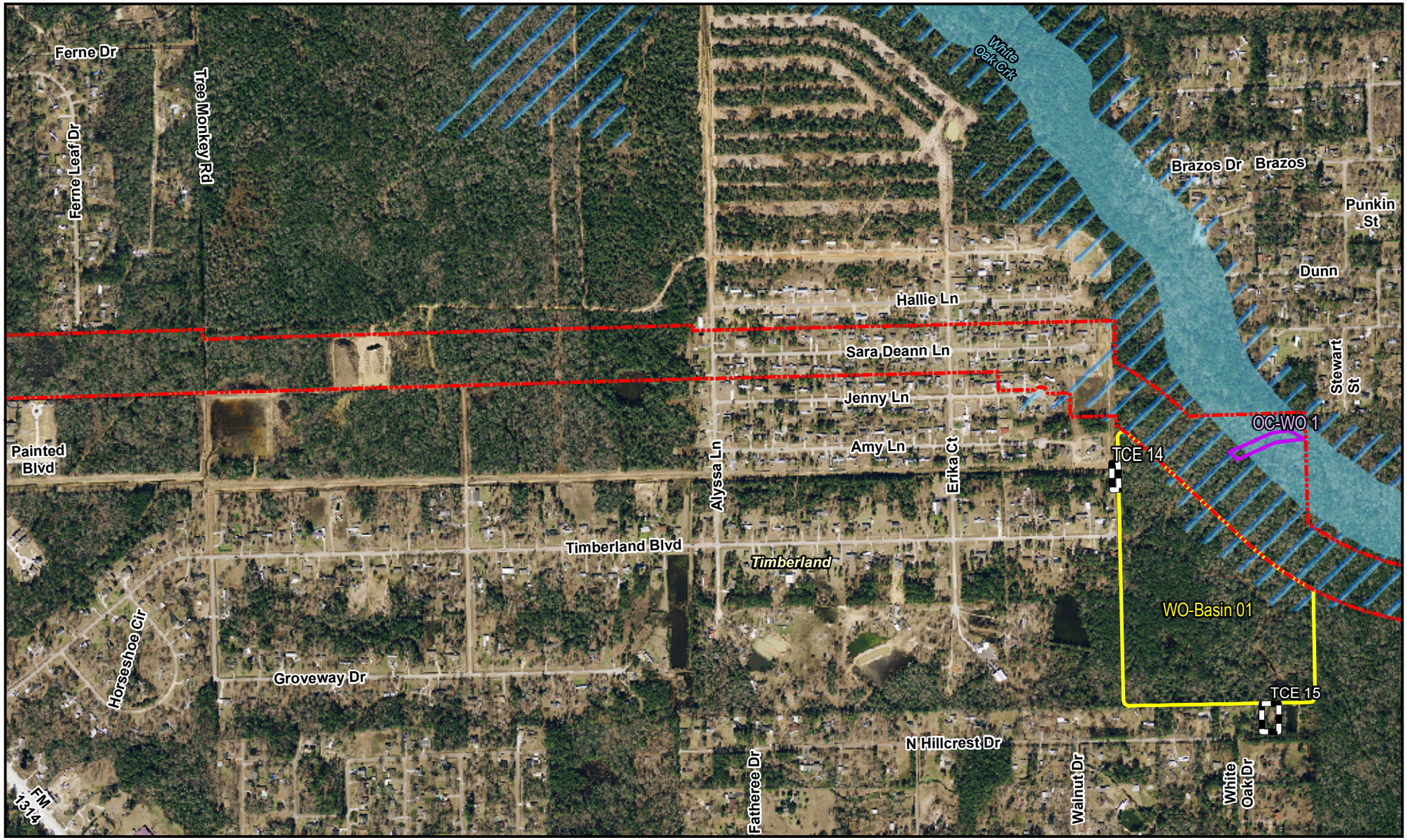
Feet

H-GAC 2010 Aerials





Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain

- Identified HazMAT sites

Noise Related

- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

Exhibit 2:
SH 99, Grand Parkway
Segment G

SH 99, The Grand Parkway
Segment G

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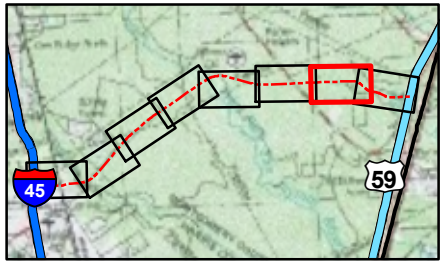
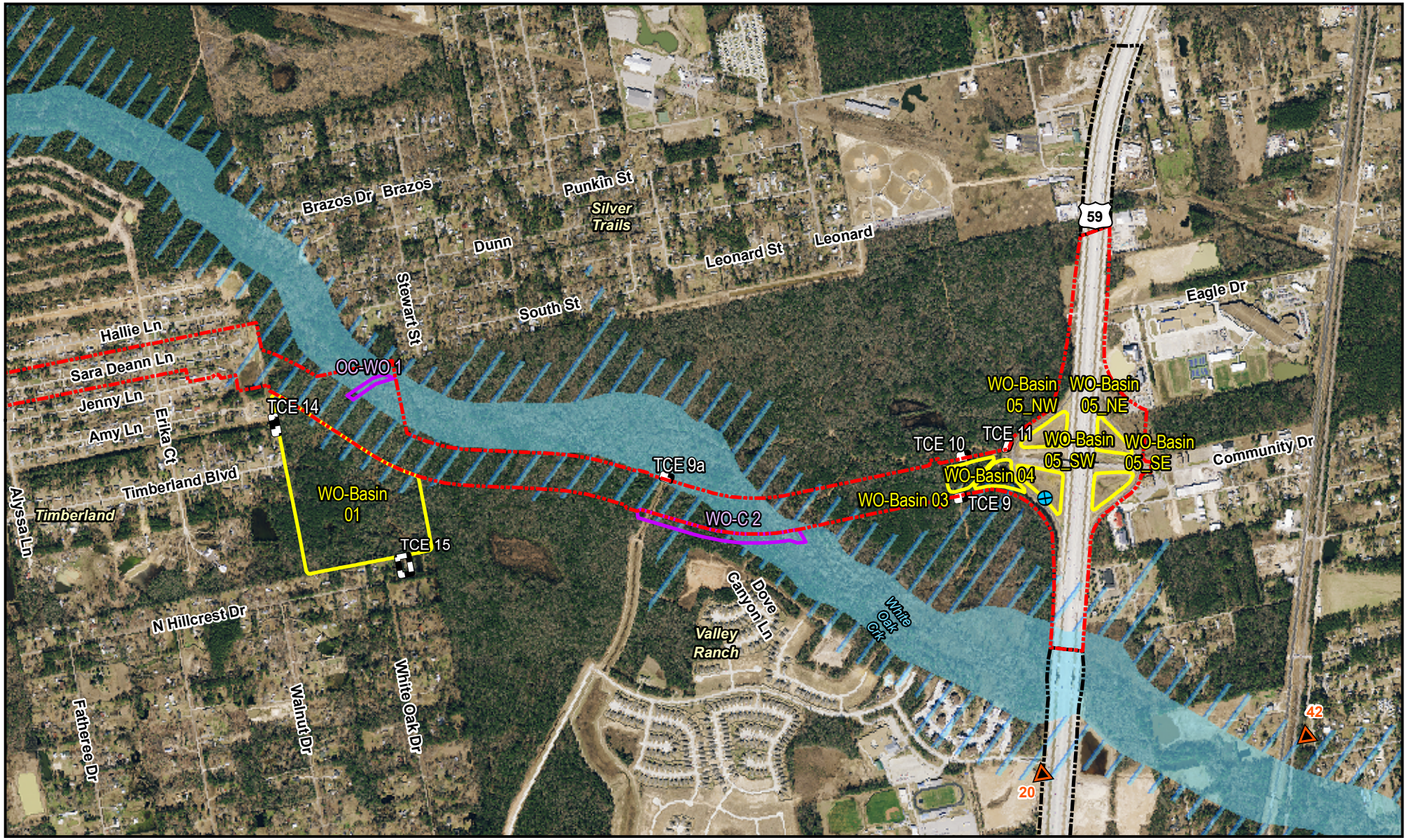
Feet

H-GAC 2010 Aerials





Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Floodway
- 100 Year Floodplain
- Identified HazMAT sites

Noise Related

- Non-Impacted Receivers
- Receivers Benefitting from Noise Barrier
- Impacted Receivers
- Noise Barrier

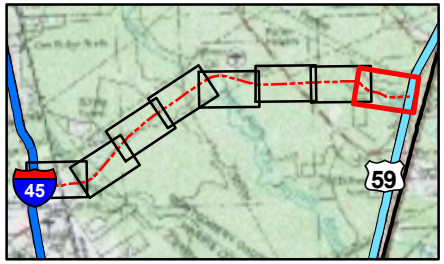
Exhibit 2:
SH 99, Grand Parkway
Segment G

SH 99, The Grand Parkway
Segment G

N W E S

0 500 1,000 Feet

H-GAC 2010 Aerials



PRELIMINARY

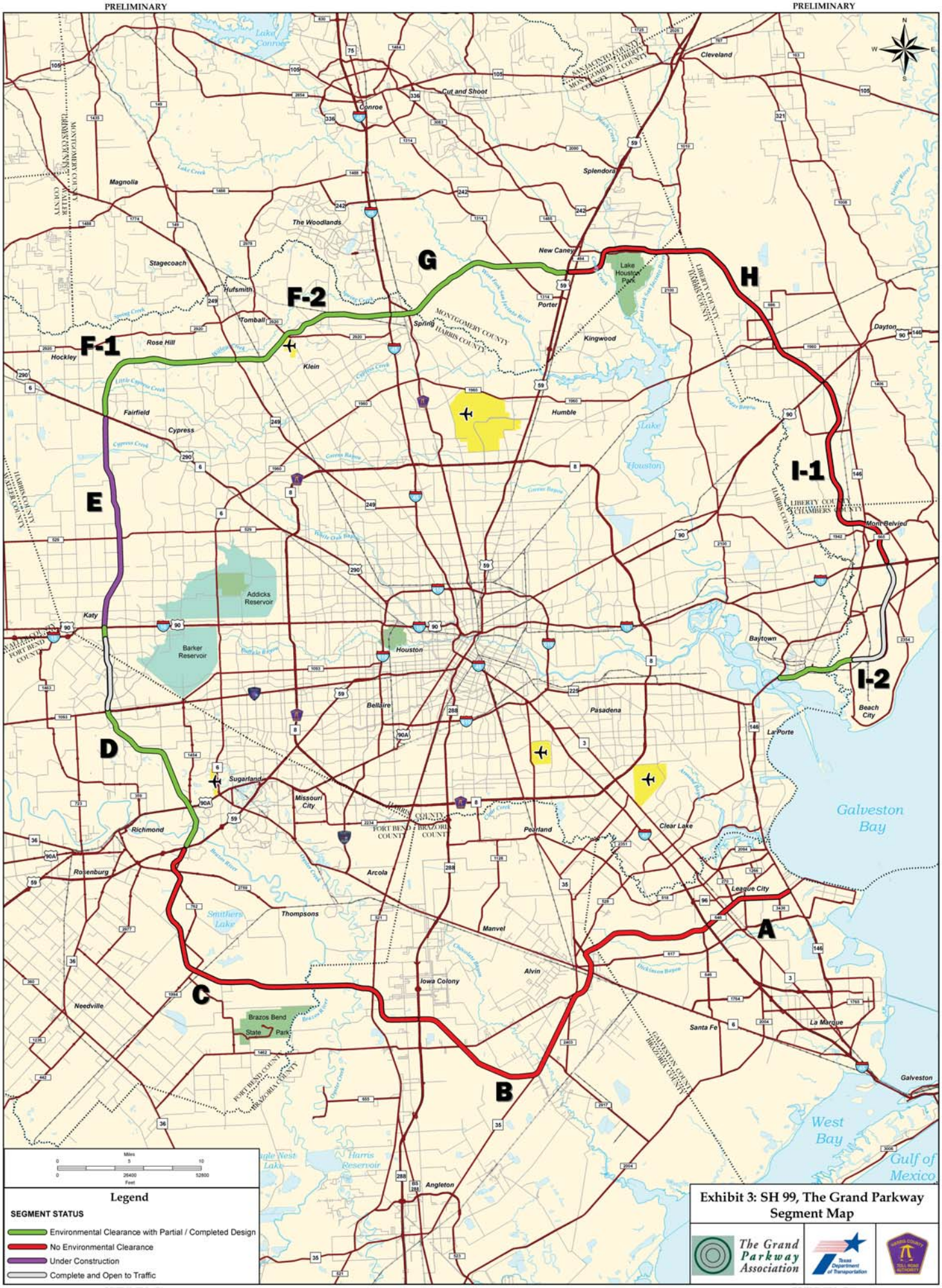


Exhibit 3: SH 99, The Grand Parkway Segment Map

The Grand Parkway Association

Texas Department of Transportation

Harris County Toll Road Authority

PRELIMINARY

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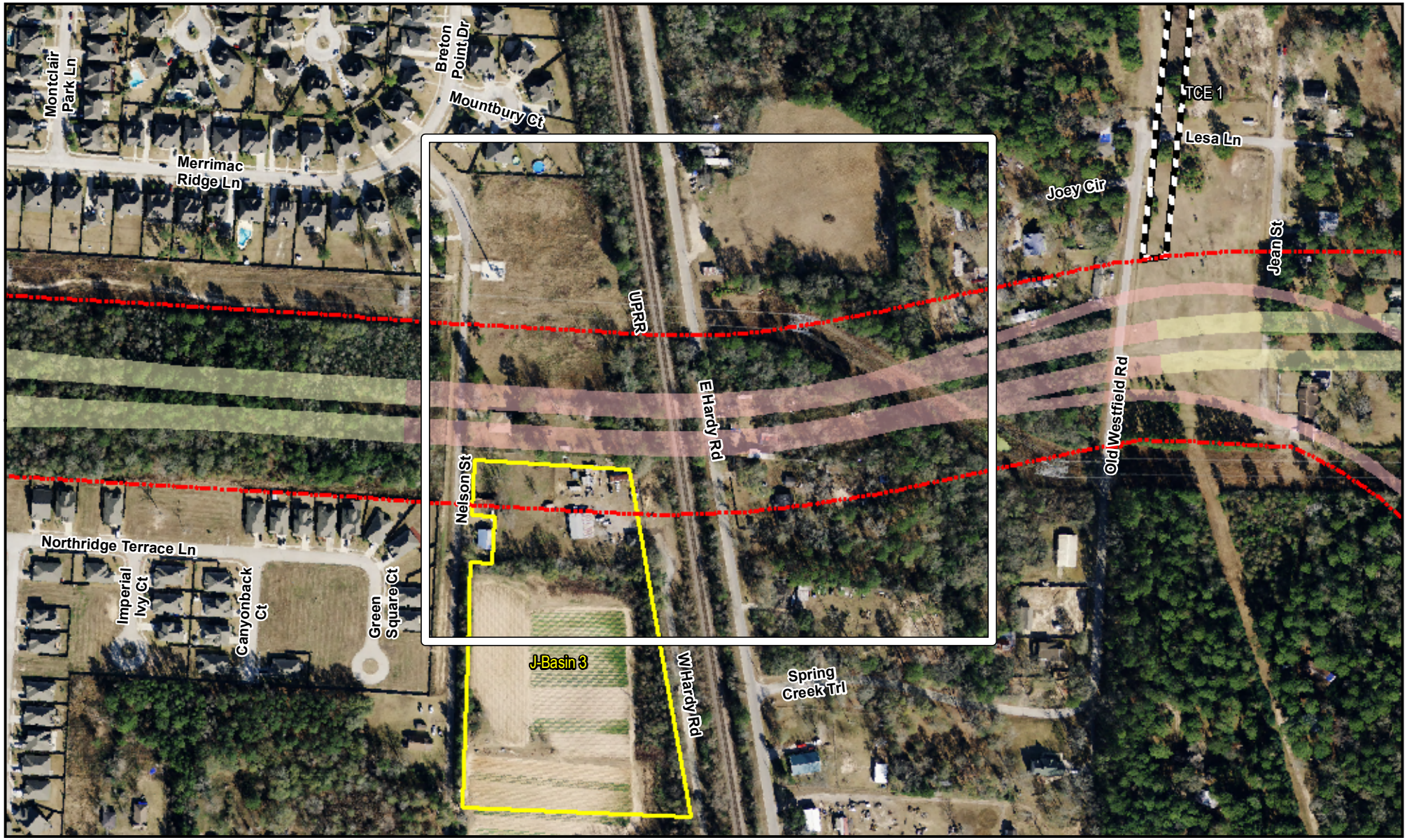

Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement
- Bridge
- At Grade

H-GAC 2010 Aerials

Exhibit 4:
SH 99, Grand Parkway
Segment G
UPRR Bridge Design Modification

SH 99, The Grand Parkway
Segment G

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Feet

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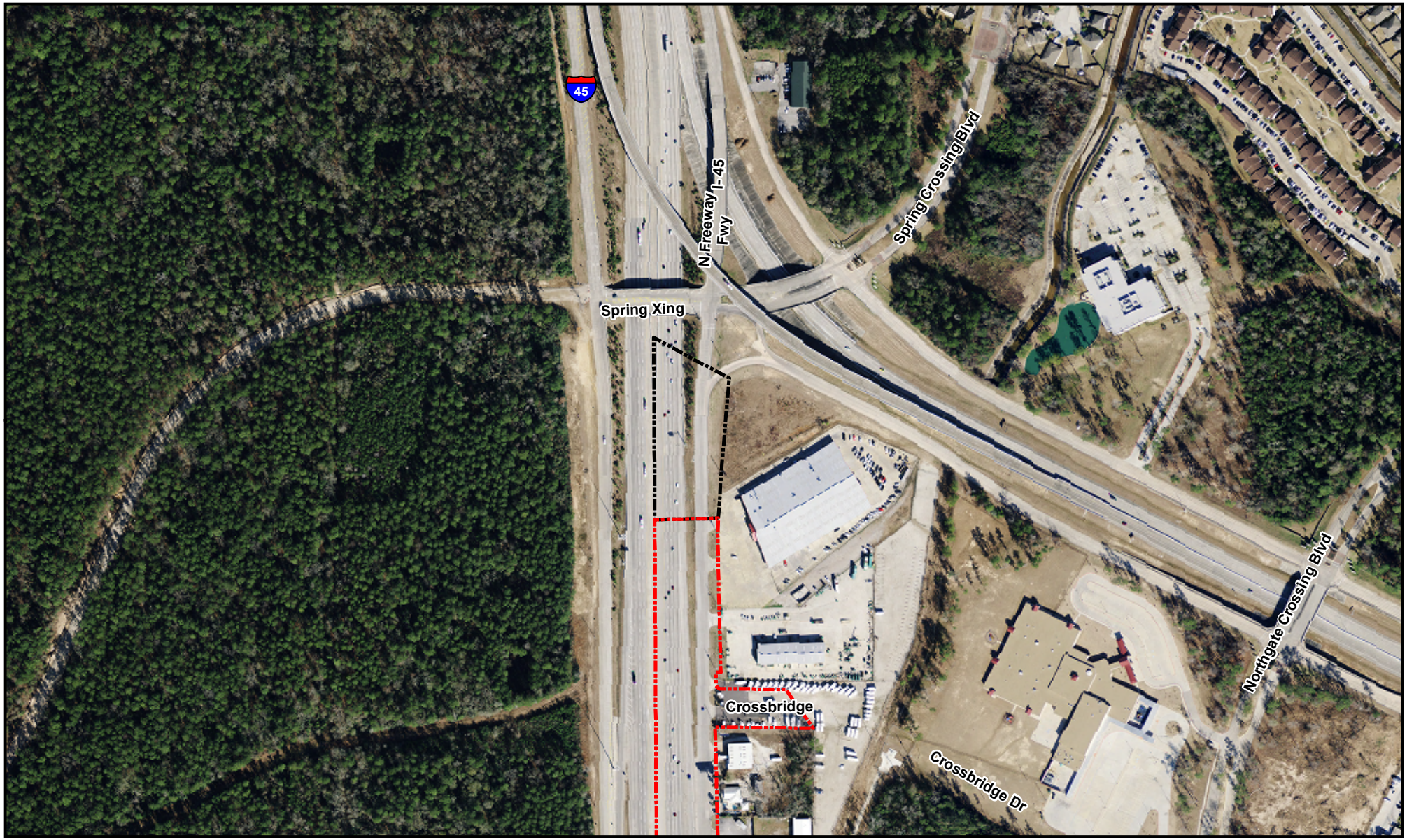

Legend

Proposed ROW

Touchdown Easement

Exhibit 5:
SH 99, Grand Parkway
Segment G
ROW Design Modification

Page 1 of 4

SH 99, The Grand Parkway
Segment G

N
W E
S

0 250 500 Feet

H-GAC 2010 Aerials

Legend

Proposed ROW

Touchdown Easement

Exhibit 5:
SH 99, Grand Parkway
Segment G
ROW Design Modification

Page 4 of 4

SH 99, The Grand Parkway
Segment G

N
W E
S

0 250 500 Feet

H-GAC 2010 Aerials

McCleskey Rd

Legion Rd

Libary

Cuttler Rd

Cuttler Rd

Cuttler Rd

Leonard

Legion Rd

UPRR

Lodge Rd

Legend

Proposed ROW

Touchdown Easement

Exhibit 5:
SH 99, Grand Parkway
Segment G
ROW Design Modification

Page 3 of 4

SH 99, The Grand Parkway
Segment G

N
W E
S

0 250 500 Feet

H-GAC 2010 Aerials

Legend

Proposed ROW

Touchdown Easement

Exhibit 5:
SH 99, Grand Parkway
Segment G
ROW Design Modification

Page 4 of 4

SH 99, The Grand Parkway
Segment G

N
W E
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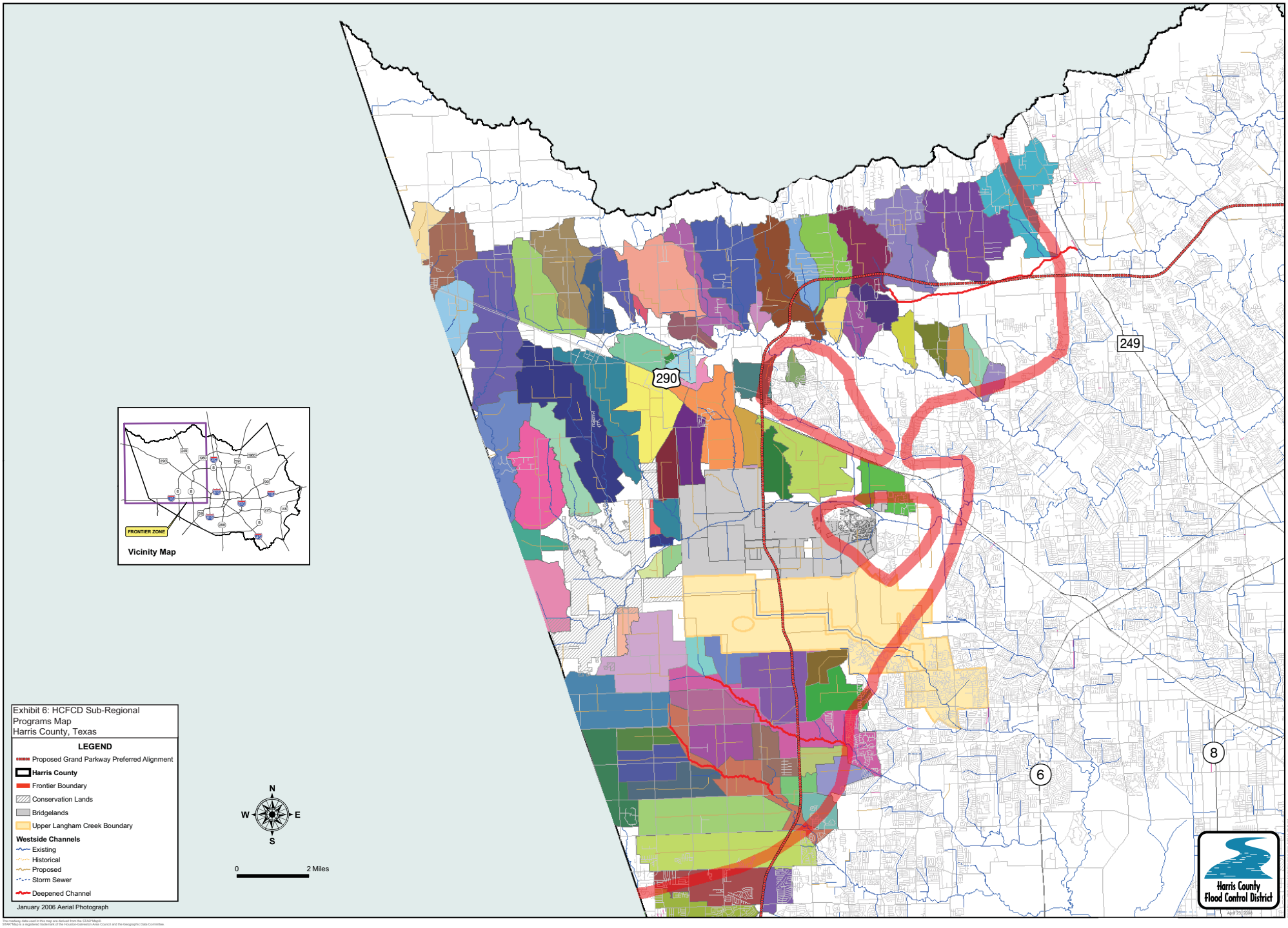
0 250 500 Feet

H-GAC 2010 Aerials

Sub-Regional Programs



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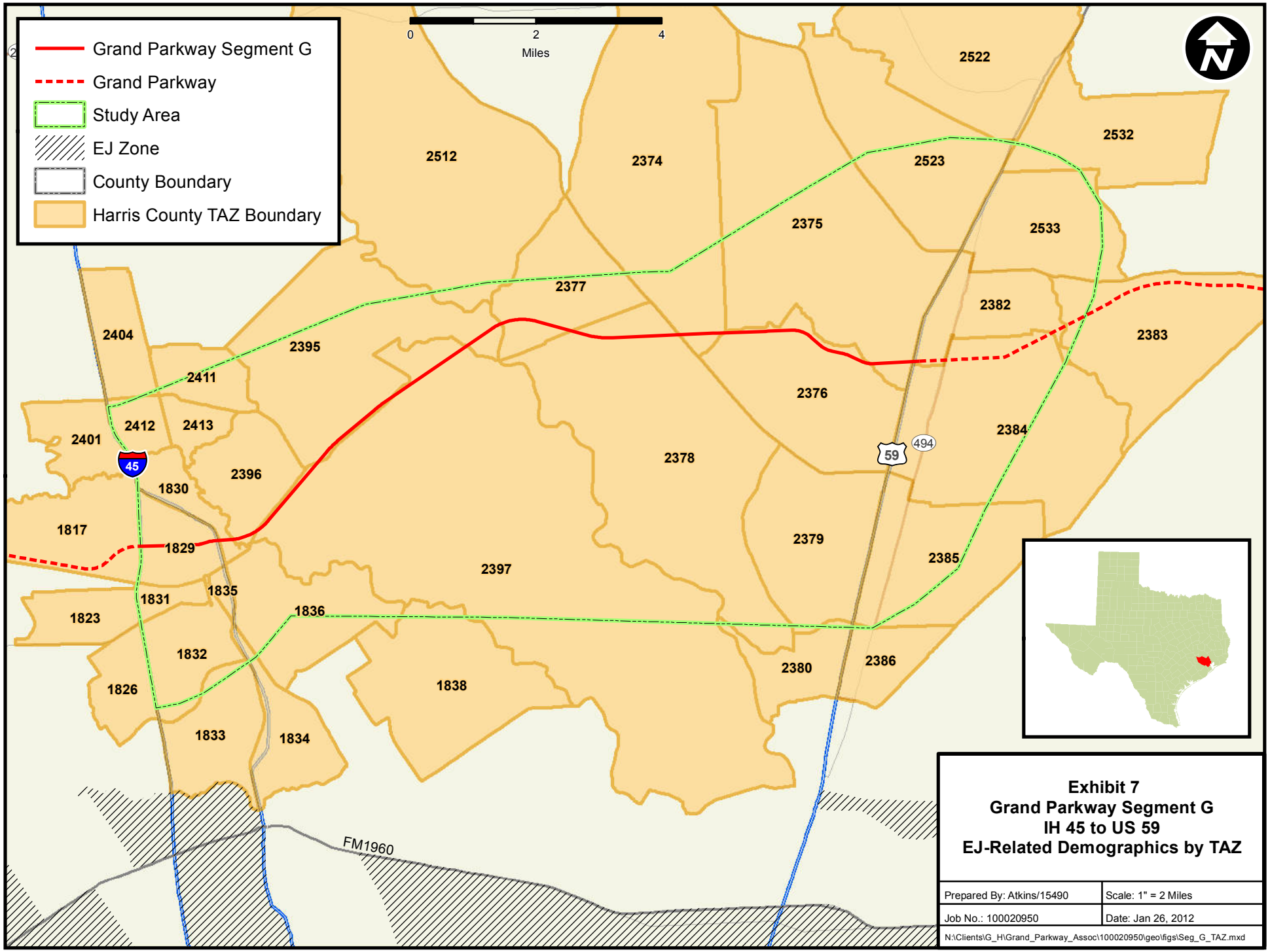

Exhibit 7
Grand Parkway Segment G
IH 45 to US 59
EJ-Related Demographics by TAZ

Prepared By: Atkins/15490	Scale: 1" = 2 Miles
Job No.: 100020950	Date: Jan 26, 2012
N:\Clients\G_H\Grand_Parkway_Assoc\100020950\geo\figs\Seg_G_TAZ.mxd	

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APPENDIX B
LETTERS OF COORDINATION

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TEXAS TRANSPORTATION COMMISSION

VARIOUS County

MINUTE ORDER

District VARIOUS

In VARIOUS COUNTIES, projects have been proposed to develop STATE HIGHWAY 99 (Grand Parkway), a proposed 170 mile facility from State Highway 146 in Galveston County to State Highway 146 at Spur 55 in Chambers County.

The completion of the Grand Parkway is essential and urgent, as construction of the projects would alleviate congestion and improve traffic flow in the Houston metropolitan area and the surrounding region.

While the projects have been ongoing since the designation of State Highway 99 by the Texas Transportation Commission (commission), economic conditions and budgetary constraints have affected the ability of the Texas Department of Transportation (department) to continue the development of the Grand Parkway in a timely manner.

There exists the potential for expediting the completion of the Grand Parkway by financing a portion of the design and construction costs through the use of toll financing. The commission recognizes that innovative financing methods, including tolls, are an effective means of maximizing the use of limited available resources, without compromising the quality of the state's transportation system.

To further the expeditious development of the Grand Parkway, Harris County has been requested to conduct traffic and revenue studies of segments of the Grand Parkway for the purpose of determining the feasibility of developing those segments as toll facilities. Harris County is currently performing a comprehensive traffic and revenue study that assumes development of the Grand Parkway as a toll facility, with results of the study due in the summer of 2003.

The commission has determined that constructing and operating the Grand Parkway as a toll facility is the most efficient and expeditious means of ensuring its development, and encourages the development of partnerships and the employment of innovative methods for its financing and construction.

Any change in the assumed operational characteristics of the Grand Parkway, including the development and operation of the Grand Parkway as a toll facility, may require an amendment to the metropolitan transportation plan of the Houston-Galveston Area Council (HGAC), the metropolitan planning organization for the region, and the HGAC transportation improvement program, and will require new modeling in the HGAC Air Quality Conformity Analysis.

House Bill 3545 and Senate Bill 1463, 78th Legislature, 2003, relating to the conversion of a non-tolled state highway to a toll facility, would authorize the commission, if enacted, to convey a non-tolled state highway or a segment of a non-tolled state highway, including any real property acquired to construct or operate the highway, to Harris County for operation and maintenance as a county toll project, or to convert the highway to a department turnpike project.

IT IS THEREFORE ORDERED by the commission that the department is directed to develop an action plan for the development of the Grand Parkway as a toll facility to the extent feasible under current law, including plans for carrying out any necessary studies and making any necessary modifications to the HGAC metropolitan transportation plan, transportation improvement program, and Air Quality Conformity Analysis.

TEXAS TRANSPORTATION COMMISSION

MINUTE ORDER

VARIOUS County

District VARIOUS

IT IS FURTHER ORDERED that the department evaluate and investigate options for converting one or more segments of the Grand Parkway to county toll projects or to department turnpike projects, including, contingent upon the enactment of House Bill 3545, Senate Bill 1463, or similar legislation, proceeding with the implementation of the authority provided in that legislation.

Submitted and reviewed by:

Director, Texas Turnpike Authority Division

Recommended by:

Executive Director

109226 APR 24 03

Minute Number | Date Passed

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Division of Ecological Services
17629 El Camino Real #211
Houston, Texas 77058-3051
281/286-8282 FAX 281/488-5882

June 11, 2010

Bryan W. Phillips
Environmental Affairs Division
Texas Department of Transportation
125 E. 11th Street
Austin, Texas 78701-2483

Dear Mr. Phillips:

Thank you for your letter, dated March 29, 2010, concerning the proposed construction of Segment G of State Highway 99, which is also known as the Grand Parkway. The proposed project will extend for approximately 13.7 miles between IH 45 and US 59 in Harris County and Montgomery County, Texas.

The Texas Department of Transportation (TxDOT), as the designated non-federal representative for the Federal Highway Administration, has determined that the proposed project will have no effect on the federally listed red-cockaded woodpecker (*Picoides borealis*). TxDOT has also determined that the project may affect, but is not likely to adversely affect the Texas prairie dawn-flower (*Hymenoxys texana*).

The U.S. Fish and Wildlife Service (Service) concurs with TxDOT's determination that the proposed project is not likely to adversely affect the Texas prairie dawn-flower. This concurrence is based upon a review of your project information and Service files. Please note that no coordination or contact with the Service is necessary for no effect determinations, nor does the Service concur with no effect determinations.

In the event the project changes or additional information on the distribution of listed or proposed species or designated critical habitat becomes available, the project should be reanalyzed for effects not previously considered.

Our comments are provided in accordance with the provisions of the Endangered Species Act of 1973 (87 Stat. 884, as amended; 16 U.S.C. 1531 et seq.).

Please contact me at 281/286-8282 if you have questions or need further assistance.

Sincerely,

Edith Erfling

Edith Erfling
Acting Field Supervisor, Clear Lake ES Field Office

TAKE PRIDE® IN AMERICA

From the Office of
Larry E. Brown, Plant Taxonomist
6223 Henniker Drive
Houston, Texas 77041 - 5844

Home Phone Number: 832 - 467 - 3348
Cell Phone Number: 832 -515 - 8174
E-mail Address: Larry-theplantman@att.net
Alternate E-mail Address: Ruby.brown@att.net

June 04, 2009

To Whom It May Concern, I have been hired by PBSJ to help with a survey for *Hymenoxys texana* (Prairie Dawn) along the proposed right of way of Segment G of the Grand Parkway. This segment extends from IH 45 to U.S. 59 in Harris and Montgomery Counties Texas.

Methods Used in Survey

Prairie dawn only grows with early flowers from late February into March and forming seeds and later flowers in April. It occurs as small colonies on sparsely vegetated areas of pale, fine-sandy, and compacted soil. The 2009 survey was in April thus numerous plants in full anthesis will be on suitable sites. These sites are sometimes at the base of mima (pimple) mounds. Prairie Dawn is a heliophyte, growing in full sun in undisturbed native prairies. It is not present under trees in woodlands nor on highly disturbed fields such as those caused by plowing and thus overturning the top soil. Soil disturbed sites are often covered with a mixture of introduced and native weedy species thus not the vegetation of native prairies.

PBSJ provided me with fine aerial photographs with the current alignment clearly indicated. I used these aerials to identified potential sites. One site was in a open areas with a pale colored soil exposed. The potential habitat site is outlined in red lines at site 1 on sheet 7 of 20. The pale color could have potentially been due to the death of plants, from hay stacks, or small sandy roads and other man made factors. Areas identified as having no potential Prairie Dawn habitat were densely wooded areas, open areas with a uniform brown color, and those with contour lines show plowed soils.

Potential Prairie Dawn habitat was located at site 1. Land owner permission was denied on this site. Site 1need further investigation after land owner permission is granted.

Qualifications

I have a Ph.D. in plant taxonomy from Texas A&M University. I have conducted about 100 surveys for Prairie Dawn over the past 20 years and have some 30 papers published in floristic plant biology. I am also the co-author of the federal recovery plan for *Hymenoxys texana*.

Survey conditions

The survey of section F-2 in 2009 was conducted in April. At this time Prairie Dawn plants are in full anthesis on suitable sites. Three full days were devoted to this segment. We motored to

the potential sites picked out on the aerials but most of the time we needed to walk for access to them. Nathan Olday from PBS&J was on the survey each day and Jeremy Marshall from PBS&J also assisted with the surveys

Summary of survey

We saw no Prairie Dawn plants during the April 2009 survey. Eight sites seemed to have suitable habitat, but at sites 8 and 12 we were unable to verify Prairie Dawn there because we were unable to secure permission from the land owner for a close-up examination.

Larry E. Brown,

Larry E. Brown

Plant Taxonomist and
Environmental Consultant

7600 Washington Avenue, Houston, Texas 77007

May 3, 2012

CONTACT: DPD

Proposed Detention Basins, Outfall Easements, and Selected Alternative ROW
Harris and Montgomery Counties
SH 99 (Grand Parkway, Segment G) IH 45 to US 59
CSJ: 3510-06-903, 3510-06-001, 3510-07-001, and 3510-07-901

Ms. Edith Erfling
U. S. Fish and Wildlife Service Ecological Services
17629 El Camino Real, Suite 211
Houston, Texas 77058-3051

Dear Ms. Erfling,

The proposed State Highway (SH) 99, Grand Parkway, is a planned approximate 180+ mile circumferential roadway around the Houston metropolitan area. SH 99 would be a new location facility designed to accommodate a 70-mile-per-hour design speed within a 400-foot right-of-way (ROW). The proposed SH 99 facility consists of 11 segments of independent utility, which are being developed separately and are at various stages of the planning process. Segment G, the proposed project, extends approximately 13.6 miles from Interstate Highway (IH) 45 to United States Highway (US) 59. Transportation improvements are needed in the Segment G study area because there are insufficient connections between suburban communities and radial roadways, the current and future transportation demand exceeds capacity, many roadways in the study area have a high accident rate, and there is an increasing strain on transportation infrastructure from population and economic growth. The purpose of the proposed transportation improvements in the Segment G study area is to efficiently link the suburban communities and major roadways, enhance mobility and safety, and respond to economic growth.

The Texas Department of Transportation (TxDOT) coordinated with the U. S. Fish and Wildlife Service (USFWS) regarding the proposed project, and a determination of "not likely to adversely affect" for the proposed activities was concurred with by USFWS on June 11, 2010. Currently, detention basins and outfall easements have been added as part of the proposed project (additional project area). The locations of the additional project areas are provided on Exhibits A (Topographic Maps) and Exhibit B (Aerial Maps). In October, November, and December 2011 and January 2012, TxDOT consultants performed field investigations on the additional project areas and completed an updated survey of the 400 foot ROW as part of their project due diligence and the commitments TxDOT made in the Final Environmental Impact Statement (FEIS) and Record of Decision (ROD). Therefore, this letter is intended to update the USFWS of additions to the Segment G project area, and to provide updated data for the 400-foot ROW.

In addition to the field surveys of the 400-foot ROW, detention and mitigation basins, and outfall easements, the Texas Parks and Wildlife Department's (TPWD) Natural Diversity Database (NDD) was reviewed in February 2012 to identify previously-recorded occurrences of both state and federal threatened and endangered species within the vicinity of the additional project area. USFWS and TPWD threatened and endangered species county lists were also reviewed. The results of these searches indicated that three federally protected species whose ranges or migratory routes may extend specifically into the additional

project area: the bald eagle *(Haliaeetus leucocephalus)*, the Texas prairie dawn flower *(Hymenoxys texana)*, and the red-cockaded woodpecker *(Picoides borealis)*.

Bald Eagle

As of August 9, 2007, the bald eagle is no longer a federally threatened species; however, it will be monitored closely for at least the first five years after delisting (USFWS, 2009). The bald eagle is still afforded special protection under the Bald and Golden Eagle Protection Act. The bald eagle is an uncommon to rare migrant and winter resident throughout Texas (Texas Ornithological Society, 1995). It is generally found in coastal areas and around large bodies of water, such as reservoirs, lakes, and rivers. Nesting in Texas is largely restricted to the eastern one-third of the state and to the coastal prairies region. The bald eagle prefers habitat in deciduous forests with large hardwoods or pine trees for roosting and nesting (K. Lad, 2008). In Texas, wintering and migrating bald eagles frequently stop-over along water body shores and large rivers, which provide the eagle with the bulk of its dietary requirements (Campbell, 1995).

During October, November, and December 2011 and January 2012, field surveys were conducted in conjunction with wetland delineation surveys within the right-of-way and the additional project area. During the surveys no presence of bald eagles, or their protected critical habitat was observed within the 400-foot ROW or the additional project areas. Based on a review of TPWD's Annotated County Lists of Rare Species for Harris County, Texas (revised September 28, 2011), TPWD's NDD (accessed February 2012), USFWS list, and on-site evaluations, it has been determined that the proposed project will have no effect on bald eagles, or their designated critical habitats.

The Bald Eagle may still occur within the additional ROW. Should Bald Eagles be noted foraging and/or roosting within the additional ROW, steps would be taken to minimize potentially disruptive activities per the *USFWS National Bald Eagle Management Guidelines* (USFWS, 2007).

Texas Prairie Dawn

In the FEIS, TxDOT concluded that the project is not likely to adversely affect any federally listed species, its habitat, or designated critical habitat within the Segment G ROW. A conclusion of "no effect" could not be made for the Texas prairie dawn because of lack of access to one property within the Segment G ROW identified as potential Texas prairie dawn habitat, as presented in the ROD. The remaining portion of the ROW contained upland forest, unmaintained, disturbed pasture, urban development, and wetlands. As a result, TxDOT committed in the FEIS and ROD to continue coordination with the USFWS and to perform additional surveys for Texas prairie dawn as access was granted to additional properties.

The Texas prairie dawn flower, a federal and state listed endangered plant, is an annual sunflower (Asteraceae) that ranges in height from 1.5 to 7 inches. The bracts conceal the minute ray flowers; the yellow disk flowers are 0.1 to 0.2 inch long. Texas prairie dawn habitat consists of small, sparsely-vegetated areas of fine-sandy saline soil. These sparsely-vegetated areas commonly occur on the lower sloping portion of pimple (mima) mounds or on the level to slightly concave area around the mound's base. Texas prairie dawn prefers native prairies that have not been disturbed by agricultural activities such as plowing (Brown, 2009). Prairie remnants are often characterized by this unusual microrelief topography (Smeins, 1994). Texas prairie dawn flower blooms and fruits from mid~March to mid-April and senescence is usually complete by May (Poole and Riskind, 1987).

Ground surveys conducted for Texas prairie dawn during the flowering period (April 2000 and April 2001)

found no populations within the alternative alignments in properties granted landowner access. Although the April 2000 surveys were conducted during drought conditions, a local population of Texas prairie dawn was identifiable during the survey period near Addicks, Texas. The portion of the Segment G project area traversed by the alternative alignments consists primarily of upland forest, unmaintained, disturbed pasture, urban development, and wetlands and therefore is unlikely to include the viable habitat (i.e., remnant prairie topography) preferred by Texas prairie dawn. Using aerial photography, only one small area was determined to potentially contain Texas prairie dawn habitat in the vicinity of proposed alignments. Access was not granted to this parcel, therefore a determination of not likely to adversely affect was concluded. Additionally, during the surveys conducted of the Preferred Alternative Alignment in December 2006, March-April 2007, no Texas prairie dawn was identified.

In April 2009, additional surveys were completed by reviewing habitats on recent (2008) high-resolution aerial photography. Landowner access was not granted for the one property containing potential Texas Prairie dawn habitat (Site 1 identified in the March 2010 Biological Assessment [BA]); therefore, ground surveys were not completed. Additionally, approximately 60 percent of the ROW that had not been ground –surveyed (although not identified as potential habitat through aerial photography) still remained unsurveyed due to lack of access or visibility from public roads. Based on a commitment in the BA, additional surveys were to be completed for the remaining unsurveyed property within the ROW

During October, November, and December 2011 and January 2012, field surveys were conducted in conjunction with wetland delineation surveys within the 400-foot ROW and the additional project area. During these field surveys, ecologists performed an evaluation of soil characteristics, habitat types, presence or absence of wetland and wetland features, identification of waterbodies, and previous disturbances. Additionally, access was granted to the remaining parcel from the 2009 surveys identified as potential habitat for Texas prairie dawn. Site 1 was field surveyed and vegetation observed consisted of disturbed urban and herbaceous upland surrounded by forested uplands. Species included dallisgrass (*Paspalum dilatatum*), St. Augustine Grass (*Stenotaphrum secundatum*), and West Indian Panicgrass (*Panicum diffusum*). The upland forested community included species such as loblolly pine (*Pinus taeda*), sweetgum (*Liquidambar styraciflua*), and yaupon (*Ilex vomitoria*). Soils observed consisted of clay with sandy layers. A small manmade pond and small forested wetland was observed on the property as well. The soils and vegetation were not consistent with the potential habitat for prairie dawn. Approximately nine percent of the parcels remain to be surveyed based on lack of access. Of the remaining properties, none were identified as potential habitat for Texas prairie dawn. The remaining parcels are upland forest, unmaintained, disturbed pasture, or urban development, and were surveyed from public access roads and no potential habitat was observed. During the surveys, no presence of Texas prairie dawn or its viable habitat was observed within the 400-foot ROW or the additional project areas.

Based on a review of TPWD's Annotated County Lists of Rare Species for Harris County (revised September 28, 2011), Texas, TPWD's NDD (2012) , USFWS list (2012), and on-site evaluations, it has been determined that the proposed project will have no effect on Texas prairie dawn or its designated critical habitats.

Red-cockaded Woodpecker

In April 2009, surveys were completed for properties that were granted landowner access. Two areas of potential Red-cockaded woodpecker (RCW) foraging habitat were identified during the 2009 roadside survey and aerial review. No RCW or nesting habitat were identified within the Preferred Alignment ROW (FEIS) during the 200/2001, 2007, and 2009 surveys. Additionally, approximately 60 percent of the ROW that had not been ground –surveyed (although not identified as potential nesting habitat through

aerial photography) still remained unsurveyed due to lack of access or visibility from public roads. Based on a commitment in the BA, additional surveys were to be completed for the remaining unsurveyed property within the ROW

During October, November, and December 2011 and January 2012, field surveys were conducted in conjunction with wetland delineation surveys within the 400-foot ROW and the additional project area. During these field surveys, ecologists performed an evaluation of soil characteristics, habitat types, presence or absence of wetland and wetland features, identification of waterbodies, and previous disturbances. Additionally, access was granted to the remaining parcels from the 2009 surveys identified as potential foraging habitat for RCW. The sites identified in the 2010 BA were field surveyed and vegetation observed consisted of forested uplands. Species included water oak (*Quercus nigra*), loblolly pine (*Pinus taeda*), American elm (*Ulmus americana*), southern red oak (*Quercus falcate*), yaupon (*Ilex vomitoria*), Chinese privet (*Ligustrum sinense*), American beautyberry (*Callicarpe americana*), and slender woodoats (*Chasmanthium laxum*). Soils observed consisted of loamy sand. Various wetlands and stream crossings were observed on the property as well. Species composition, forest structure, and stand age were not consistent with the potential foraging habitat for RCW. Approximately nine percent of the parcels remain to be surveyed based on lack of access. Of the remaining properties, none were identified as potential nesting or foraging habitat for RCW. The remaining parcels are upland forest, unmaintained, disturbed pasture, or urban development, and were surveyed from public access roads and no potential habitat was observed. During the surveys, no presence of RCW or its viable habitat was observed within the 400-foot ROW or the additional project areas.

Based on a review of TPWD's Annotated County Lists of Rare Species for Harris County (revised September 28, 2011), Texas, TPWD's NDD (2012) , USFWS list (2012), and on-site evaluations, it has been determined that the proposed project will have no effect on RCW or its designated critical habitats.

Based on the above-mentioned studies for the 400-foot ROW and additional project area, a determination of "no effect" was concluded. The proposed additional ROW impacts are not anticipated to risk the continued existence of any federally threatened and endangered species or their preferred habitat. TxDOT is requesting your review of the continued evaluation of federally listed threatened or endangered species or their habitats within proposed project area, and we respectfully request any guidance or input you might have regarding the abovementioned species. Once access is granted to the unsurveyed properties within the mainlanes and prior to construction, field surveys will be performed and an update of this evaluation will be forwarded to the USFWS for review.

The proposed additional project area impacts are not anticipated to risk the continued existence of any federally threatened and endangered species or their preferred habitat. If you have any questions or need additional information, please contact Mr. Sonny Kaiser with Michael Baker, Jr., Inc., at (281) 586-5311.

Sincerely,

Pat Henry, P.E.
Director of Project Development
Houston District

Attachments: References
Exhibit A: Topographic Maps

Exhibit B: Aerial Photographs

cc: Mr. Sonny Kaiser – Michael Baker Jr., Inc.
Ms. Susan Theiss – TxDOT-Houston District
Mr. Lance Olenius – TxDOT-Houston District

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Chairman-Emeritus
Fort Worth

Carter P. Smith
Executive Director

March 13, 2009

Dianna Noble
Environmental Affairs Division
Texas Department of Transportation
125 E. 11th Street
Austin, Texas 78701-2483

RE: Grand Parkway/SH 99 Segment G, from IH 45 to US 59, Harris and Montgomery Counties. CSJs: 3510-06-001, 3510-06-903; 3510-07-001; 3510-07-901

Dear Ms Noble:

Texas Parks and Wildlife Department (TPWD) received your request regarding an environmental review of the proposed project. Department staff reviewed the information provided for possible impacts to fish and wildlife resources of the state.

The project entails the proposed construction of Segment G of the Grand Parkway, which would consist of an approximately 13.74-mile long, four main-lane controlled access highway with intermittent frontage roads located within a 400-foot right-of-way (ROW). The proposed roadway would reduce the through radial traffic along SH 249 and IH 45 and would provide a continuation of the existing and planned portions of the Grand Parkway.

Impacted Areas

The preferred alternative alignment would be approximately 13.74 miles in length. The preferred alignment would have the following impacts:

352.8 acres of forest areas, of which, 129.9 acres consist of bottomland hardwoods
40.2 acres of forested wetlands
24.3 acres of non-forested wetlands
14 stream crossings including 4 major crossings at Spring Creek, Woodsons Gully, West Fort San Jacinto River, and White Oak Creek
95.42 acres of floodplain

4200 SMITH SCHOOL ROAD
AUSTIN, TEXAS 78744-3291
512.389.4800
www.tpwd.state.tx.us

To manage and conserve the natural and cultural resources of Texas and to provide hunting, fishing and outdoor recreation opportunities for the use and enjoyment of present and future generations.

Cumulative Impacts

The FEIS states that compensatory mitigation will be considered for both regulated and non-regulated habitats and that the Grand Parkway Association (GPA) would coordinate with the federal and state natural resource agencies and project stakeholders to develop a final compensatory mitigation plan that protects, enhances, and preserves the integrity of the natural environment. Although the proposed project is linear, the construction of the roadway would encourage the development of properties adjacent to project area and further impact natural resources throughout the area. The Council on Environmental Quality (CEQ) regulations (40 CFR §1500-1508) that implement the National Environmental Policy Act require cumulative effects to be addressed. Cumulative effects are the total effect, including both direct and indirect effects, on a given resource, ecosystem and human community of all actions taken. Indirect effects would include commercial and residential development, other infrastructure, etc.

TPWD recommends considering the cumulative impacts to fish and wildlife resources resulting from the construction of SH 99 in determining the needs for compensatory mitigation needs. Particular attention should be paid to the Katy Prairie region which serves as an important wintering area for waterfowl and has faced significant impacts due to urban sprawl from the Houston region.

Forested Area

The Segment G corridor encompasses a significant forested area and these areas within Harris and Montgomery Counties are continually being lost as the Houston urban sprawl continues outward. Impacts to this relatively unfragmented pine and hardwood forest and other forested areas within the project area should be minimized and appropriate compensatory mitigation should be considered for any unavoidable impacts due to both direct and cumulative sources. Coordination of all impacts to the forested areas should be coordinated with Jamie Schubert with our Coastal Program; he can be reached at 281-534-0135.

Stream Crossings

Stream crossings, especially major stream crossing, can be particularly disruptive to habitat and wildlife behavior. Streams, including the aquatic waterway and associated riparian zone, are extremely important nesting, foraging, and travel corridors for a broad array of aquatic and terrestrial wildlife, and often provide significant reservoirs for native plant species and biodiversity in general. TPWD

recommends that bridges and other stream crossing be designed to minimize barriers to hydrology, vegetation and wildlife. Bridge spans should be sufficient to avoid emergent vegetation and streamside wetlands, and permit re-establishment of riparian vegetation. Channelization should be held to the absolute minimum necessary to protect transportation infrastructure.

Mitigation

Section 4.10.3 of the FEIS discussed proposed mitigation of regulatory and non-regulatory resources. According to the FEIS the assessment of mitigation efforts are still being considered and have not been finalized. Mitigation of all impacts to the aquatic resources (both regulated and non-regulated areas) should be coordinated with Jamie Schubert with our Coastal Program.

Native Vegetation

Section 4.10.3.2 of the FEIS states that native plant species of grasses, shrubs, and/or trees, where practicable, would be used in revegetation efforts within the project area. TPWD recommends utilizing site-specific native plant species in the restoration of disturbed areas.

TPWD advises review and implementation of these recommendations. If you have any questions, please contact Amy Hanna at (361) 576-0022.

Sincerely,

Amy Hanna

Amy Hanna
Wildlife Habitat Assessment Program
Wildlife Division

/ajh:5589

See Theiss - HOU

7 29 09

Texas Department of Transportation

DEWITT C. GREER STATE HIGHWAY BLDG. • 125 E. 11TH STREET • AUSTIN, TEXAS 78701-2483 • (512) 463-8585

July 21, 2009

Section 106/Antiquities Code of Texas: Review and Comments (Permit #5311)
State Highway (SH) 99 (Segment G) Roadway Project (CSJ: 3510-06-001, -06-903, -07-901)
Houston District; Harris and Montgomery Counties

Dr. James E. Bruseth
Department of Antiquities Protection
Texas Historical Commission
P.O. Box 12276
Austin, Texas 78711

Tx DOT RECEIVED
AUG 0 6 2009
HOUSTON MAIL OPERATIONS

SCANNED ON
AUG 0 6 2009
MAIL OPERATIONS HOUSTON

Dear Dr. Bruseth:

The proposed project will be undertaken with Federal funding. In accordance with Section 106 and the First Amended Programmatic Agreement among the Texas Department of Transportation (TxDOT), the Texas State Historical Preservation Officer (TSHPO), the Federal Highway Administration (FHWA), and the Advisory Council on Historic Preservation and the Antiquities Code of Texas and the Memorandum of Understanding between the Texas Historical Commission (THC) and TxDOT, this letter continues consultation for the proposed undertaking.

The proposed project would construct the State Highway (SH) 99 outer loop; between Interstate Highway (IH) 45 and United States Highway (US) 59, in Harris and Montgomery Counties. The proposed roadway would be a four-lane, controlled-access toll road with intermittent frontage roads located within a 400-foot (ft) wide right-of-way (ROW). The proposed project includes bridges over drainages and grade separations at various intersections. The proposed project is approximately 13.6 miles in length. Approximately 781 acres of new right-of-way (ROW) would be acquired; all work would remain within the proposed 400-ft wide corridor. The area of potential effect is defined as the project length, the proposed ROW and any existing ROW that may be utilized, and the depth of construction impacts, no more than 75-ft in depth. This additional consultation is the result of a reevaluation of the proposed project for inadvertent discrepancies with previously surveyed areas within the APE and attempting to rectify these discrepancies before the proposed ROW that was denied right-of-entry (ROE) is acquired and will soon need an archeological survey as well.

PBS&J, a consultant for the Houston District, conducted a background review and an intensive survey under Permit #5311 for the proposed project. Four previously recorded archeological historic properties were identified within the APE of this proposed segment, 41MQ197, 41MQ198, 41MQ199, and 41MQ225; three of these are prehistoric occupation sites and one (41MQ225) a historic-age farmstead and homestead. The Geologic Atlas of Texas, Houston Sheet (Bureau of Economic Geology: 1982) indicates that the proposed project APE is within an area mapped as Pleistocene Lissie Formations. The Lissie surface has negligible potential to contain artifacts dating from demonstrated, culturally relevant periods. The Soil Survey of Harris County, Texas (USDA-SCS: 1976) indicates that the proposed project APE crosses areas mapped as the Katy-Aris soil association, Clodine-Addicks-Gessner soil association, Wockley-Gessner soil association, and the Segno-Hockley soil association.

DPD

The Houston Potential Archeological Liability Map (PALM) indicates the proposed project crosses the following PALM map units. PALM Unit #4, recommending no archeological survey needed. PALM Unit #3a, recommending deep mechanical trenching, PALM Unit #2a recommending surface survey of intact pimple mounds only. PALM Unit #2 recommending an archeological surface survey only. PALM Unit # 1, recommending an intensive archeological survey with shovel-testing and mechanical trenching, if deep impacts are anticipated.

PBS&J surveyed approximately 206.4 acres during this survey. A total of 161 shovel-tests were excavated during the pedestrian survey. No unrecorded cultural resources were encountered during the survey. Recorded sites 41MQ197-198 and 41MQ225 were all reexamined to assess integrity, archeological materials were encountered at all sites. PBS&J recommends that no further archeological work is needed within the portion of the APE that has had the inventory completed. They further recommend that Site 41MQ197 is the only site that warrants eligibility testing for possible listing on the National Register of Historic Places or as a State Archeological Landmark.

Please find attached for your review and comments the PBS&J draft report; *An Cultural Survey of the Preferred Alignment for Segment G of the Grand Parkway Project, Harris County, Texas*. TxDOT recommends that the report is satisfactory and acceptable; minor comments have already been submitted to PBS&J. PBS&J has already responded to TxDOT's comments and are making the appropriate changes for the final report. TxDOT requests your concurrence that; 1) the areas surveyed by this 2009 survey are complete and do not warrant any additional archeological investigation, 2) Site 41MQ197 warrants eligibility testing if avoidance is not feasible, and 3) the remainder of the proposed project APE that has been denied ROE still warrants archeological investigation to complete the inventory. TxDOT further recommends that the remainder of the archeological inventory be deferred to allow NEPA processing and property acquisition to proceed; once the property has been acquired, TxDOT shall be obligated to complete the inventory. If you have no objections to the above request and recommendation, and have no comments on this report and find it acceptable, please sign below to indicate your concurrence and stamp the draft cover as acceptable.

Thank you for your consideration in this matter. If you have any questions or further need of assistance, please contact Allen Bettis of the TxDOT Archeological Studies Program at (512) 416-2747.

Sincerely,

Allen C. Bettis Jr.
Archeological Studies Program
Environmental Affairs Division

cc w/o attachments: Karla Cordova – PBS&J – Houston
Susan Theiss – Houston District APD
ACB DGN PA File

Concurrence: 7-23-09 Date:
for F. Lawerence Oaks, State Historic Preservation Officer

Document No. 090126
PBS&J Job No. 100008903

A Cultural Resources Survey of the Recommended Alignment for Segment G of the Grand Parkway Project Harris and Montgomery Counties, Texas

Texas Antiquities Permit No. 5311
CSJ Nos.: 3510-06-903, 3510-06-001, and 3510-07-901

Prepared for:

Texas Department of Transportation
7721 Washington
Houston, Texas 77251

DRAFT REPORT ACCEPTABLE
Please submit 20 final report copies
by
for F. Lawerence Oaks
State Historic Preservation Officer
Date 7-23-09
Track#

Prepared by:

PBS&J
1250 Wood Branch Park Drive
Suite 300
Houston, Texas 77079

Principal Investigator:
Karla J. Córdova

Report Author:
Darren Schubert
Philip Bishop

July 2009

United States Department of Agriculture
NRCS
Natural Resources Conservation Service

101 S. Main Street
Temple, TX 76501-6624
Phone: 254-742-9826
FAX: 254-742-9859

February 22, 2012

Baker, Inc.
5825 North Sam Houston Parkway West
Suite 250
Houston, Texas 77086

Attention: Mr. Kaiser

Subject: LNU-Farmland Protection
Proposed SH 99, Grand Parkway, Segment G Corridor
Harris and Montgomery Counties, Texas

We have reviewed the information provided concerning the proposed project in Harris and Montgomery Counties, Texas as outlined in your email dated February 14, 2012. This review is part of the National Environmental Policy Act (NEPA) evaluation for FHWA and TXDOT. We have evaluated the proposed site as required by the Farmland Protection Policy Act (FPPA).

There are Important Farmland Soils in the subject area. We have developed a rating for the soils of this preferred corridor and completed Parts II, IV, and V of the Farmland Conversion Impact Rating for Corridor Type Projects (form CPA-106). The relative value of farmland in Part V should be used in your calculation for Part VII.

To meet reporting requirements of section 1546 of the Act, 7 U.S.C 4207, and for data collection purposes, after your agency has made a final decision on a project in which one or more of the alternative sites contain farmland subject to the FPPA, NRCS is requesting a return copy of the Form CPA-106, which indicates the final decision.

We have attached the completed form. If you have any questions, please contact me at (254) 742-9855, Fax (254) 742-9859.

Sincerely,

Wayne Gabriel
NRCS Soil Scientist

Attachment

U.S. DEPARTMENT OF AGRICULTURE
Natural Resources Conservation Service

NRCS-CPA-106
(Rev. 1-91)

FARMLAND CONVERSION IMPACT RATING FOR CORRIDOR TYPE PROJECTS

PART I *(To be completed by Federal Agency)*	3. Date of Land Evaluation Request 2/14/12	4. Sheet 1 of _____
1. Name of Project **Grand Parkway Segment G**	5. Federal Agency Involved **FHWA/TTA/TxDOT**	
2. Type of Project **Highway Transportation**	6. County and State **Harris & Montgomery Counties, Texas**	
PART II *(To be completed by NRCS)*	1. Date Request Received by NRCS 2-15-2012	2. Person Completing Form Wayne J. Gabriel
3. Does the corridor contain prime, unique statewide or local important farmland? (If no, the FPPA does not apply - Do not complete additional parts of this form). YES ☒ NO ☐		4. Acres Irrigated 12,470 / Average Farm Size 200
5. Major Crop(s) Grain Sorghum, Improved Bermuda	6. Farmable Land in Government Jurisdiction Acres: 663068 % 37	7. Amount of Farmland As Defined in FPPA Acres: 1346898 % 76
8. Name Of Land Evaluation System Used LESA	9. Name of Local Site Assessment System NA	10. Date Land Evaluation Returned by NRCS 2-22-2012

PART III *(To be completed by Federal Agency)*	Alternative Corridor For Segment _____			
	Corridor A	Corridor B	Corridor C	Corridor D
A. Total Acres To Be Converted Directly	843			
B. Total Acres To Be Converted Indirectly, Or To Receive Services				
C. Total Acres In Corridor	843	0	0	0
PART IV *(To be completed by NRCS) Land Evaluation Information*				
A. Total Acres Prime And Unique Farmland	178.9			
B. Total Acres Statewide And Local Important Farmland	0			
C. Percentage Of Farmland In County Or Local Govt. Unit To Be Converted	8.027%			
D. Percentage Of Farmland In Govt. Jurisdiction With Same Or Higher Relative Value	38%			
PART V *(To be completed by NRCS) Land Evaluation Information Criterion Relative value of Farmland to Be Serviced or Converted (Scale of 0 - 100 Points)*	67			

PART VI *(To be completed by Federal Agency) Corridor Assessment Criteria (These criteria are explained in 7 CFR 658.5(c))*	Maximum Points				
1. Area in Nonurban Use	15	5			
2. Perimeter in Nonurban Use	10	5			
3. Percent Of Corridor Being Farmed	20	1			
4. Protection Provided By State And Local Government	20	0			
5. Size of Present Farm Unit Compared To Average	10	2			
6. Creation Of Nonfarmable Farmland	25	0			
7. Availability Of Farm Support Services	5	2			
8. On-Farm Investments	20	8			
9. Effects Of Conversion On Farm Support Services	25	10			
10. Compatibility With Existing Agricultural Use	10	5			
TOTAL CORRIDOR ASSESSMENT POINTS	160	38	0	0	0
PART VII *(To be completed by Federal Agency)*					
Relative Value Of Farmland (From Part V)	100				
Total Corridor Assessment (From Part VI above or a local site assessment)	160	38	0	0	0
TOTAL POINTS *(Total of above 2 lines)*	260	38	0	0	0

1. Corridor Selected:	2. Total Acres of Farmlands to be Converted by Project:	3. Date Of Selection:	4. Was A Local Site Assessment Used? YES ☐ NO ☑

5. Reason For Selection:

Signature of Person Completing this Part: | DATE

NOTE: Complete a form for each segment with more than one Alternate Corridor

APPENDIX C

WETLAND DELINEATION MAPS

(From 2012 Segment G Wetland Delineation Report)

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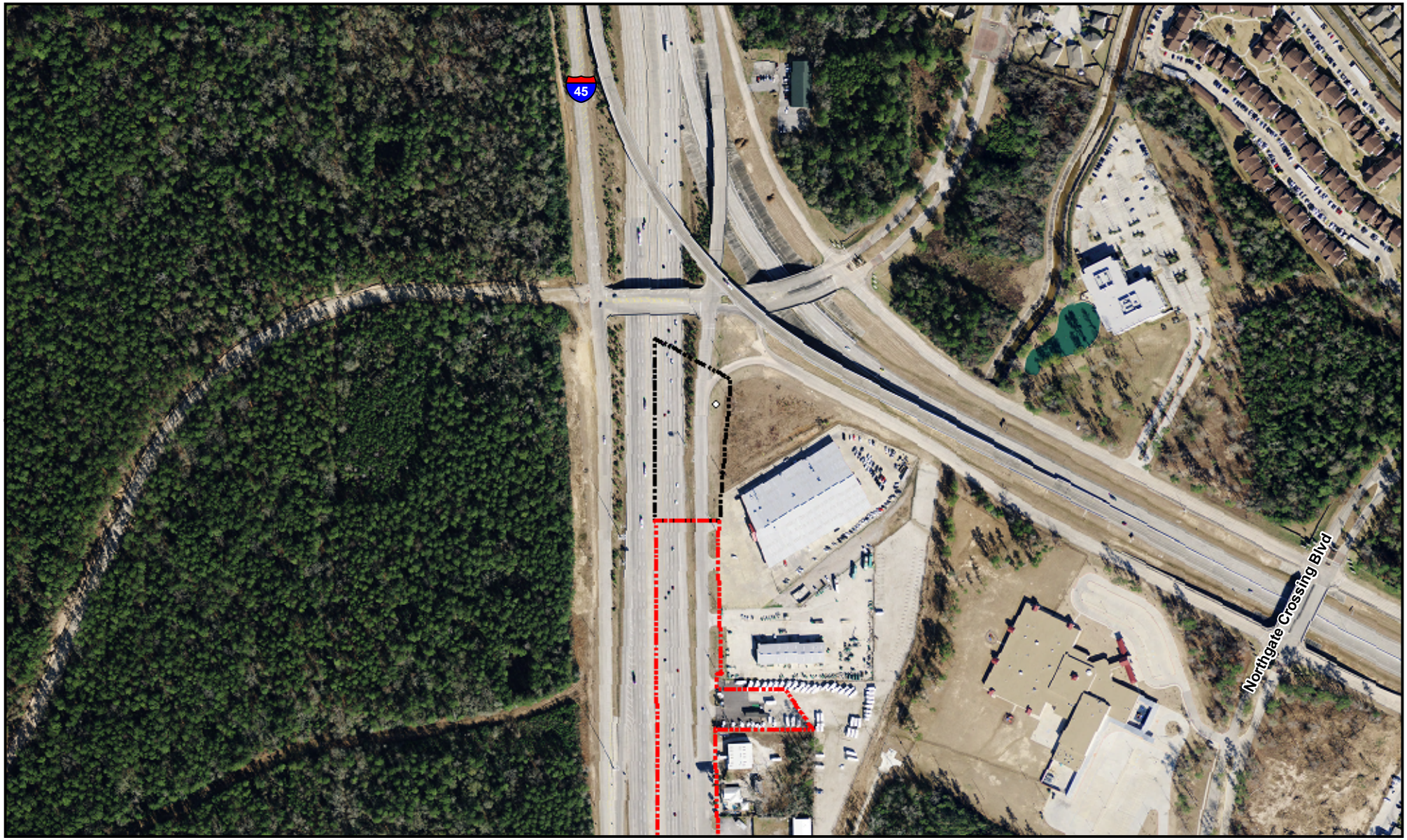

Legend

- Proposed ROW
- Touchdown Easement
- Outfall Channel
- Floodplain Fill Mitigation Basin
- Stormwater Detention Basin
- Temporary Construction Easement (TCE)
- Data Point
- Ditch
- Pond
- Waters of the U.S.
- Wetland

H-GAC 2010 Aerials

Exhibit 2:
SH 99, Grand Parkway
Segment G
Wetland Delineation Map

Page 1 of 31

SH 99, The Grand Parkway
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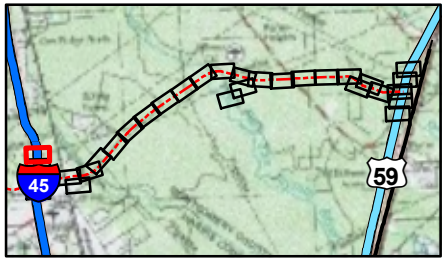

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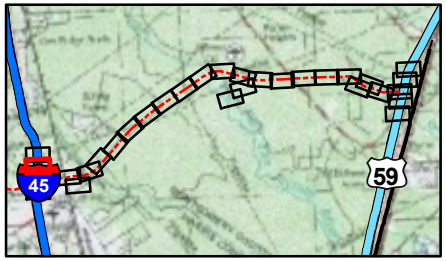

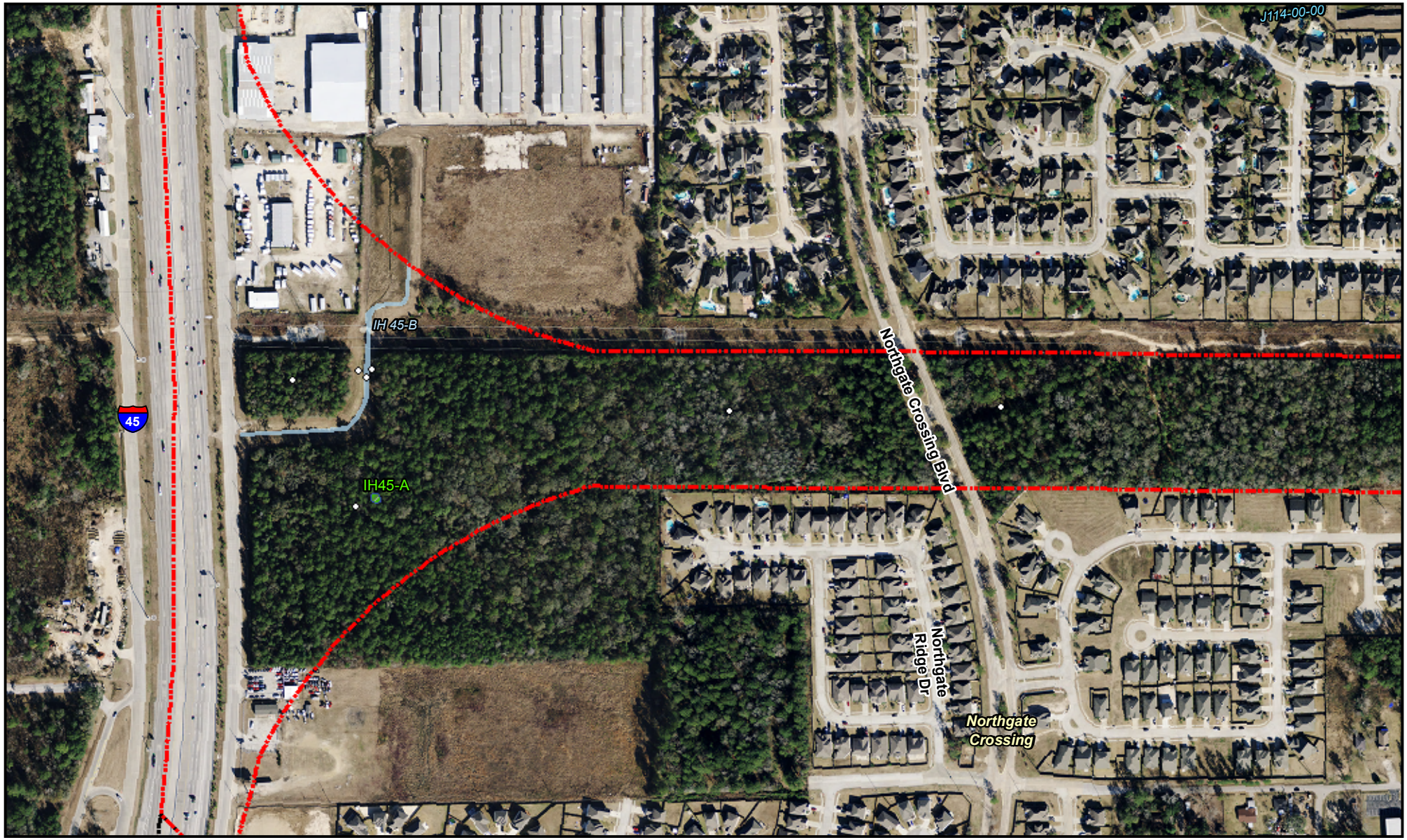

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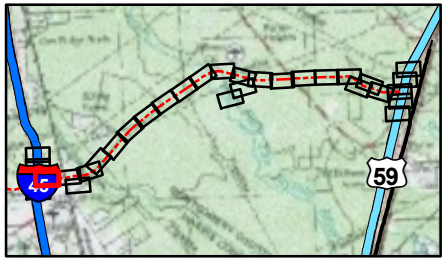

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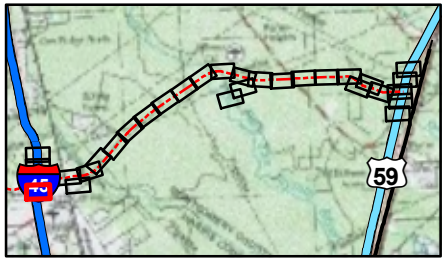

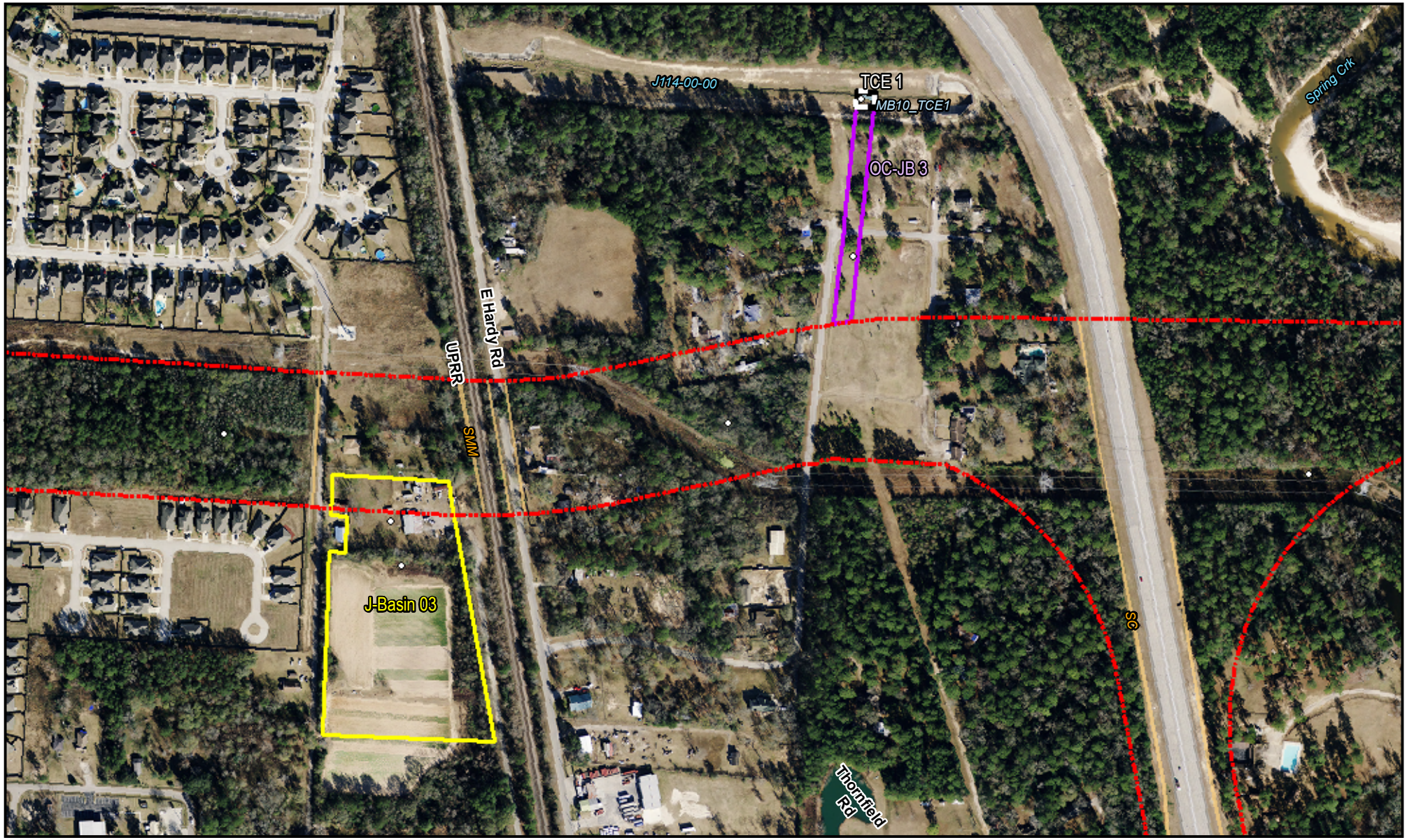

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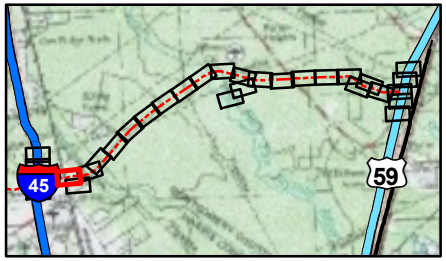

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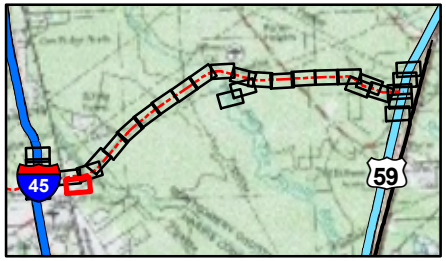

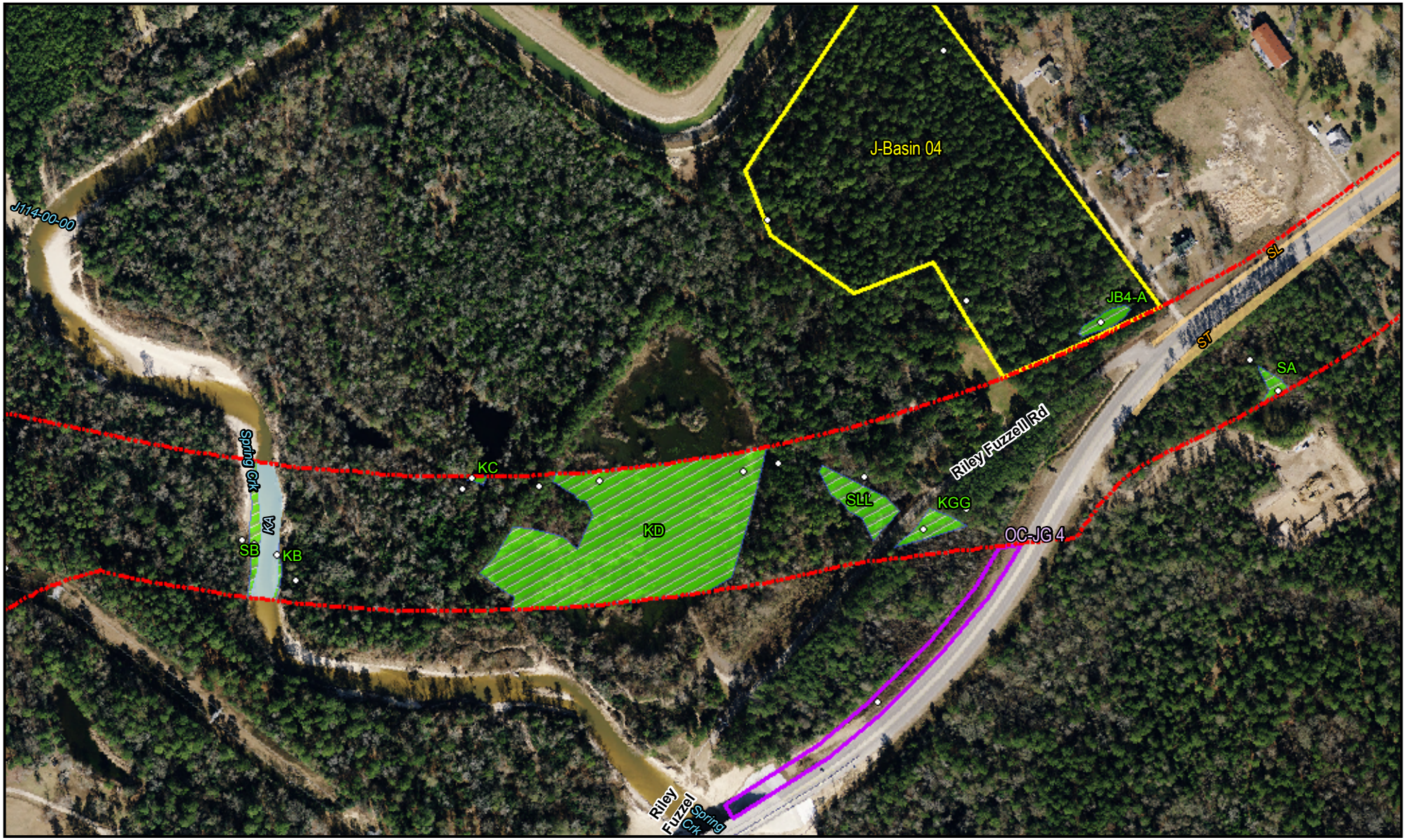

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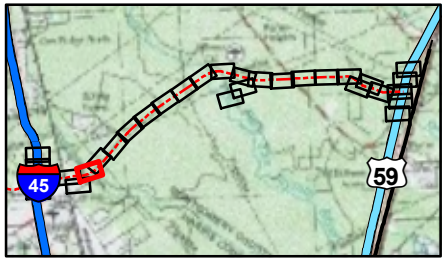

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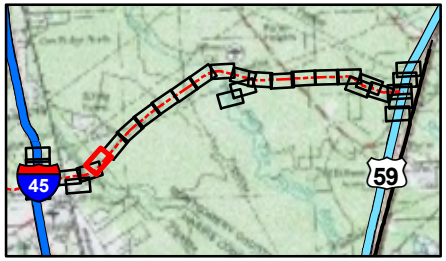

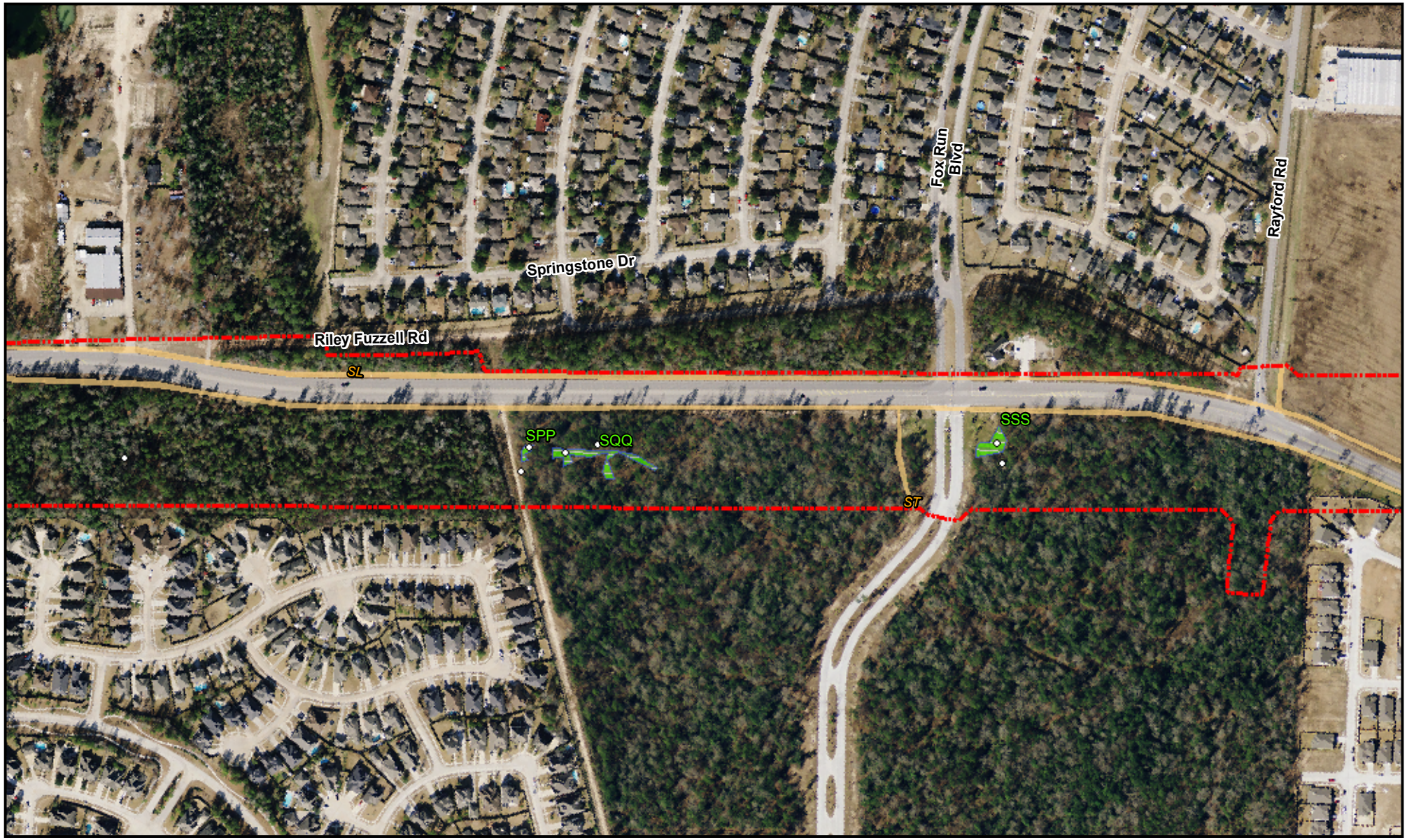

Legend

- Proposed ROW
- Touchdown Easement
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H-GAC 2010 Aerials

Exhibit 2:
SH 99, Grand Parkway
Segment G
Wetland Delineation Map

SH 99, The Grand Parkway
Segment G

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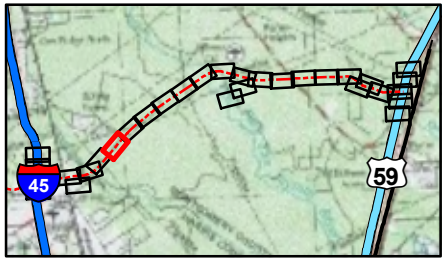

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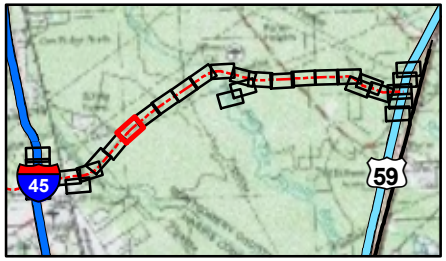

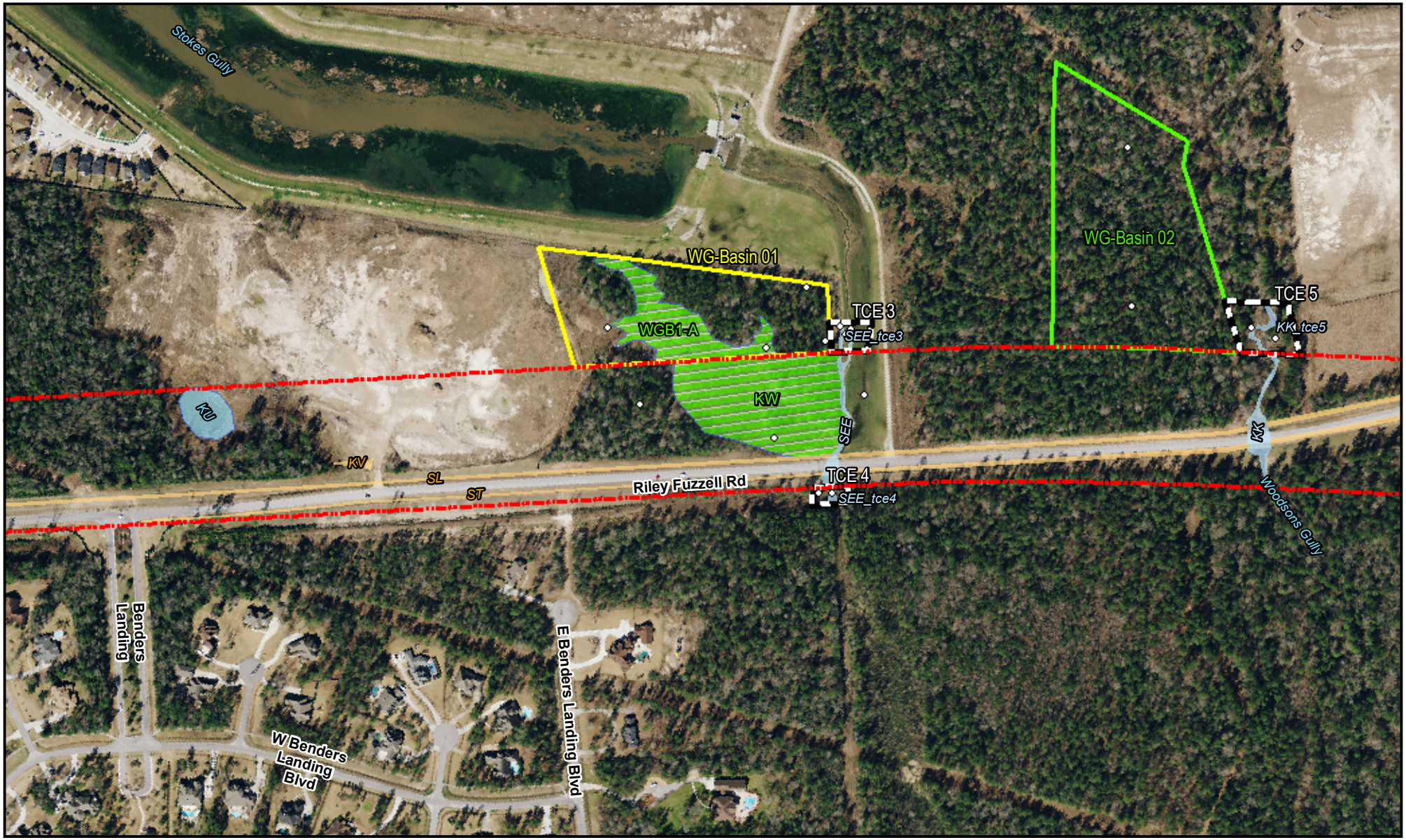

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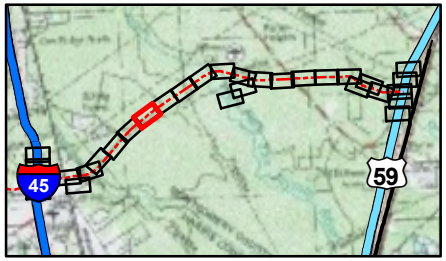

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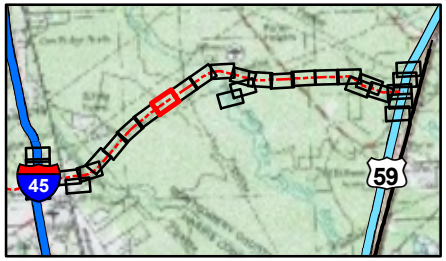

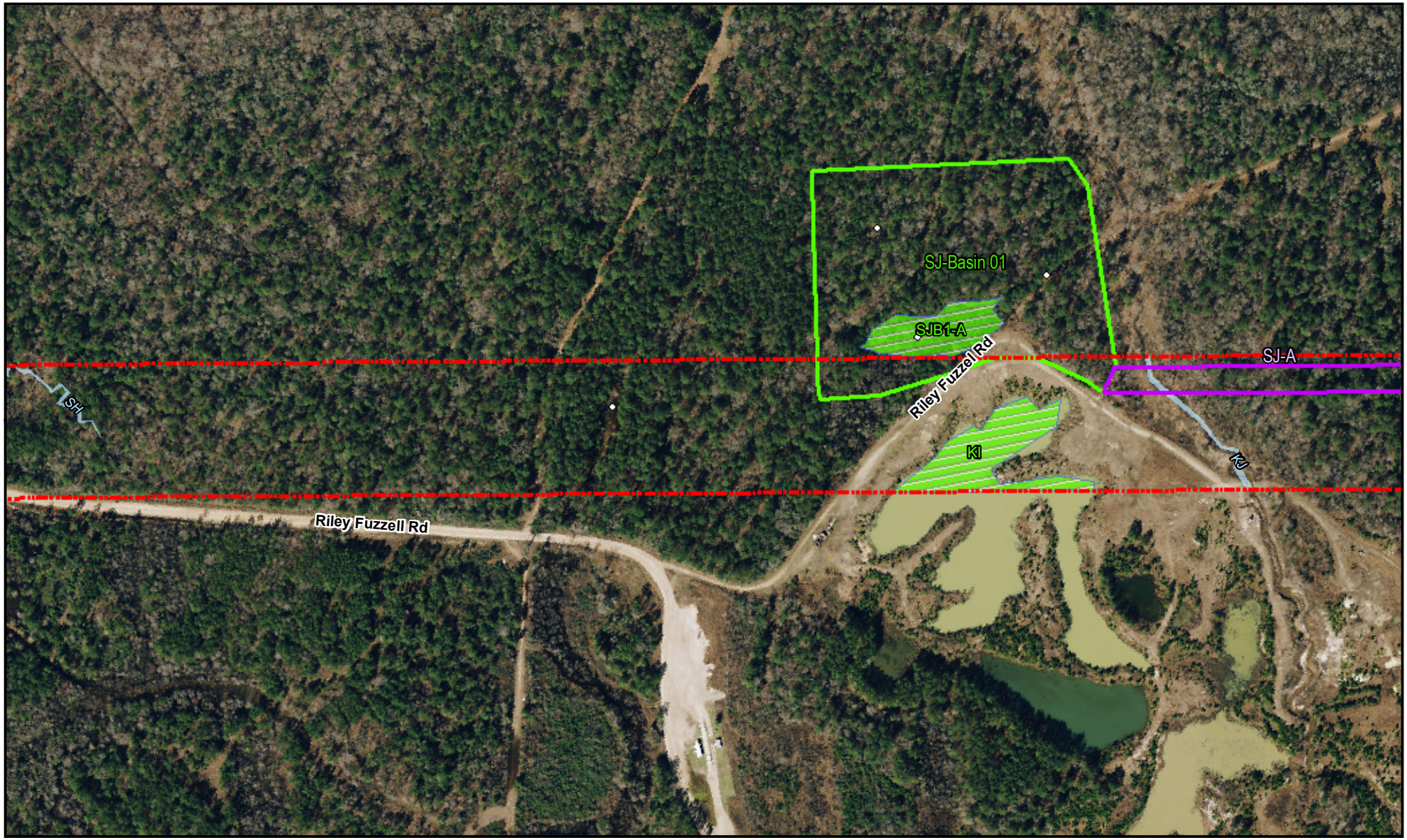

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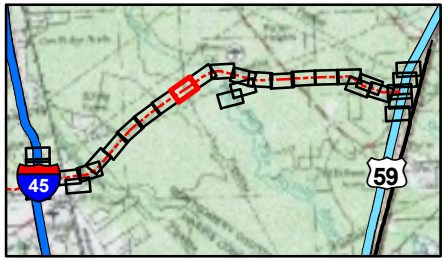

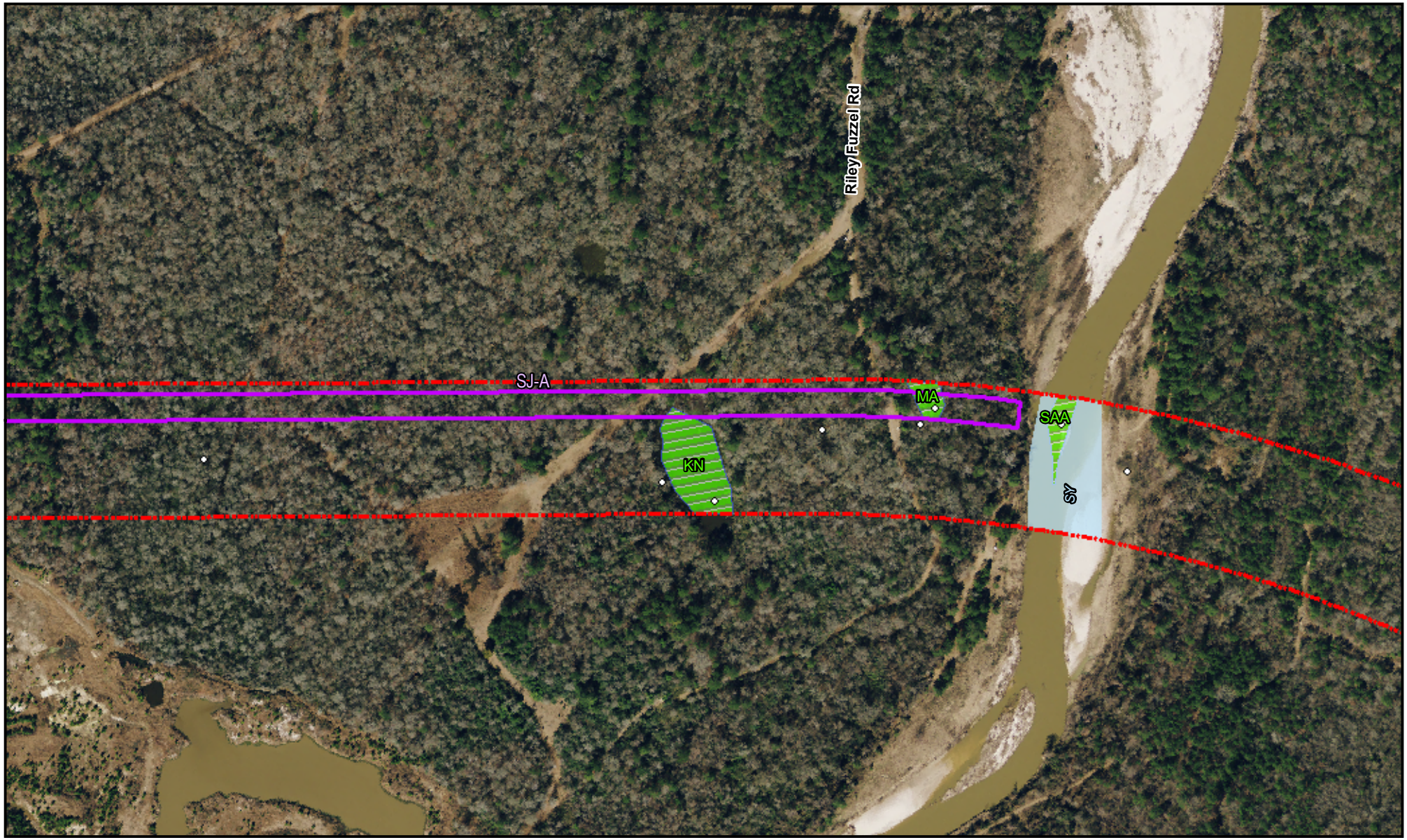

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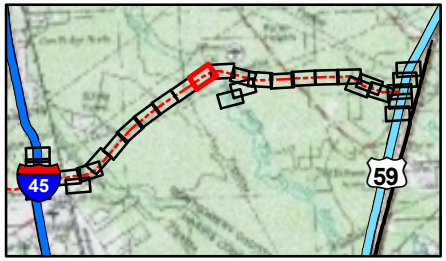

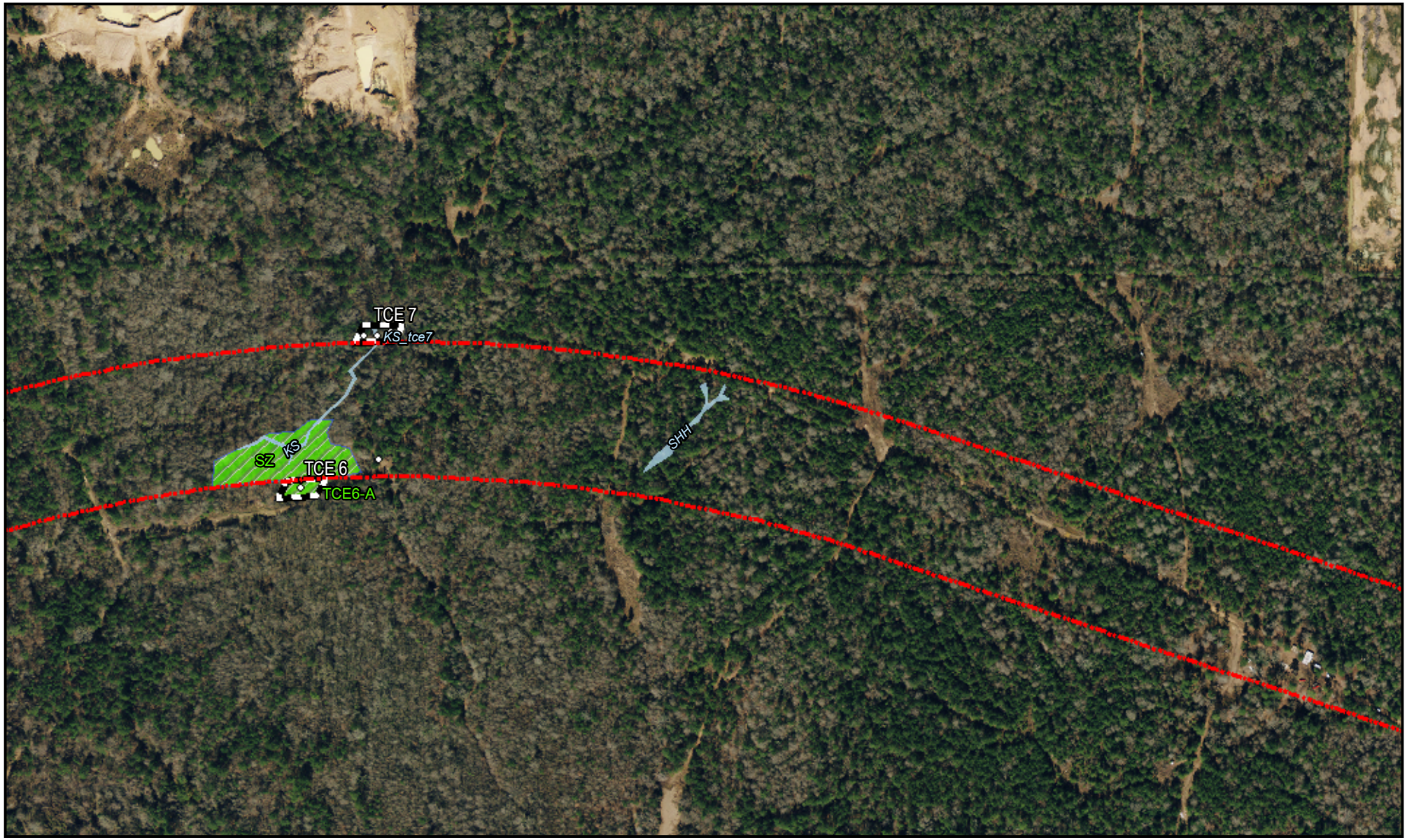

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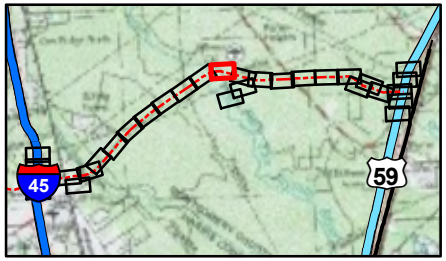

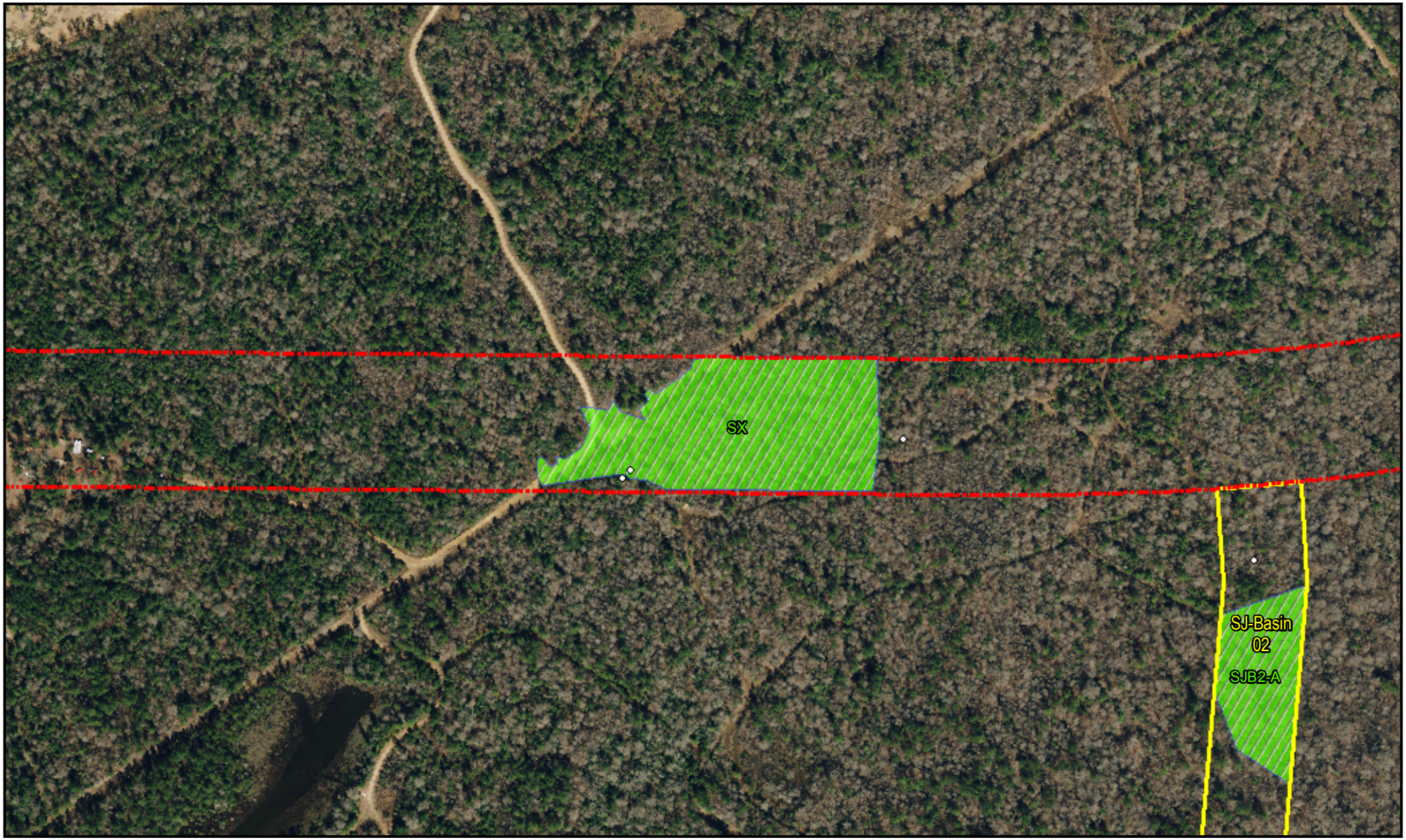

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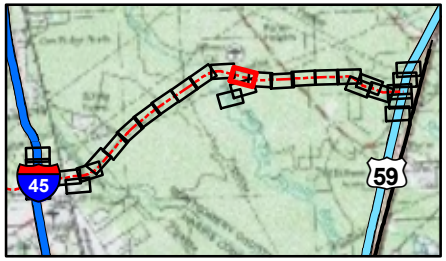

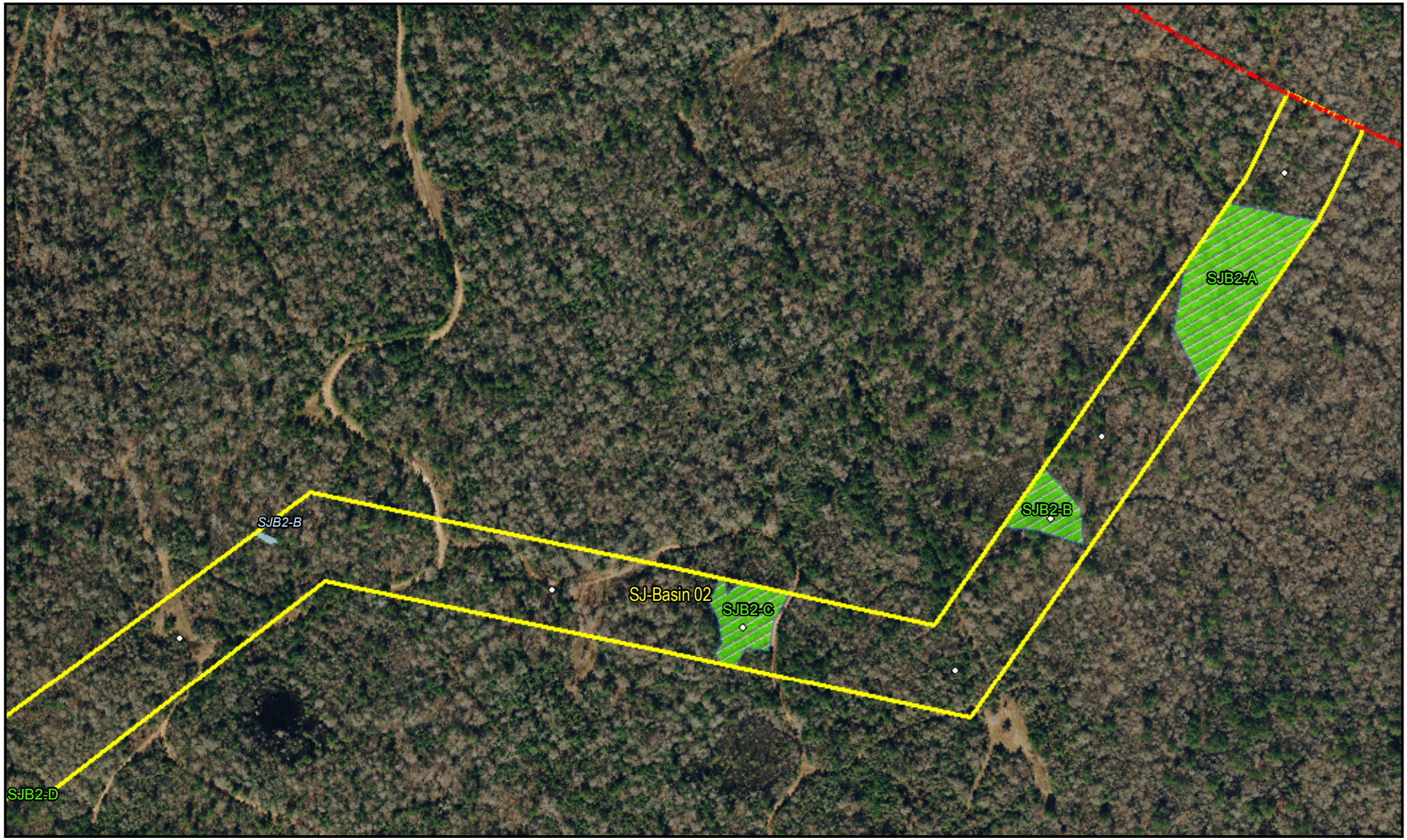

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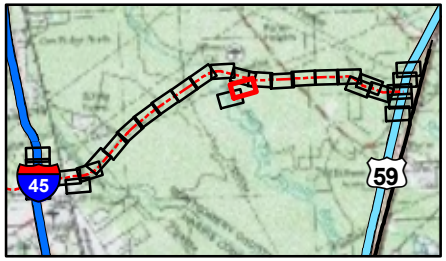

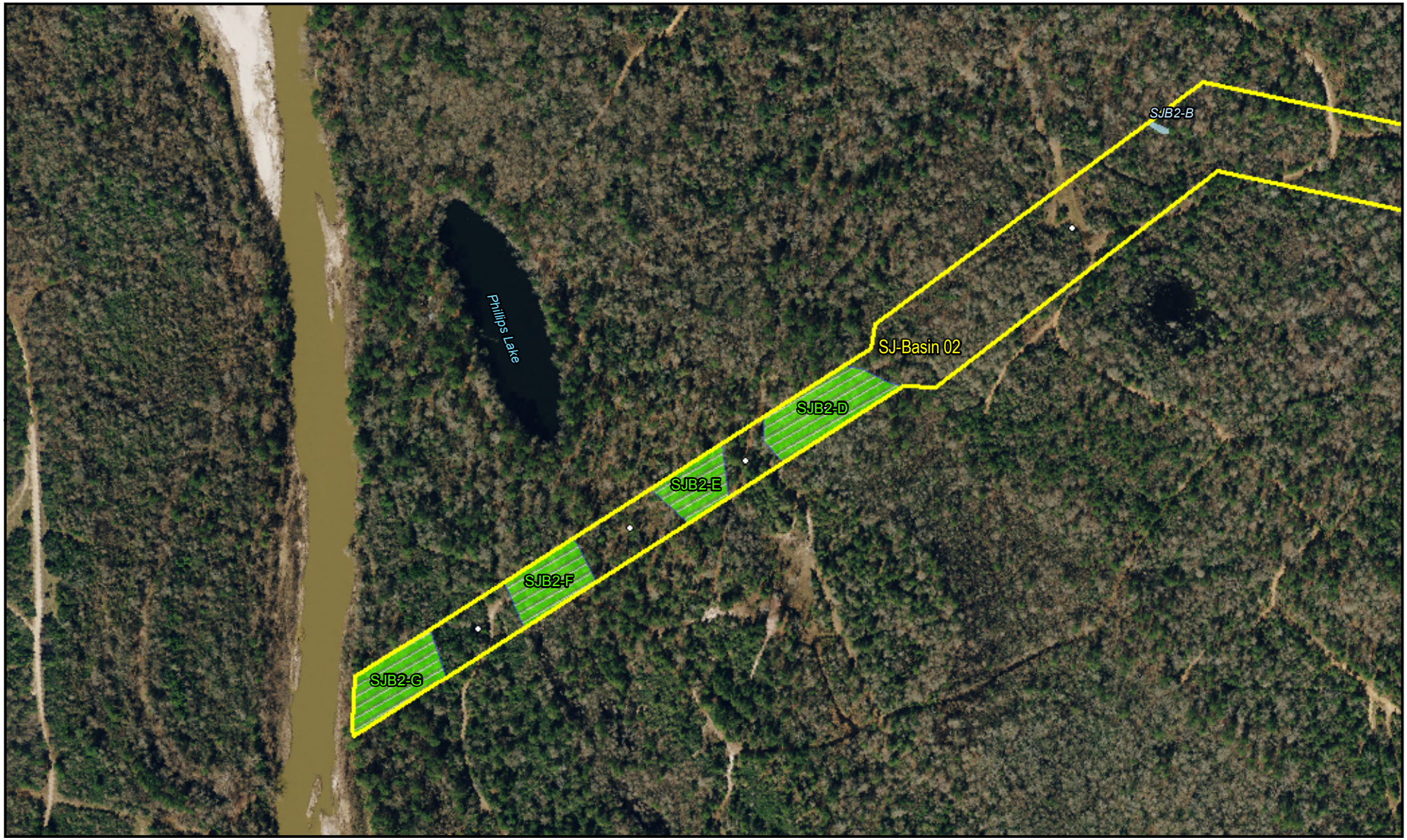

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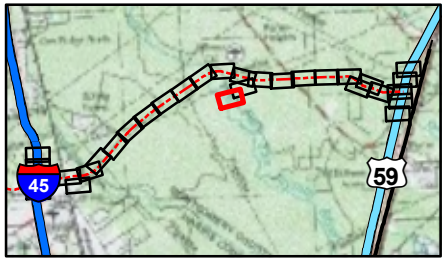

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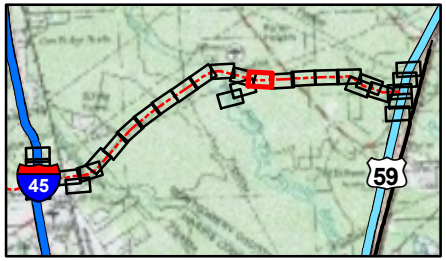

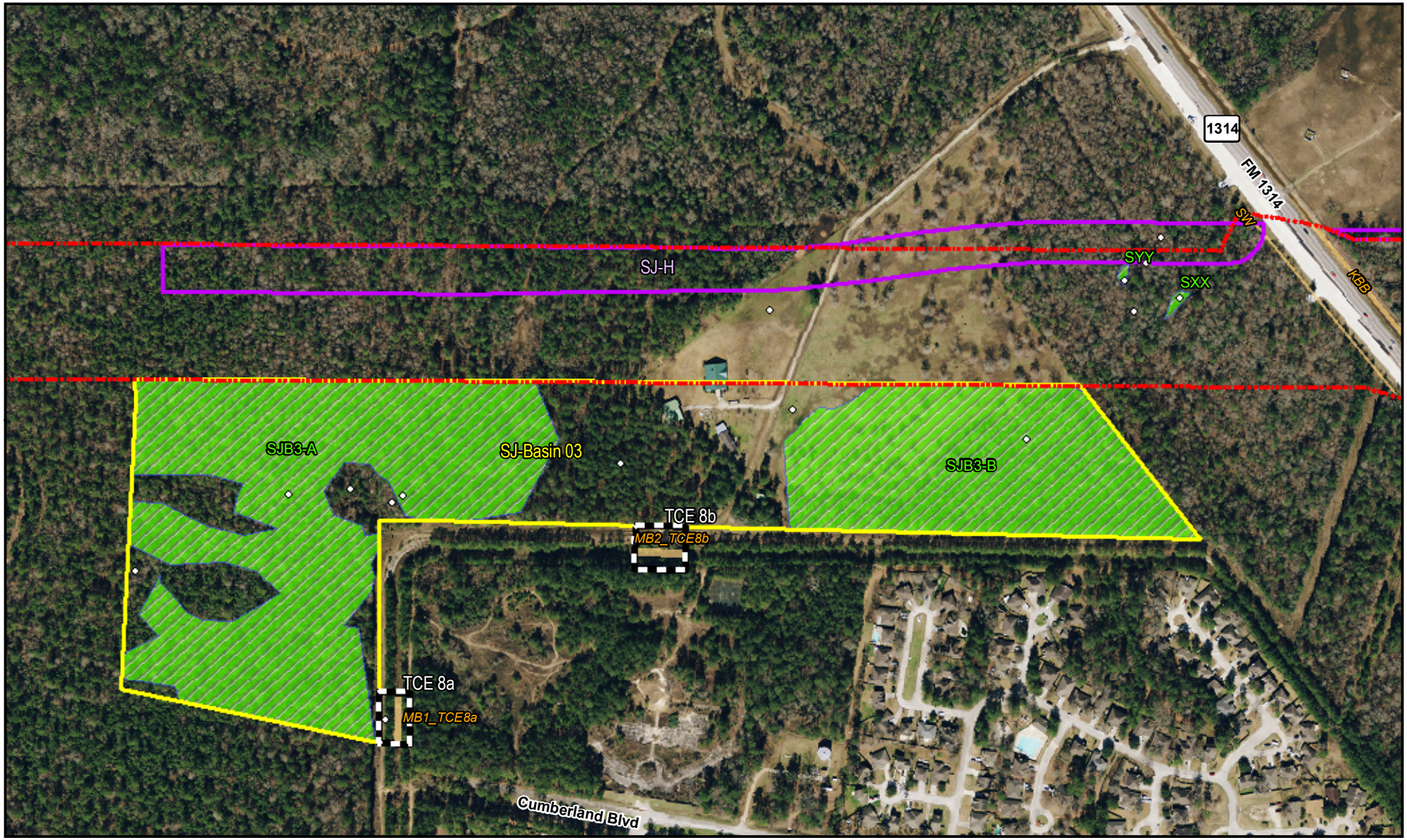

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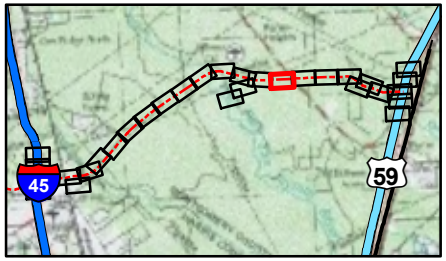

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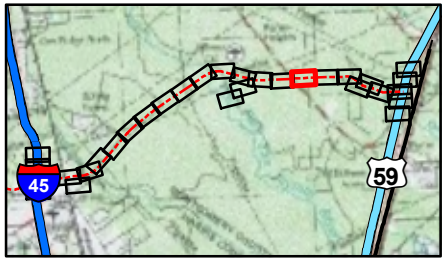

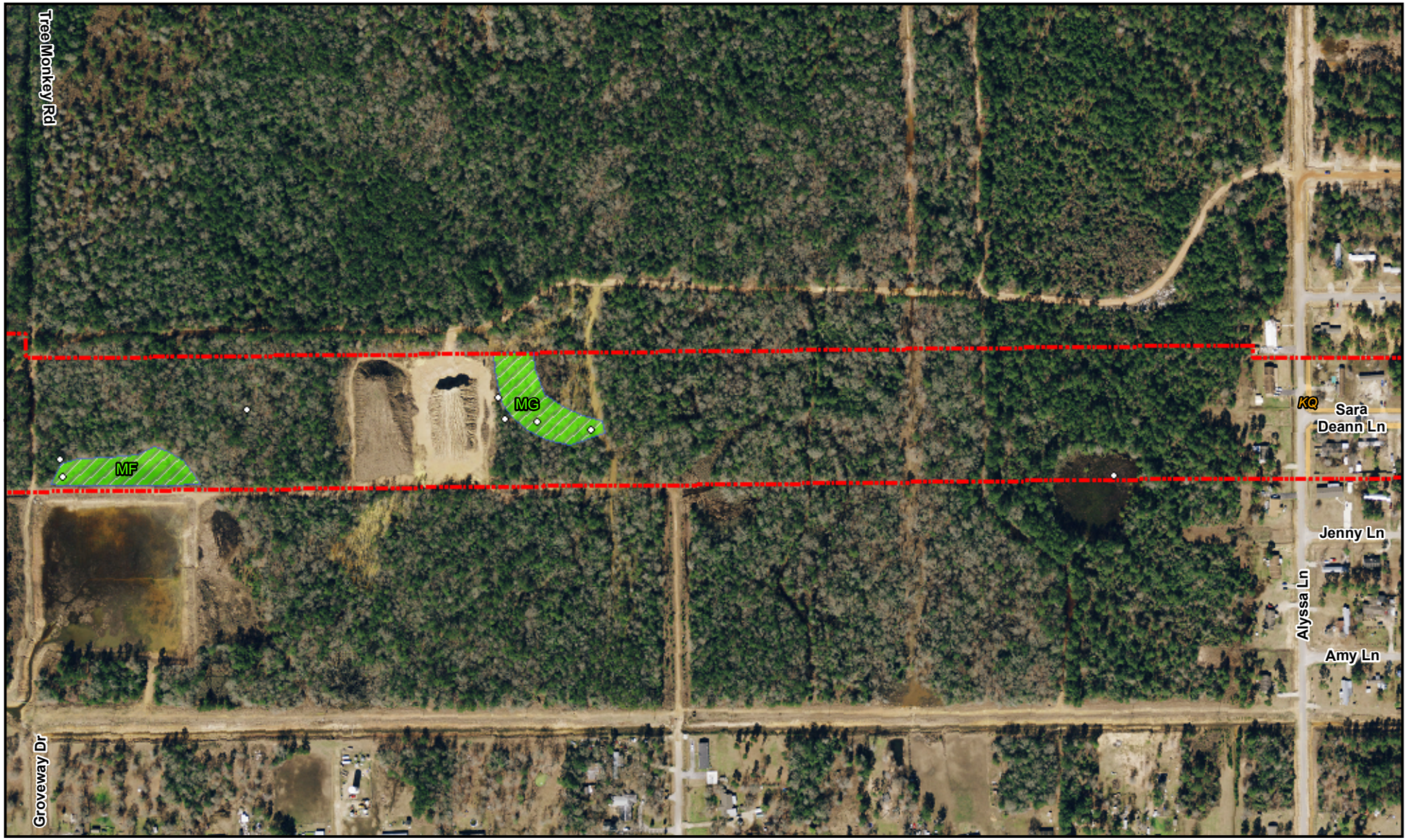

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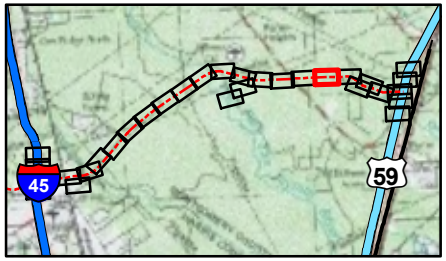

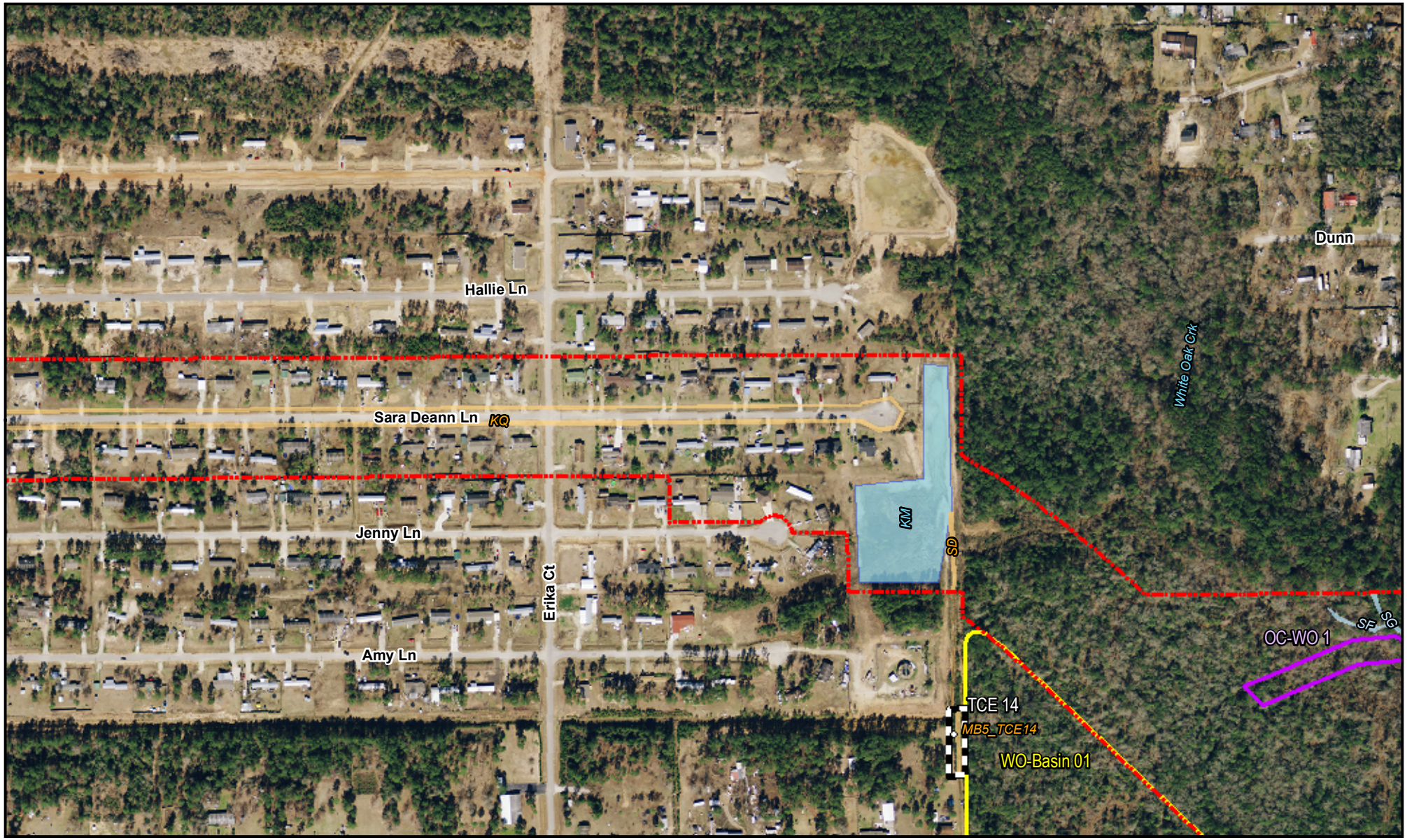

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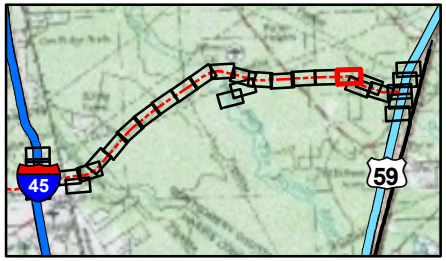

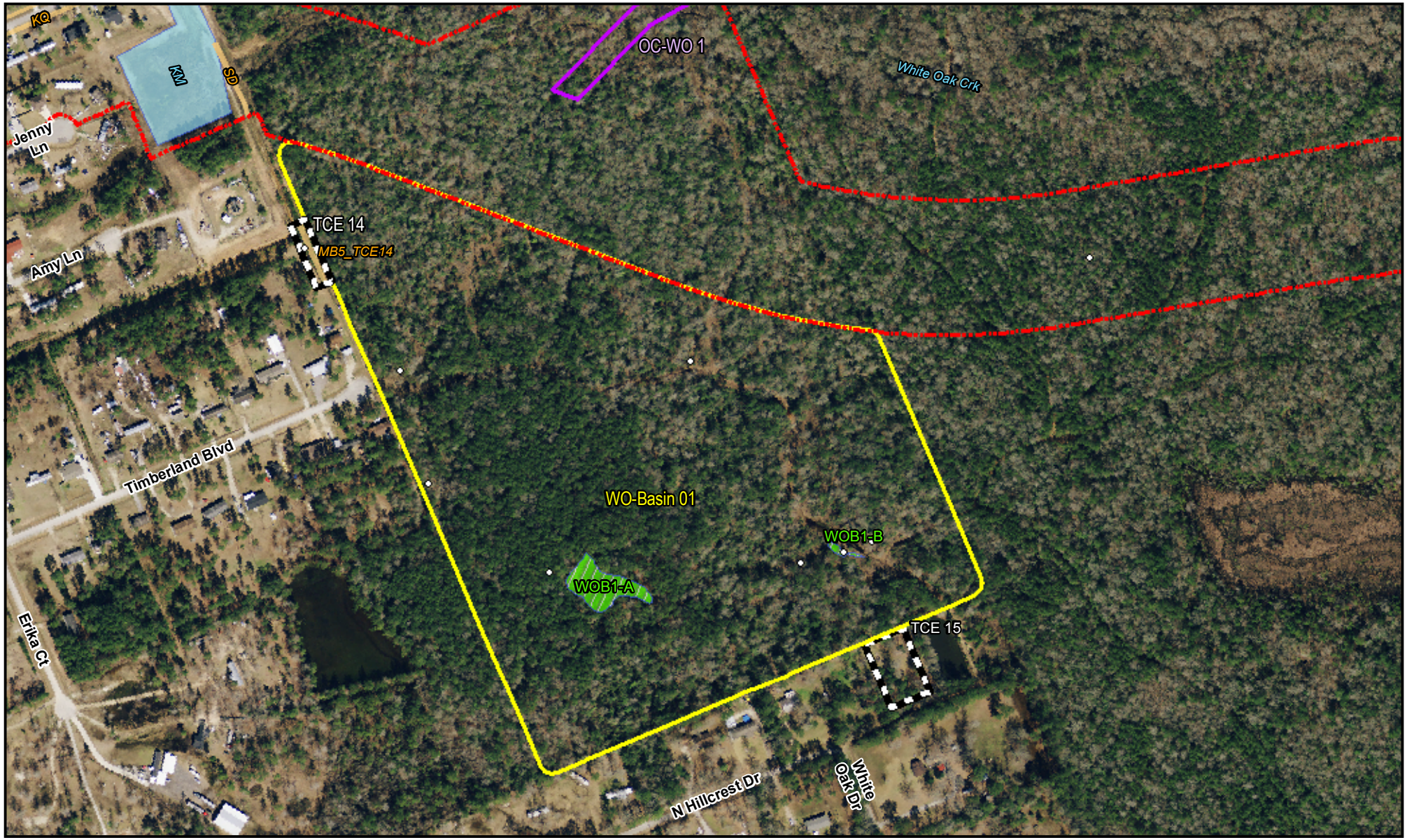

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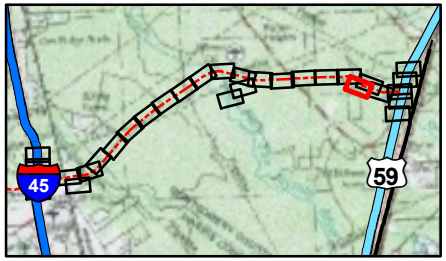

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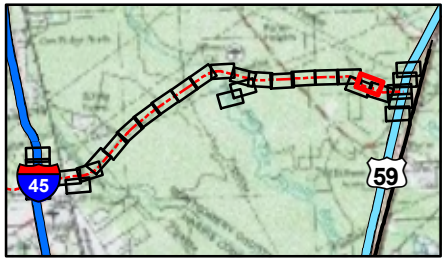

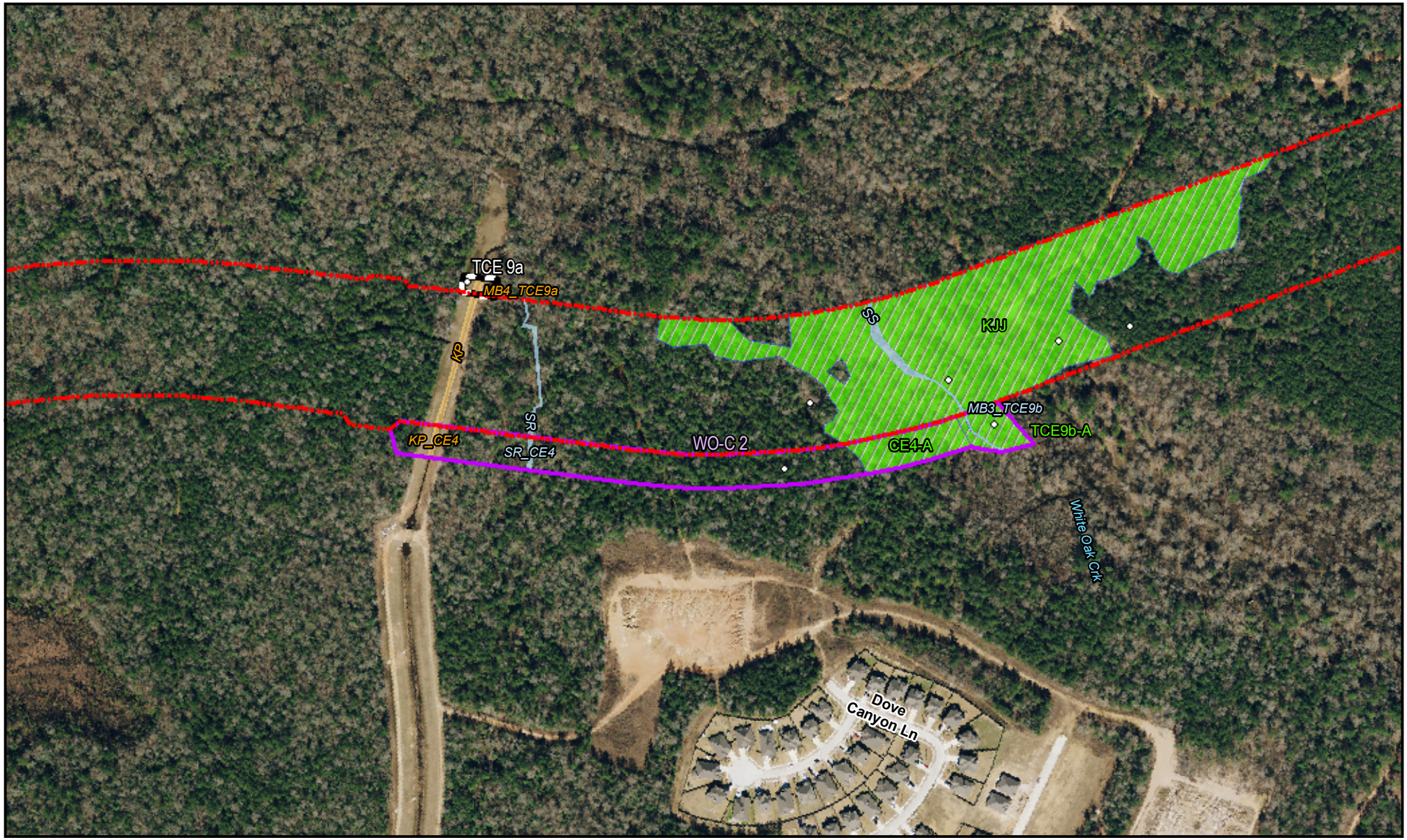

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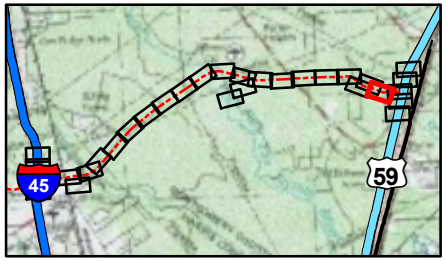

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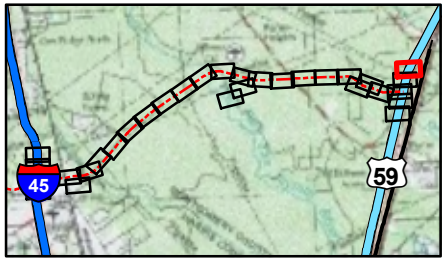

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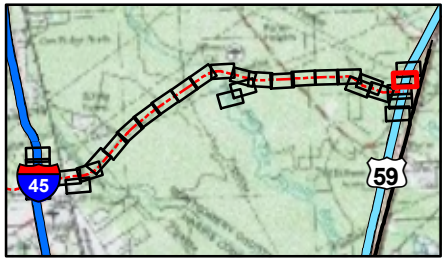

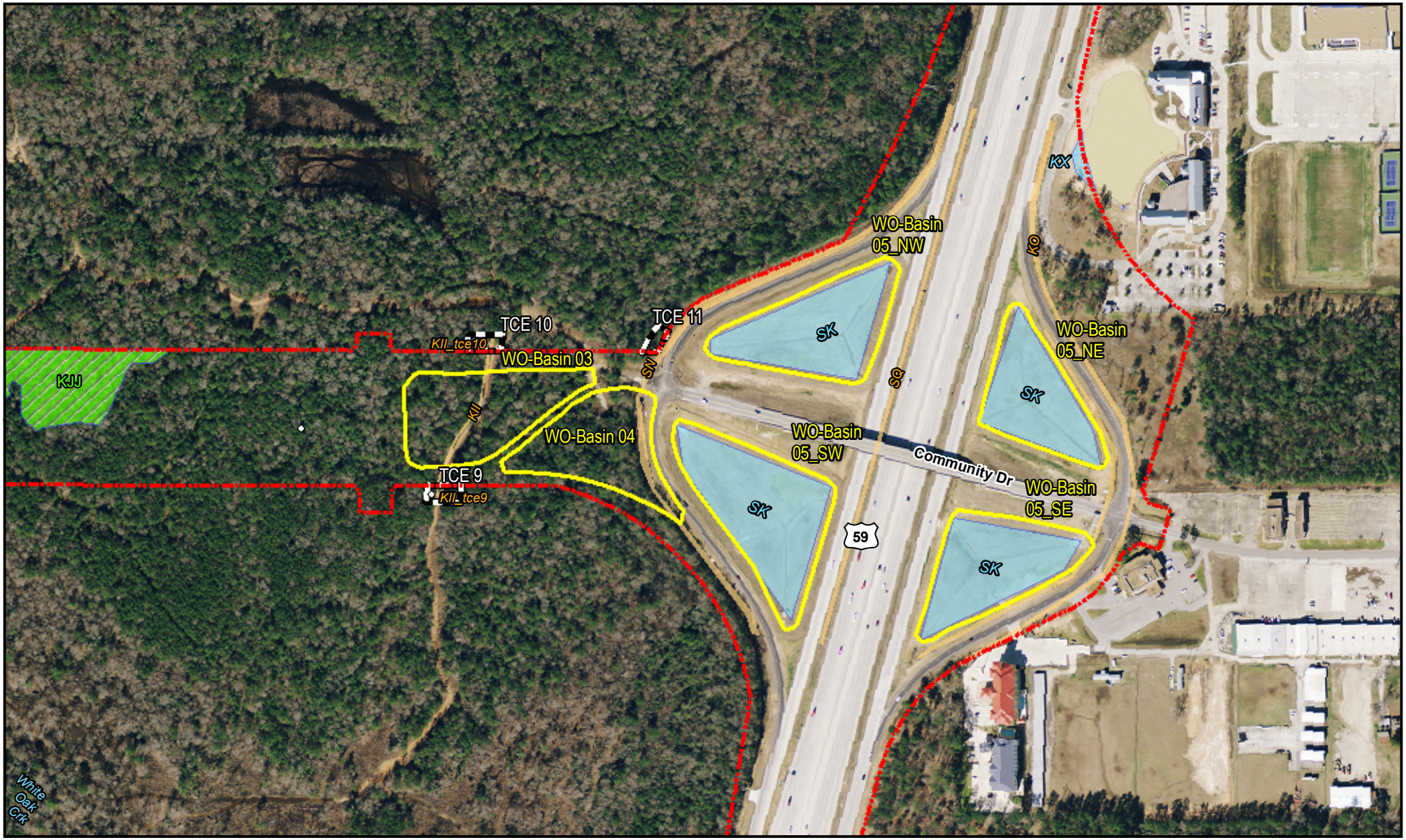

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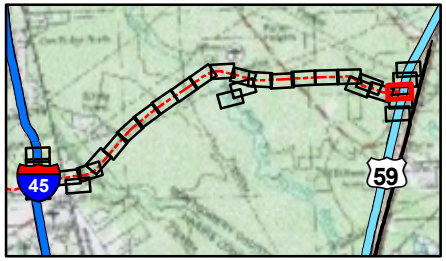

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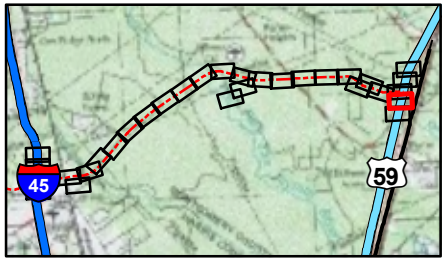

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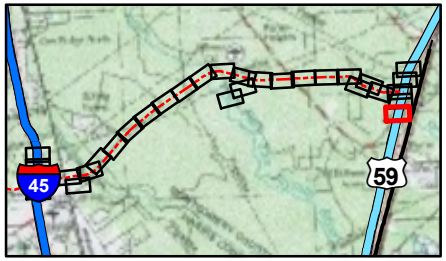

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APPENDIX D

REGIONAL CUMULATIVE AND INDIRECT EFFECTS OF TOLL FACILITIES

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REGIONAL TOLL ANALYSIS SUMMARY FOR INCLUSION IN HOUSTON AREA TOLL ROAD ENVIRONMENTAL DOCUMENTS

April 9, 2009

Revised July 24, 2009
Revised May 14, 2010
Revised July 13, 2010
Revised August 13, 2010
Revised February 8, 2012
Revised March 9, 2012
Revised March 19, 2012

Regional Indirect Effects of Tolled Facilities and Managed Lanes

The freeway and toll road system is a major component of the Houston-Galveston regional roadway network. Currently, the freeway/toll road system represents nearly 19 percent of regional lane miles. The 2009 regional roadway network consists of nearly 24,571 total lane miles. This includes nearly 658 tolled lane miles and 289 managed lane miles (Table 1). By 2035, these numbers are expected to increase to 27,997 lane miles of which 1,584 are tolled lane miles and 425 are managed lane miles.

Table 1: Regional Roadway Network (lane miles)

	Freeway	Toll Roads	Managed Lanes	Arterial	Total Lane Miles
2009 Network	3,669	658	289	19,955	24,571
2035 Network	3,862	1,584	425	22,126	27,997

Note: Table data is based on the 2035 RTP Update conducted by H-GAC in 2011.

Source: GP-GEC 2012.

In addition, the transit system has 485,000 daily passenger boardings and is expected to increase to nearly 725,000 by 2035. This increase will be attributed to:

- Expansion of transit services (increased bus and rail transit services),
- New transit modes (commuter rail transit and signature express bus service),
- Transit connectivity to multiple employment centers, and
- Coordination of transit services among regional public transportation providers.

METRO's 2035 Long Range Plan recommends significant expansion of the current transit system and includes a network of integrated high capacity transit facilities on major travel corridors. This plan also identifies service expansions beyond the METRO service area. New improvements scheduled for implementation through the year 2035 include high occupancy tolls, a new intermodal terminal, park-n-ride facilities, and several new high capacity transit corridors throughout the region. Additional key elements of the plan include:

- 89 miles of fixed guideway transit – Light Rail Transit (LRT)
- 84 miles of Commuter Rail Transit (CRT)
- 40 miles of Signature Bus (H-GAC 2009)

Figure 1 shows the future corridor and capital facilities projects in the 2035 METRO Long Range Plan.

Figure 1: 2035 Future Corridor and Capital Facilities Projects

Source: H-GAC 2009.

Conclusion

The expanding regional roadway network, including tolled facilities and managed lanes, along with the expanding transit network could have indirect and cumulative impacts. However, the impacts are not isolated to one location and would be better considered at the regional level. As a result, the consideration of the regional tolled roadway network is included in the cumulative impacts portion of this document.

Regional Cumulative Effects of Tolled Facilities and Managed Lanes

As the Metropolitan Planning Organization (MPO) for the Houston Galveston region, the Houston-Galveston Area Council (H-GAC) is charged with enabling and creating a regional perspective for transportation and mobility. The 2035 Regional Transportation Plan (RTP) provides the major strategies that would accommodate forecasted growth and preserve mobility in the region. In 2009, H-GAC prepared a planning-level assessment, *Regional Cumulative and Indirect Effects of Toll Facilities*[1] report, to determine how the 2035 RTP regional toll roadway network could indirectly or cumulatively affect socioeconomic and natural resources. Resources evaluated in this planning study included Environmental Justice (EJ) populations (low-income and/or minority populations as defined in Executive Order (EO) 12898[2]), air quality, water resources, vegetation, and land use. However, the majority of the H-GAC analysis focused on the potential impact of the regional toll roadway network on EJ populations in the region. The RTP and the *Regional Cumulative and Indirect Effects of Toll Facilities* report were updated in 2010 to consider the impact of changes in toll rates on EJ populations. The RTP was again updated in 2011 to address changes in the projects that are included in the 2035 roadway network. For more information on the resources evaluated and for more detail on the EJ analysis, please see the H-GAC *Regional Cumulative and Indirect Effects of Toll Facilities* report and the project technical files**.**

The indirect impact portion of this document identified the need to consider impacts of the expanding regional roadway network, specifically the expansion of toll facilities and managed lanes. An evaluation of the regional cumulative effects of these facilities was considered for potential impacts on Environmental Justice (EJ) populations, air quality, water quality, vegetation, and land use. The Resource Study Area (RSA) for this evaluation is the Houston-Galveston Area Council (H-GAC) eight county region.

Environmental Justice

Methodology

H-GAC conducted an evaluation to determine the effects of a regional tolled roadway network on Environmental Justice (EJ) populations. Initially, the evaluation identified those 2000 Census block groups which contained 51 percent or more of minority and/or low income populations. Once the EJ block groups were identified, EJ Traffic Analysis Zones (TAZs) were identified if 50 percent or more of its area was identified as an EJ population. Approximately 46 percent of the TAZs are EJ TAZs. In addition, they contain nearly a third of the regional population (Table 2). Figure 2 depicts the EJ TAZ for low income populations and/or minority populations.

[1] HGAC, Regional Cumulative and Indirect Effects of Toll Facilities April 2009.
[2] Executive Order 12898: Federal Action to Address Environmental Justice in Minority Populations and Low-Income Populations.

Table 2: Traffic Analysis Zone Data

	2000 Population	Percent of Regional Population	Number of TAZ	Percent of Total TAZ
Total EJ TAZ Population	1,634,500	31	1,383	46
Total Regional Population	5,214,051	100	3,000	100

Note: Table data is based on the original 2035 RTP but is consistent with the RTP Update conducted by H-GAC in 2011 as they did not change their growth scenarios for this update.

Source: H-GAC 2009.

Following the identification of the EJ TAZs, two regional roadway network scenarios were utilized, the 2035 RTP Build Scenario and the 2035 RTP Update No-Build Scenario, to conduct an analysis on travel time for persons within the EJ TAZs and non-EJ TAZs. The Build Scenario includes the new tolled lanes, managed lanes, and high occupancy tolled lanes (HOT) projects identified in the 2035 RTP Update (Figure 3). The No Build Scenario includes the current roadway network, the fiscally constrained 2035 RTP Update roadway network and the Katy Freeway HOT lanes (Figure 4).

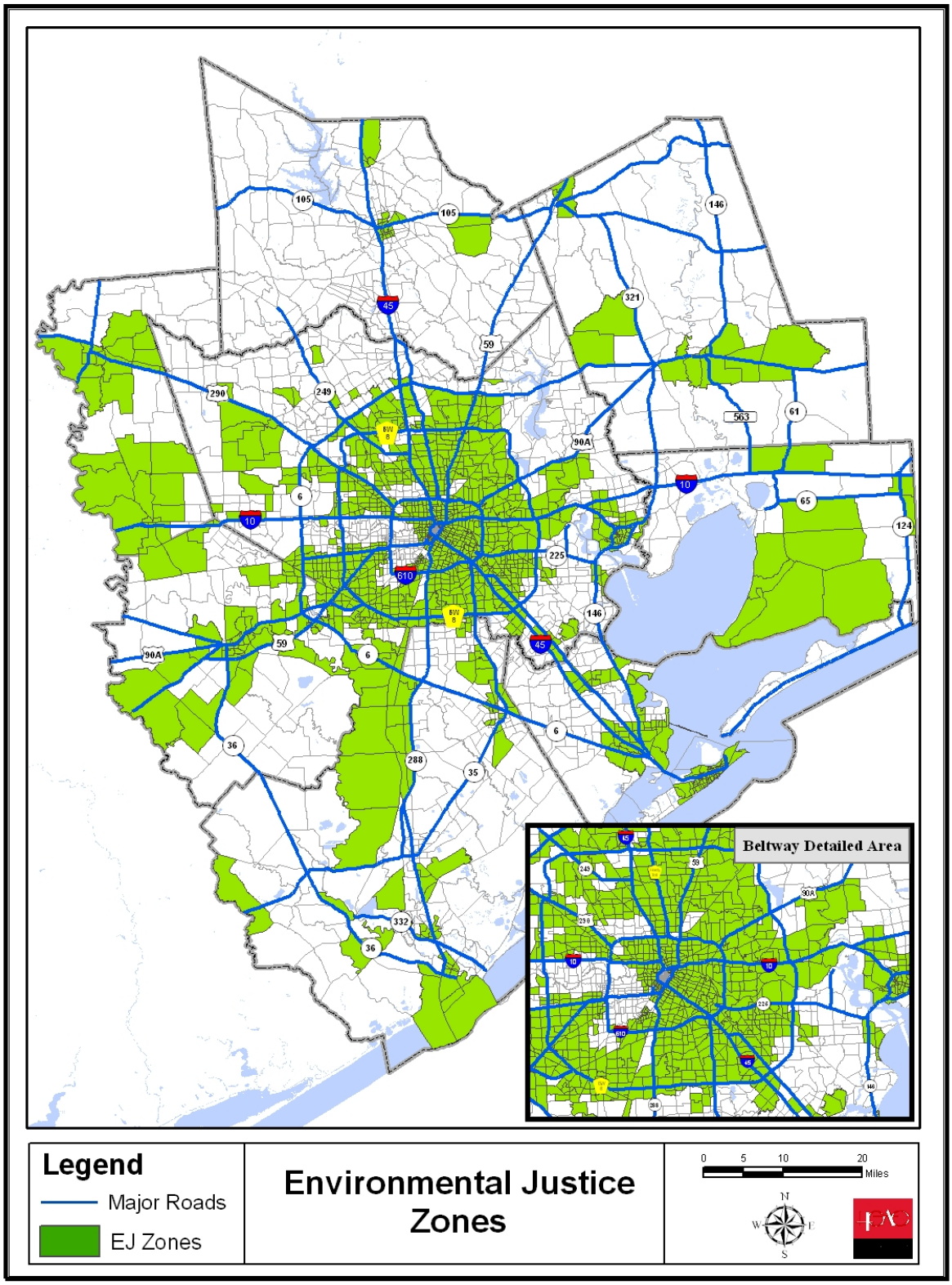

Figure 2: Environmental Justice Traffic Analysis Zones

Source: GPA-GEC 2012.

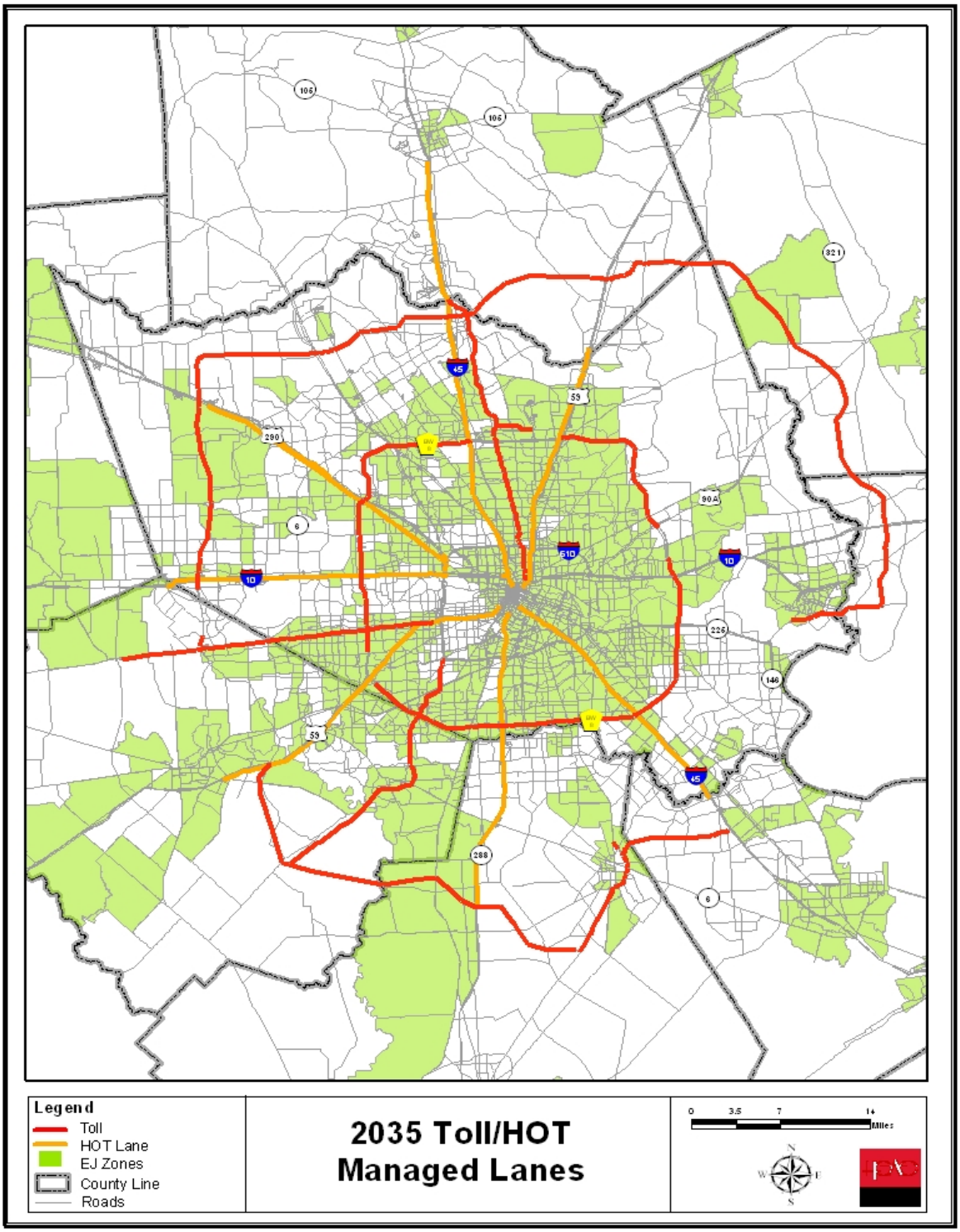

Figure 3: 2035 Toll/HOT Managed

Source: GP-GEC 2012.

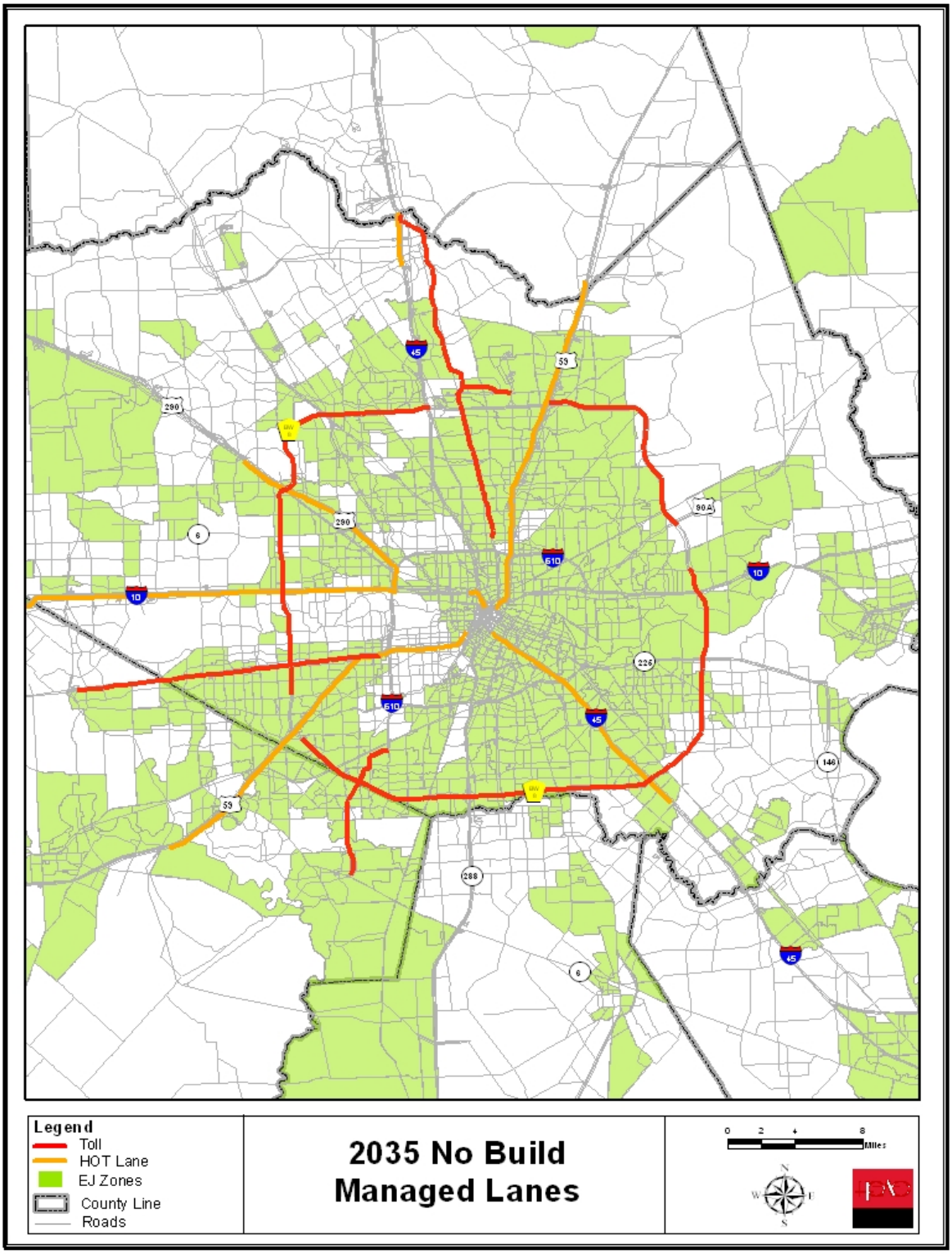

Figure 4: 2035 No-Build Managed Lanes Network

Source: GP-GEC 2012.

Analysis Assumptions and Limitations

The region's travel demand models do not provide a means for tracking travel at an individual household level, but do provide a means for tracking travel at a zonal level. For purposes of the analyses, the zones are specified as either EJ zones or non-EJ zones based on the socioeconomic characteristics of the zonal populations. Some regional travel models employ a generalized cost assignment procedure for toll analyses. The H-GAC models perform toll analyses at the mode choice level. Hence, the H-GAC travel model uses a multi-class assignment procedure rather than a generalized cost procedure.

The mode choice models are applied by trip purpose. For the mode choice toll analyses, two travel time estimates are developed from each zone to all other zones: 1) the travel time using both toll and non-toll links (commonly referred to as "toll path" travel times), and 2) the travel time using only non-toll links (commonly referred to as the "free path" travel time). In the mode choice model, if the toll path does not offer a shorter travel time between two zones than the free path travel time, the trip is not considered a "candidate" for the toll facility. If a trip can save travel time using a toll path over a free path then it is considered a "candidate" trip. Of course, not all candidate trips will choose to use a tolled path. The probability of a candidate trip using a tolled path is a function of a number of variables such as the magnitude of the potential travel time savings, the toll costs and the income characteristics of the zones residents. Aspects of this approach are employed in the analyses presented in this report.

In mode choice model applications, there is a single highway network which is used to estimate the travel times for toll paths and free paths. For the regional toll analyses, there are two networks: the "Build" network (i.e., the forecasted roadway network containing the subject toll facilities) and the "No-Build" network (i.e., the network containing all the forecasted roadways except the subject toll facilities). Existing and committed toll facilities are contained in both networks. In this analytical setting, simply comparing the toll path versus free path option will not identify the candidate trips for only the new toll facilities being studied. Indeed, such a grouping would include trips using both existing and proposed toll facilities.

To focus on candidate trips for the new toll facilities, the travel time for toll paths in the Build network is compared to the toll path travel time in the No-Build network. Trips that have a shorter toll path travel time in the Build network than the toll path travel time in the No-Build network are defined as candidate trips for the new toll facilities. The trips from EJ zones are stratified as either candidate trips or non-candidate trips using the data from the two networks. Likewise, the trips produced by the Non-EJ zone are similarly stratified. Stated differently, the trips for a given trip purpose is segmented into four groups:

1. Trips produced by EJ zones that are classified as "Candidate" trips

2. The remaining trips produced by EJ zones are classified as non-"Candidate" trips

3. Trips produced by non-EJ zones that are classified as “Candidate” trips

4. The remaining trips produced by non-EJ zones are classified as non-“Candidate” trips

Using toll path travel times and free path travel times from the Build and the No-Build networks, there are four travel times for each trip, (i.e. 1) Build network-toll path option, 2) Build network-free path option, 3) No-Build network-toll path option, and 4) No-Build network – free path option). By computing the average trip lengths for each of the options, the impacts of the two networks on the choice options can be quantified, compared, and analyzed.

Using this approach, the results allow the comparison of the toll and free path options for each network for each segmentation of trips. Clearly, the implementation of new toll facilities should be expected to benefit those who might choose to use a toll facility. Of perhaps more interest is determining if there are any expected overall disadvantages to those who might chose not to use a toll facility or that are not candidates for using one of the new toll facilities.

One of the interesting side benefits of the approach used is that it calls attention to the fact that there will be some potential travel time savings realized for trip makers who chose not to use a toll facility. These time savings would be expected to accrue from the reduced congestion on free facilities due to trips diverted to toll facilities.

These analyses are regional level analyses and focus on average regional results. Such analyses do not isolate any zone specific analyses or the impacts in the immediate proximity of the new proposed facilities. These impacts were addressed by the analyses performed for the individual facilities. Indeed, the purpose of these analyses are to determine if there are any cumulative regional impacts to the EJ populations represented by the zones designated as EJ zones.

To determine the time analysis for the different scenarios, trips were divided into home based work trips (HBW) and home based non-work trips (HBNW) for both tolled and free facilities.

Table 3 shows the 2035 HBW person trips and the average trip length (ATL) in minutes for the Build and No-Build Scenarios.

The results for the home based work trips analysis indicate:

- The addition of the tolled facilities to the regional roadway network under the Build Scenario results in a reduction of travel time in the EJ and Non-EJ Zones for all trips on tolled facilities (3.53 and 7.65 minutes respectively).

- The addition of the tolled facilities to the regional roadway network under the Build Scenario results in a reduction of travel time in the EJ and Non-EJ Zones for all trips on free facilities (1.93 and 3.95 minutes respectively).

- Overall, the Build Scenario provides a reduction in travel time for both the tolled and free facilities within the regional roadway network for all zones. As a result, there is no potential for a disproportionate negative effect to the Environmental Justice populations from the regional tolled roadway network. In fact, the entire region, including the EJ Zones, will recognize a benefit in travel time savings because of the added capacity the tolled roadway facilities provide to the regional roadway network.

Table 3: AM Peak Home Base Work Trips

			AM Peak Average Trip Length (ATL) in minutes for Free and Tolled Facilities under the Build and No-Build Network Scenarios				Difference in AM Peak ATL in minutes	
			Build Network Scenario		Non-Build Network Scenario			
Zones	2035 HBW Trip Scenarios	Number of 2035 HBW Person Trips	ATL Using Tolled Facility	ATL Using Free Facility	ATL Using Tolled Facility	ATL using Free Facility	Difference in ATL for the Tolled Facility (No-Build – Build)	Difference in ATL for Free Facility (No-Build – Build)
EJ Zone	Trips that save 0+ minutes using a new tolled facility	924,197	45.43	51.14	48.96	53.07	3.53	1.93
	Trips that cannot save 0+ minutes using a new tolled facility	1,726,782	24.78	24.83	25.52	25.57	0.74	0.74
Non-EJ Zone	Trips that save 0+ minutes using a new tolled facility	1,313,564	58.75	66.25	66.4	70.2	7.65	3.95
	Trips that cannot save 0+ minutes using a new tolled facility	1,793,534	29.30	29.35	30.66	30.71	1.36	1.36

Note: Table data is based on the 2035 RTP Update conducted by H-GAC in 2011.

Source: GP-GEC 2012.

Table 4 shows the 2035 HBNW person trips and the average trip length (ATL) in minutes for the Build and No-Build Scenarios.

Table 4: AM Peak Home Based Non-Work Trips

			AM Peak Average Trip Length (ATL) in minutes for Free and Tolled Facilities under the Build and No-Build Network Scenarios				Difference in AM Peak ATL in minutes	
			Build Network Scenario		Non-Build Network Scenario			
Zones	2035 HBW Trip Scenarios	Number of 2035 HBW Person Trips	ATL Using Tolled Facility	ATL Using Free Facility	ATL Using Tolled Facility	ATL using Free Facility	Difference in ATL for the Tolled Facility (No-Build – Build)	Difference in ATL for Free Facility (No-Build – Build)
EJ Zone	Trips that save 0+ minutes using a new tolled facility	674,267	32.23	34.32	35.54	36.51	3.31	2.19
	Trips that cannot save 0+ minutes using a new tolled facility	5,736,756	14.78	14.79	15.18	15.19	0.4	0.4
Non-EJ Zone	Trips that save 0+ minutes using a new tolled facility	1,019,058	45.77	49.01	54.84	55.61	9.07	6.60
	Trips that cannot save 0+ minutes using a new tolled facility	5,811,141	23.05	23.06	24.28	24.30	1.23	1.24

Note: Table data is based on the 2035 RTP Update conducted by H-GAC in 2011.

Source: GP-GEC 2012.

The results for the HBNW trips analysis indicate:

- The addition of the tolled facilities to the regional roadway network under the Build Scenario results in a reduction of travel time in the EJ and Non-EJ Zones for all tolled facilities (3.31 and 9.07 minutes respectively).
- The addition of the tolled facilities to the regional roadway network under the Build Scenario results in a reduction of travel time in the EJ and Non-EJ Zones for all free facilities (2.19 and 6.60 minutes respectively).

- Overall, the Build Scenario provides a reduction in travel time for both the tolled and free facilities within the regional roadway network for all zones. As a result, there is no potential for a disproportionate negative effect to the Environmental Justice populations from the regional tolled roadway network. In fact, the entire region, including the EJ Zones will recognize a benefit in travel time savings because of the added capacity the tolled roadway facilities provide to the regional roadway network.

In addition, the Build Scenario, which includes the regional tolled roadway network, provided an overall reduction in daily vehicle hours traveled (VHT). Essentially, daily VHT decreased by nearly 2 percent for the 2035 regional roadway network. This reduction indicates that the 2035 roadway network with tolled facilities would improve system performance and provide travel time savings for EJ and non-EJ populations.

Table 5: 2035 Regional VMT and VHT

	Build	No-Build
Daily VMT	273,728,894	272,667,394
Daily VHT	9,723,213	9,971,737
AM VMT	58,603,316	45,028,280

Note: Table data is based on the 2035 RTP Update conducted by H-GAC in 2011.

Source: GP-GEC 2012.

Overall Environmental Justice Toll Network Findings

For HBW and HBNW trips, EJ population trips that are candidate toll users are benefited by the introduction of the new toll facilities in terms of both the toll and free path travel times. Equally important, EJ population trips that are not candidate toll users benefit by the introduction of the new toll facilities as the free path travel time average trip length is reduced between the No-Build and Build scenarios. As such, EJ populations experience an overall benefit under the Build Alternative for their HBW and HBNW travel.

Although EJ zones are spread throughout the region, they are generally clustered within Beltway 8 and are not in close proximity to the majority of future toll facilities as the Non-EJ zones are. Consequently, as the ATL of the EJ zones are less than the ATL of non-EJ zones, the EJ zones cannot derive as much travel time savings as the longer trips from Non-EJ zones. A substantial amount of future transit improvements are targeted at EJ zones; the ATLs for the populations within those zones will tend to improve due to increased access to improved transit facilities. As previously mentioned, METRO's 2035 Long Range Plan recommends significant expansion of the current transit system

and includes a network of integrated high capacity transit facilities on major travel corridors. This plan also identifies service expansions beyond the METRO service area. New improvements scheduled for implementation through the year 2035 include high occupancy tolls, a new intermodal terminal, park-n-ride facilities, 40 miles of Signature Bus lines, and several new high capacity transit corridors throughout the region including the 89 miles of LRT, and 84 miles of CRT.

An analysis was also conducted to determine the annual financial burden of utilizing the toll road system for HBW trips. The analysis assumed a 2035 toll rate per mile of 19.96 cents (current toll rate of 10 cents per mile with an annual escalation rate of 2.5 percent). In addition the analysis assumed that an average HBW trip length is 23.30 miles and the SOV user makes 250 round-trips per year using the toll facility. Under this scenario, the annual cost would be approximately $2,325 per year. However, the accrual cost should be substantially less since the likelihood of a trip using only tolled facilities is diminutive.

Although EJ populations will see an increase in spending for toll facilities, the entire region will also see an increase in spending and usage as the toll and managed lane system expands. Both EJ and Non-EJ populations will benefit from future toll facilities. In fact, the 2035 RTP Update relies heavily on toll funding to finance a portion of future added capacity projects, both free and toll. Additionally, for both populations who choose to use non-toll options, the Build scenario for 2035 will provide a roadway network that will operate at better traffic conditions than the No-Build scenario and would provide an increased benefit for those users over the No-Build scenario. Consideration was included in the this 2011 regional toll analysis for the 2035 RTP Update changes in the 2035 roadway network and toll increases which were implemented and evaluated in 2010.

Based on the previous discussion and analysis, the Build scenario for the 2035 RTP Update, even with the network changes and the 2010 toll increases, would not cause cumulative disproportionately high and adverse effects on EJ populations as per Executive Order 12898 regarding environmental justice.

Air Quality

The Clean Air Act Amendments of 1990 (CAAA) require transportation plans, programs, and projects in nonattainment areas, which are funded or approved by the Federal Highway Administration (FHWA) or Federal Transit Administration (FTA), to conform to the State Implementation Plan (SIP). This ensures that transportation plans, programs, and projects do not produce new air quality violations, worsen existing violations, or delay timely attainment of the National Ambient Air Quality Standards (NAAQS). Under the Clean Air Act, the Environmental Protection Agency (EPA) established criterion called the National Ambient Air Quality Standards (NAAQS) to determine the health threat of criteria pollutants, generally located within Consolidated Metropolitan Statistical Areas (CMSAs). If a CMSA has a health threat, it is designated as a ‘non-attainment’ area until compliance is achieved. The Houston-Galveston region is classified as a non-attainment area for the 1997 8-hour Ozone standard, and it has been further classified as “severe”.

Transportation conformity is an analytical methodology that establishes the connection between projected on-road emissions from the RTP Update and the known reductions in the motor vehicle emission budget from the SIP. Through the process of transportation conformity, the RTP Update uses the SIP on-road mobile strategies and air quality targets to demonstrate if the RTP Update complies with the federal air quality requirements. Vehicle emissions resulting from the implementation of transportation projects in the 2035 RTP Update cannot exceed emission budgets established by the SIP. The Houston-Galveston region must demonstrate that the 2011 - 2014 Transportation Improvement Plan (TIP) and the long-range plan (2035 RTP Update) result in less volatile organic compounds (VOC) and nitrogen oxides (NOx) than established and approved by EPA for each analysis year. On January 25, 2011, the USDOT determined that the 2035 RTP Update and the 2011-2014 TIP conformed to the requirements of the SIP for the Houston-Galveston ozone non-attainment area. The Level of Mobility (LOM) was developed to illustrate the degree of congestion on roadways within the region. Figure 5 shows the relative distribution of morning peak period congestion levels for the current and future regional roadway network as a percentage of vehicle miles traveled in each LOM category. Based on the forecasted growth predicted in the 2035 RTP Update, regional congestion levels would still exist on the regional roadway network. However, the 2035 RTP Update Regional Roadway Network would improve morning peak congetion approximately 50 percent to less than 30 percent when compared to the 2035 No-Build Scenario.

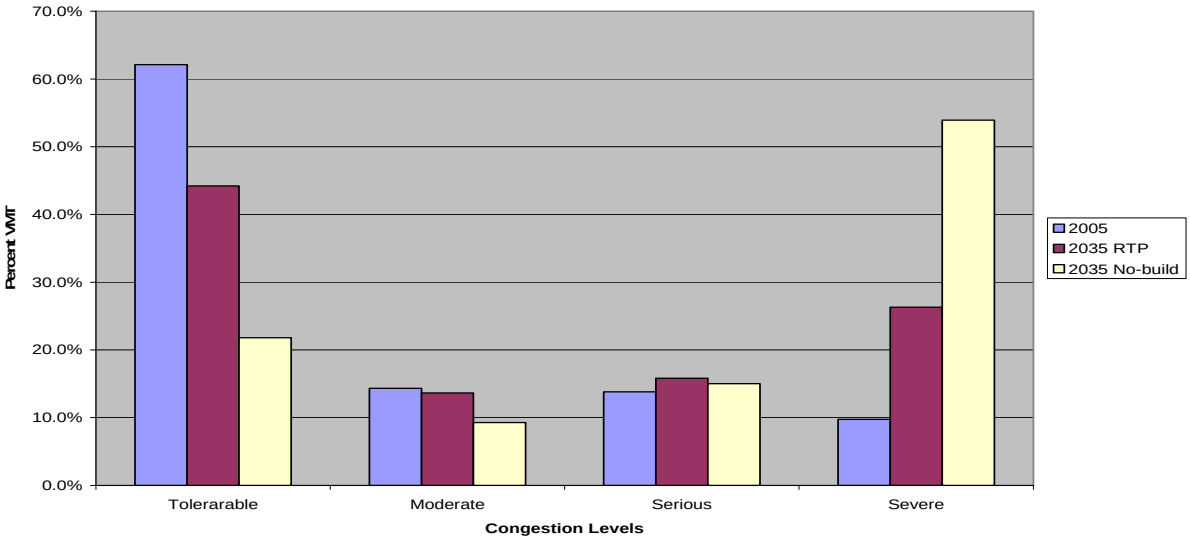

Figure 5: Level of Mobility – AM Peak

Note: Data is based on the 2035 RTP Update conducted by H-GAC in 2011.

Source: GP-GEC 2012.

Air Quality Findings

The addition of tolled facilities and managed lanes into the existing regional roadway network would not have any cumulative impacts to air quality. Moreover, a tolled roadway network adds capacity to the regional roadway network, thus allowing a better flow of traffic and decreasing the amount of cars traveling at lower speeds or idling conditions. The improved traffic flow results in less fuel combustion and lower emissions including Mobile Source Air Toxics (MSATs), Carbon Monoxide (CO), and Ozone. As noted in the direct, indirect, and project level cumulative analysis discussions, EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in substantial reductions of on-road emissions, including MSATs, CO and ozone precursors.

Water Quality

The Houston-Galveston region has an abundance of water resources including rivers, lakes, and bays. The Texas Commission on Environmental Quality (TCEQ), along with the Clean Rivers Program and numerous local agencies, are responsible for monitoring all major bodies of water and reporting those conditions in a biennial Texas Water Quality Inventory report. Section 303(d) of this report details those water bodies TCEQ has identified as impaired because of water contamination. The 303(d) list identifies several major water systems as impaired with pollutants and bacteria in the RSA. A majority of the waterways located in the Trinity-San Jacinto Coastal Basin, San Jacinto River Basin, San Jacinto-Brazos Coastal Basin, Brazos-Colorado Coastal Basin, including bays and estuaries that flow to the Gulf of Mexico, are impaired and included in the 303(d) list. The construction of the regional tolled roadway network would cross and impact the above mentioned water bodies at various locations and could cause water quality impacts. The increase of impervious cover from adding capacity to the regional roadway network greatly increases non-point source pollution and the potential to cause further impairment to the region's waterways. As stated previously, TCEQ regulates water quality through Storm Water Pollution Prevention Plans (SWP3), Municipal Separate Storm Sewer Systems (MS4), and Best Management Practices (BMPs). All construction of the regional tolled roadway network in the RTP Update would follow these water quality regulations that would aid in preventing further pollution to these impaired waters and to waters that are not impaired. Additionally, any land use development that would occur from the construction of these facilities would follow TCEQ's regulations for water quality through SWP3 and MS4.

Water Quality Findings

Although overall impacts cannot be avoided, the above mentioned mitigation techniques will ensure that the regional tolled roadway network would not have significant cumulative impacts to water quality.

Vegetation

Prairie, Wetland, Bottomland Forest, Upland Forest, and Riparian Corridor ecosystems are all located in the Houston-Galveston region. Each of these resources provide vital

functions such as flood protection, air quality, water quality and wildlife habitat. Protection of these natural resources which contribute to our region's quality of life is an important priority when planning for our region's future growth and transportation infrastructure. This sentiment was voiced strongly at the Envision Houston Region workshops and forums.

As growth and development are part of our region's future, it is not feasible that every undeveloped parcel be preserved. However, it is feasible that the region identify and work to conserve those areas that are most ecologically sensitive. H-GAC identified areas that have sensitive environmental resources for special consideration in the transportation planning process. However, the identification is not intended to be used for project-level screening. The results are intended to be used for long-range planning purposes and screening to identify areas in which future transportation projects or development may potentially impact these sensitive resources. In addition, the identified environmental resources are areas in which mitigation efforts may be focused.

In some instances, disturbing natural resources may be unavoidable for regionally significant projects or projects located on facilities that are multiple-lane, limited access facilities, such as highways and toll roads. Currently, projects within the 2035 RTP Update are individually subject to environmental requirements but have no mechanism for cumulatively identifying or mitigating environmental impacts. At the project level, the Texas Department of Transportation (TxDOT) Houston District can mitigate for loss of vegetation with the Texas Parks and Wildlife Department, and wetlands mitigation would occur through the permitting process under the jurisdiction of the U.S. Army Corps of Engineers. Locally, cities can also curb vegetation loss by implementing measures to protect vegetation areas.

Vegetation Findings

Impacts to vegetation will undoubtedly occur from the regional tolled roadway network. However, these impacts are best evaluated and mitigated at the project level.

Land Use

While we can increase system capacity, manage demand, and improve the efficiency of the existing regional roadway network, the greatest potential effect upon improving mobility and quality of life is connecting transportation and land use planning. Land use has a direct impact on the ability of the region's transportation system and agencies to deliver a variety of travel choices. The 2035 RTP Update has shown that sustained major investments in roadway capacity will only moderate, and will not eliminate the level of future traffic congestion. However, improved mobility is possible through better coordinated land use and transportation planning.

The Envision Houston Region process was initiated by the H-GAC and its partners to engage residents in a discussion of the region's future growth and development. The process focused on land use and transportation alternatives. Citizen input from workshops was used to develop growth scenarios representing two different types of alternative development patterns. The objective was to provide information on the

projected impacts of the alternatives and to highlight the difference between the two growth scenarios developed from the workshops and the Base Case or traditional growth scenario. Brief descriptions of each scenario are found below:

- Scenario A: (Base Case) denotes the current growth and development pattern for the Houston-Galveston region, based on H-GAC's 2035 demographic forecasts. It is characterized by low-density housing development in currently undeveloped portions of the region with mixed-use development along major roadways. Jobs are concentrated in the central business district, and several other employment centers are scattered throughout the region.

- Scenario B: denotes the workshop participants' ideal growth pattern, adjusted to the *regional forecast* of household and employment growth. This scenario is characterized by development along major roadways, in a radial pattern, creating centers at major intersections.

- Scenario C: denotes the workshop participants' ideal growth pattern, adjusted to the forecast of household and employment *growth by county*. This scenario clusters mixed-use development in satellite cities and along major roadways in a radial pattern. Satellite employment centers emerge throughout the region.

Table 6 identifies the transportation related data associated with the growth scenarios.

Table 6: Alternative Growth Scenarios

Data of Interest	Scenario A	Scenario B	Scenario C
Transit Boardings	758,000	+10%*	+20%*
Vehicle Miles Traveled	248M	-7%*	-7%*
Vehicle Hours Traveled	7M	-16%*	-15%*
NOx Emissions	46.58	46.43	43.74
VOC Emissions	50.72	48.65	47.65

Note: Table data is based on the original 2035 RTP but is consistent with the RTP Update conducted by H-GAC in 2011 as they did not change their growth scenarios for this update.

Source: H-GAC 2009.

*Denotes change over Scenario A

These results reinforce the public's intuitive notions about coordinated transportation and land use planning. H-GAC has identified a three-pronged land use and transportation coordination strategy that calls for the creation of bicycle and pedestrian

friendly Centers; establishment of better Connections between the centers, and designs based on the Context of the surrounding land uses. This “3C's” strategy, in addition to enhancing mobility choices, is expected to produce economic, environmental and “quality of place” benefits for the region.

In order to integrate the 3C’s concepts into regional transportation planning, H-GAC has identified the following five strategies:

1. Coordinate transit and roadway planning to connect existing and planned centers with the region's multi-modal transportation network,

2. Promote roadway designs appropriate for the context of the surrounding community to ensure safe, convenient travel choices for all user modes,

3. Coordinate transportation improvements and private sector development efforts to promote projects that combine sustainable mobility and economic benefits,

4. Help fund local planning studies to assist in the development of centers, and

5. Provide funding support for infrastructure projects that enhance connections within and between centers.

In addition to expanding the regional transit system, transit ridership and efficiency can be improved by coordinating transit and land use. Development along transit lines that increases density and integrates transit with development can make transit more accessible and decrease the need for single-occupancy vehicle trips. Recommended strategies include:

- Promote community design that provides convenient access to transit systems,

- Promote transit-oriented development investments around regional transit facilities, and

- Enhance access opportunities for the transportation disadvantaged.

These land use/transportation coordination tools are tools that can be used in the H-GAC region to reduce the need for additional infrastructure, including utilities, transportation, water, and tolled facilities for the region. Without sustainable land use, the additional cost of new infrastructure items will increase beyond the current estimated costs.

The proposed 2035 regional roadway network is in support of the predicted land use changes and growth in the region. To meet the demand of the expansive growth and changes in land use from development, the aim of the 2035 regional roadway network is to supply the transportation portion of infrastructure requirements for the expanding growth and development. Current and future predicted available funds from the federal government for transportation alone will not be able meet the demands for the transportation infrastructure needed to support the predicted changes. Tolled roads and

managed lanes are methods that the RTP Update employs to ensure the transportation demands from future growth is met when considering the limited transportation funds available.

Land Use Findings

The proposed 2035 regional tolled roadway network may affect land use within the MPO boundaries by creating land development and/or redevelopment opportunities. However, the regional tolled roadway network is only one factor in creating favorable land development conditions; other prerequisites for growth in the region include demand for new development, favorable local and regional economic conditions, adequate utilities, and supportive local land development policies. The proposed 2035 regional tolled roadway network may influence and facilitate the additional planned regional land use conversion, redevelopment, and growth.

Conclusion

The regional tolled roadway network would cause some impacts to natural and socio-economic resources. However, the regional tolled roadway network would have a beneficial impact on EJ populations and air quality in the Houston-Galveston area. Overall, with the 2035 build scenario, which includes the regional tolled roadway network in place, travel efficiencies in the region will benefit both EJ and non-EJ populations. The net benefit may be slightly greater for the non-EJ populations because the average trip length in these zones is greater than the average trip length from the EJ zones. The additional vehicle lane miles that the regional tolled roadway network provides enables traffic to flow more efficiently thereby reducing emissions associated with cars traveling at lower speeds or idling conditions.

In addition, regional mitigation for air quality and EJ populations are also addressed by the H-GAC as part of 2035 RTP Update. The Transportation Planning Process at the MPO regional level is required to incorporate measures to minimize the potential to affect the environment and communities, including populations protected under Title VI of the Civil Rights Act of 1964 and Executive Order 12898 and air quality which is protected by the CAAA. Any transportation facility including the regional tolled roadway network would be required to meet these standards in order to be included in the TIP/STIP and RTP Update. Furthermore, all new projects to be added to the TIP/STIP and RTP Update must be in conformance with the SIP.

Although land use impacts cannot be mitigated at a regional level, they can at a municipal level because these entities have direct control over land use. However, the MPO can aid in land use impact avoidance at the regional level by only funding transportation projects consistent with the regional vision and by working with municipalities to address regional infrastructure changes in their comprehensive plans. State and Federal regulatory agencies are required to institute policies and monitor project-level effects to the natural and cultural resources that are found in their jurisdictions. Avoidance, minimization and mitigation strategies are used to support those policies in order to reduce impacts to these resources.

Finally, as required by NEPA, appropriate mitigation for direct impacts would occur at the project level. Because of these mitigation measures, the regional proposed tolled roadway network is not anticipated to have a substantial cumulative impact on the resources considered in this section.