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**ENVIRONMENTAL ASSESSMENT  
CONSTRUCTION OF DIRECT CONNECTORS  
IH 45/LP 197 DIRECT CONNECTORS  
GALVESTON COUNTY, TEXAS**

**CSJ 0500-04-112**

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# Contents

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	Page
<b>Acronyms and Abbreviations</b> .....	v
<b>INTRODUCTION</b> .....	1
<b>NEED AND PURPOSE</b> .....	1
<b>TRAFFIC</b> .....	3
<b>DESIGN</b> .....	3
EXISTING DESIGN.....	3
PROPOSED DESIGN (BUILD ALTERNATIVE).....	3
ALTERNATIVES ANALYSIS .....	4
<b>RIGHT-OF-WAY/DISPLACEMENTS</b> .....	5
<b>SOCIOECONOMIC DATA</b> .....	5
DEMOGRAPHIC CHARACTERISTICS.....	5
ECONOMIC CHARACTERISTICS .....	6
<b>ENVIRONMENTAL JUSTICE</b> .....	7
LEP POPULATIONS.....	8
<b>LAND USE</b> .....	9
<b>SOILS</b> .....	9
FARMLAND PROTECTION POLICY ACT .....	10
<b>BENEFICIAL LANDSCAPE PRACTICES</b> .....	11
<b>INVASIVE SPECIES</b> .....	11
<b>VEGETATION</b> .....	11
AVOIDANCE OF IMPACTS TO VEGETATION .....	12
MINIMIZATION OF IMPACTS TO VEGETATION.....	13
IMPACTS ASSOCIATED WITH THE BUILD ALTERNATIVE.....	13
MITIGATION OF IMPACTS TO VEGETATION.....	13
<b>WILDLIFE</b> .....	14
<b>ESSENTIAL FISH HABITAT</b> .....	16
<b>THREATENED AND ENDANGERED SPECIES</b> .....	18
<b>BIRDS</b> .....	19
<b>REPTILES</b> .....	20
<b>HISTORIC PROPERTIES</b> .....	21
HISTORIC STRUCTURES .....	22
ARCHEOLOGICAL SITES.....	23
<b>PARKLAND</b> .....	23

	<b>Page</b>
<b>WETLANDS AND WATERS OF THE U.S.</b> .....	24
WATERS OF THE U.S. ....	26
WETLANDS .....	26
IMPACTS ASSOCIATED WITH THE BUILD ALTERNATIVE .....	27
<b>WATER QUALITY</b> .....	28
<b>FLOODPLAINS</b> .....	28
<b>COASTAL ZONE MANAGEMENT PLAN</b> .....	29
<b>PERMITS</b> .....	29
U.S. ARMY CORPS OF ENGINEERS .....	29
U.S. COAST GUARD .....	29
TEXAS COMMISSION OF ENVIRONMENTAL QUALITY .....	29
<b>AIR QUALITY</b> .....	30
MSAT ANALYSIS .....	31
<b>NOISE</b> .....	37
<b>HAZARDOUS MATERIALS</b> .....	40
HISTORICAL USE OF PROPERTY AND REGULATORY RECORDS REVIEW .....	40
VISUAL OBSERVATION .....	41
<b>CONSTRUCTION IMPACTS</b> .....	42
<b>INDIRECT AND CUMULATIVE IMPACTS</b> .....	43
DETERMINATION OF RESOURCES INCLUDED IN THE CUMULATIVE IMPACTS ANALYSIS .....	44
DEFINITION OF STUDY AREA FOR EACH RESOURCE CONSIDERED IN CUMULATIVE IMPACTS ANALYSIS .....	46
CURRENT HEALTH AND HISTORICAL CONTEXT OF RESOURCES .....	47
IDENTIFICATION OF DIRECT AND INDIRECT IMPACTS THAT MAY CONTRIBUTE TO CUMULATIVE IMPACTS .....	47
OTHER PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS .....	47
POTENTIAL CUMULATIVE IMPACTS .....	48
DISCUSSION OF MITIGATION ISSUES .....	50
<b>PUBLIC INVOLVEMENT</b> .....	51
<b>SUMMARY</b> .....	52
<b>REFERENCES</b> .....	55

**Tables**

Table 1	Project Area Population .....	6
Table 2	Future Population – Project Area .....	6
Table 3	Civilian Labor Force Within the Study Area .....	6
Table 4	Minority and Low-Income Characteristics .....	8
Table 5	Limited English Proficiency Populations .....	9
Table 6	Vegetative Communities Within the Proposed ROW.....	13
Table 7	Species Managed by MSFCMA Within the Project Area .....	17
Table 8	State and Federal Threatened and Endangered Species of Galveston County.....	18
Table 9	Waters of the U.S., Including Wetlands, Within the Project Area .....	25
Table 10	Common Sound/Noise Levels .....	38
Table 11	FHWA Noise Abatement Criteria .....	39
Table 12	Traffic Noise Levels (dBA Leq) .....	40
Table 13	Sites with Potential to Impact Project Area .....	42
Table 14	Determination of Resources Included in the Cumulative Impacts Analysis.....	44
Table 15	Resource Study Area (RSA) for Each Resource Considered in the Cumulative Impacts Analysis .....	46
Table 16	Summary of Potential Cumulative Impacts .....	49

**Exhibits**

Exhibit A	Project Location Map
Exhibit B	USGS 7.5-Minute Topographic Map
Exhibit C	Typical Section
Exhibit D	Plan View
Exhibit E	Alternative Alignments Map
Exhibit F	Environmental Constraints Map
Exhibit G	PALM Map
Exhibit H	Wetland Delineation Layout
Exhibit I	Sensitive Receptors Map
Exhibit J	Noise Receiver Location Map

**Appendices**

Appendix A	Site Photographs
Appendix B	Agency Coordination Letters
Appendix C	Hazardous Materials Records Review

## Acronyms and Abbreviations

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ADT	average daily traffic
APE	area of potential effect
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CLF	Civilian Labor Force
CMP	Coastal Management Program
dB	decibel(s)
dBA	A-weighted decibel(s)
DOQQ	Digital Orthophoto Quarter Quadrangle
EFH	essential fish habitat
EIS	Environmental Impact Statement
EJ	Environmental Justice
EO	Executive Order
EPA	Environmental Protection Agency
ESA	Environmental Site Assessment
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FIRM	Flood Insurance Rate Map
FM	Farm-to-Market Road
FPPA	Farmland Protection Policy Act
GIS	Geographic Information Systems
GMFMC	Gulf of Mexico Fishery Management Council
H-GAC	Houston-Galveston Area Council
HHS	Department of Health and Human Services
IH	Interstate Highway
IRIS	Integrated Risk Information System
LEP	Limited Engineering Proficiency
Leq	equivalent sound level
LOS	level of service
LP	Loop
MOU	Memorandum of Understanding
mph	miles per hour
MSAT	Mobile Source Air Toxics
MSFCMA	Magnuson-Stevens Fishery Conservation and Management Act
NAAQS	National Ambient Air Quality Standards
NAC	noise abatement criteria
NATA	National Air Toxics Assessment

NDD	Natural Diversity Database
NFIP	National Flood Insurance Program
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NOI	Notice of Intent
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
PA	Programmatic Agreement
PALM	Potential Archeological Liability Map
PEM	palustrine emergent
PM	particulate matter
ROW	right-of-way
RSA	Resource Study Area
RTP	Regional Transportation Plan
SAL	State Archeological Landmark
SAV	submerged aquatic vegetation
SH	State Highway
SHPO	State Historical Preservation Officer
SIP	State Implementation Plan
SW3P	Storm Water Pollution Prevention Plan
TARL	Texas Archaeological Research Laboratory
TCEQ	Texas Commission on Environmental Quality
THC	Texas Historical Commission
TIP	Transportation Improvement Plan
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks & Wildlife Department
TWC	Texas Workforce Commission
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
URARPAA	Uniform Relocation Assistance and Real Property Acquisition Act
USACE	U.S. Army Corps of Engineers
USBOC	U.S. Bureau of the Census
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VMT	vehicle miles traveled
vpd	vehicles per day

## INTRODUCTION

This environmental assessment evaluates the social, economic, and environmental impacts resulting from the proposed construction of Loop ("LP") 197 direct connector ramps at the intersection of Interstate Highway ("IH") 45 in Galveston County, Texas (Exhibits A and B). The Texas Department of Transportation ("TxDOT") proposes to construct two direct connectors from IH 45 to LP 197 (one southbound/eastbound and one northbound/westbound) at the Port of Texas City at Shoal Point. A portion of the proposed project would be on new location in order to improve curvature geometry at the intersection of LP 197 and IH 45. The roadway improvements are being proposed by TxDOT under Category 2, Plan Authority. Total project length is approximately 0.91 mile. The estimated cost of the proposed project is \$45,000,000. Construction would be 80 percent federally-funded and 20 percent state-funded. The proposed project is included in Appendix D of the FY 2008-2011 Transportation Improvement Plan ("TIP") and in the Metropolitan Transportation Plan's 2035 Regional Transportation Plan ("RTP") list of Short-Range Roadway Projects. The proposed project is scheduled to let in September 2015.

## NEED AND PURPOSE

Need: The focal points regarding the need for this project are as follows:

- Inefficient transitioning of traffic at the existing IH 45/LP 197 interchange; interchange is currently below current design standards
- Traffic congestion and delays due to the at-grade railroad crossing near intersection of LP 197 and SH 146
- Future truck traffic resulting from the development of the Shoal Point Terminal Facility
- Current intersection of IH 45/LP 197 is located within the 100-year floodplain

Purpose: The purpose of the proposed project includes the following:

- To improve existing and future congestion of predicted traffic by constructing continuous non-stop connector ramps from IH 45 to LP 197, and to improve inefficient geometry of the existing IH 45/LP 197 interchange by meeting current design standards
- To avoid congestion and delays at the at-grade railroad crossing near the intersection of LP 197 and SH 146

- To provide alternate routes for the increased truck traffic created by the Shoal Point Terminal Facility
- To provide an alternate connecting route between IH 45 and LP 197, which is not subject to flooding

The existing IH 45/LP 197 interchange does not provide a direct connection between IH 45 and LP 197. Currently, commuters traveling along IH 45 must take the State Highway ("SH") 146 exit and travel a short distance along SH 146 before reaching a three-way stop. From this stoplight, commuters can turn right onto LP 197 or continue northward onto SH 146 or SH 3. Atypical curves at this three-way intersection and the IH 45/LP 197 interchange are currently below design standards and do not allow for efficient transitioning, thus increasing the potential for traffic delays. The future traffic volume at the intersection of LP 197 and IH 45 is expected to increase approximately 22 percent from 2005 to 2025, which could contribute to increased inefficiencies without the proposed improvements. The proposed interchange design would eliminate the three-way intersection and would provide an interchange that meets current standard design criteria, and therefore functions more efficiently and safely.

An at-grade railroad crossing currently traverses LP 197 north of the intersection of LP 197 and SH 146. This creates traffic congestion and delays when a train crosses the area and the intersection is blocked. The proposed direct connectors will be elevated over this at-grade railroad crossing, allowing commuters to avoid the crossing and reducing traffic delays.

The City of Texas City is currently constructing a new container terminal on a 400-acre undeveloped site northeast of the proposed project at Shoal Point. The Shoal Point Container Terminal would meet a regional need for development of a containerized cargo gateway driven by the growth in container traffic within the Texas Central Gulf region. Over 10,000 daily truck trips are expected to be generated in 2025 by the proposed container terminal. The Shoal Point Container Terminal project will provide access from the terminal to LP 197 at the Farm-to-Market ("FM") 519 intersection. The proposed direct connectors will create an alternative route, providing a more efficient travel route for the increased truck traffic travelling to IH 45

Level of Service ("LOS") is the measurement that describes traffic conditions based upon a comparison between traffic volumes and the vehicular capacity of roadways in the county. Six possible levels are represented by A-F:

- LOS A represents free flow conditions so that a driver travels at their desired speed and is virtually unaffected by other vehicles.
- At LOS B, other vehicles in the traffic stream become noticeable,
- Under LOS C, a driver's behavior becomes significantly affected by the traffic stream.

- LOS D represents high-density traffic flow where speed and maneuverability are severely restricted and poor levels of comfort and convenience are experienced.
- LOS E generally describes a traffic stream at capacity where traffic is flowing but at a very slow rate, and any additional vehicles or unusual conditions will cause the system to break down.
- LOS F occurs at the breakdown of the flow, characterized by stop-and-go conditions and queues.

The November 2002 environmental impact statement ("EIS") prepared for the Shoal Point terminal project concluded that increased roadway cargo traffic volume would create an unacceptable LOS, or LOS F, at the SH 3 and LP 197 intersection. After construction of the proposed project direct connectors, an LOS of D would be achieved.

The existing intersection of IH 45/LP 197 is located within the 100-year floodplain and currently experiences flooding during heavy rainfall periods. This creates traffic congestion and safety concerns. The elevated interchange would not be subject to the 100-year flood and would improve safety and mobility.

## **TRAFFIC**

At the intersection of LP 197 and IH 45, the Average Daily Traffic ("ADT") for 2005 was 39,600 vehicles per day ("vpd"), while the projected ADT for 2025 is 48,200 vpd. The projected ADT along the IH 45/LP 197 direct connectors is predicted to be 12,240 vpd in 2033.

## **DESIGN**

### **Existing Design**

The existing LP 197 consists of four 12-foot travel lanes (two eastbound and two westbound), 10-foot paved shoulders, and a 14-foot continuous left-turn lane within a 160-foot right-of-way ("ROW"). Stormwater drainage is conveyed through parallel roadside drainage channels (ditches). West of the Galveston, Houston & Henderson Railroad, LP 197 merges with SH 3 and SH 146 at a three-way intersection. From this intersection, all commuters traveling on these three roadways to reach IH 45 merge onto one roadway, designated as SH 146. The current posted advisory speed is 60 miles per hour ("mph") on LP 197 and 70 mph on IH 45 within the project limits.

### **Proposed Design (Build Alternative)**

The proposed project would construct two new direct connectors (one southbound/eastbound and one westbound/northbound) from IH 45 to LP 197. Each direct connector would consist of one 14-foot travel

lane with 8-foot right-hand and 4-foot left-hand outside shoulders. The ramps would begin approximately 600 feet west of the Texas City Terminal Railway and end approximately 2,000 feet east of SH 146. The elevated section of the project would also consist of 8-foot right-hand and 4-foot left-hand outside shoulders and bridge rails. The tie-ins of the ramps at IH 45 and LP 197 would be within existing ROW. New ROW would be required for the construction of the direct connectors between the two existing roadways for a distance of approximately 0.91 mile. The proposed elevated section of the proposed project would cross over the Galveston, Houston & Henderson Railroad near the southeastern portion of the project. The proposed typical section is provided in Exhibit C and the proposed plan view is provided in Exhibit D. The proposed posted advisory speed on the IH 45/LP 197 direct connectors is 50 mph within the project limits.

The proposed project would also require the addition of northbound and southbound 12-foot auxiliary lanes with 10-foot shoulders along IH 45. For this portion of the proposed project, no new ROW would be required; however, the existing northbound mainlanes and shoulders would be re-striped from the Texas City Terminal Railway bridge for a distance of approximately 2.07 miles to FM 519. East of Texas City Terminal Railway at the proposed LP 197 ramp locations, the existing ramps connecting IH 45 to the frontage roads would be removed. The proposed project would replace these ramps approximately 1,000 feet to 2,000 feet east of the existing locations.

## **Alternatives Analysis**

In addition to the no-build alternative, three build alternatives were evaluated for the proposed project (Exhibit E). The no-build alternative was not considered the preferred alternative because the existing roadway does not meet current safety and operational standards. Each of the proposed build alternatives provides a preferred alternate route for heavy truck traffic traveling to and from the City of Texas City port facilities located approximately 4 miles to the north and east of the Texas City Wye (intersection of SH 146, SH 6, and IH 45). The surrounding communities of Omega Bay, Bayou Vista, La Marque, and Hitchcock would benefit greatly from the improved truck traffic flow.

The proposed build alternative (Alternative 3) is the recommended alternative because it utilizes a portion of the existing LP 197 ROW, minimizes environmental impacts by avoiding the entire MOTCO superfund site, uses an elevated section to minimize impacts to wetlands, meets current safety and operational standards, improves driving conditions on a designated hurricane evacuation route, and facilitates future expansion of SH 6 (also a designated hurricane evacuation route). Alternative 3 provides suitable geometry for heavy truck traffic to maintain speed within the flat curve radius, thus facilitating a smooth merge and transition to the IH 45 mainlanes. The geometry would reduce elevated noise levels that result from downshifting, braking, and acceleration of heavy trucks, minimizing impacts to the communities of Omega Bay, Bayou Vista, La Marque, and Hitchcock.

Alternative 1 utilizes existing TxDOT ROW for the majority of its alignment and would therefore result in minimal impacts to wetlands. Alternative 1 would construct the direct connectors at-grade requiring subsurface construction inside the MOTCO superfund site slurry wall. Subsurface construction might compromise the integrity of the confining layers for the MOTCO constituents of concern, necessitating further remediation efforts. Alternative 1 also has an unfavorable alignment for heavy truck traffic traveling to and from the City of Texas City port facilities.

Alternative 2 avoids direct impacts to the MOTCO superfund site and is elevated to minimize wetland impacts, but does not have the most suitable geometry for accommodating heavy truck traffic at highway speeds. Alternative 2 is shifted to the south of Alternative 3 where the distance between the IH 45 mainlanes and the LP 197 mainlanes requires a smaller transition curve radius in the direct connector. Heavy trucks would have to downshift, decelerate, accelerate, and merge with (posted) 65 mph interstate and highway traffic on the mainlanes.

## **RIGHT-OF-WAY/DISPLACEMENTS**

Approximately 11.09 acres of additional ROW would be required for the proposed project. No residences, businesses, or farms would be displaced as a result of the proposed project.

Adjustments of several pole-mounted power transmission lines adjacent to the proposed ROW would be necessary for the proposed project. Utility adjustments within the project limits would be the responsibility of the utility companies.

All property acquired as a result of the proposed project would be acquired in accordance with the Uniform Relocation Assistance and Real Property Acquisition Act ("URARPA") of 1970.

## **SOCIOECONOMIC DATA**

This section presents a summary of demographic and economic characteristics for the proposed project area, which includes mostly vacant land within the cities of La Marque and Texas City, within Galveston County, Texas. Galveston County census tracts (2000 Census) 7224 and 7238 are traversed by the proposed project ROW.

### **Demographic Characteristics**

As shown in Table 1, both La Marque and Texas City experienced an 8.1 and 1.4 percent decrease in population during the 1980's, while Galveston County and the State of Texas, respectively, experienced an 11.0 and 19.4 percent population growth. During the 1990's, La Marque experienced a 3 percent decrease in population, while Texas City experienced a 1.7 percent increase in population. The State of Texas and Galveston County both realized a higher population growth during the 1990's with a 22.8 percent and 15.1 percent increase, respectively.

**Table 1**  
**Project Area Population**

Location	1980	1990	2000	% Change 1980 to 1990	% Change 1990 to 2000
State of Texas	14,229,191	16,986,510	20,851,82	19.4	22.8
Galveston County	195,940	217,399	250,158	11.0	15.1
La Marque	15,372	14,120	13,682	-8.1	-3.1
Texas City	41,403	40,822	41,521	-1.4	1.7

Source: USBOC, 1983, 1990, and 2000

Table 2 shows population projections for the State of Texas, Galveston County, and the cities of La Marque and Texas City from 2000 to 2030. The Texas Water Development Board ("TWDB") projections show that population growth from 2000 to 2030 within Galveston County and the project area is expected to be much slower than that of the state. Population growth in both La Marque and Texas City is expected to follow historical trends and be negligible from 2000 to 2030.

**Table 2**  
**Future Population – Project Area**

Location	2000	2010	2020	2030	% Change		
					2000 to 2010	2010 to 2020	2020 to 2030
State of Texas	20,851,790	24,909,072	29,108,012	33,040,035	19.5	16.9	13.5
Galveston County	250,158	268,714	284,731	294,218	7.4	6.0	3.3
La Marque	13,682	13,682	13,682	13,682	0.0	0.0	0.0
Texas City	41,521	41,891	42,211	42,400	0.9	0.8	0.4

Source: TWDB, 2004

## Economic Characteristics

The Civilian Labor Force ("CLF") was studied from 1980 through 2000. Data was unavailable for La Marque and Texas City for 1980. As shown in Table 3, the growth of the CLF in Galveston County was slightly lower than that of the State of Texas during the 1980's and was much less than the state during the 1990's. During the 1990's, growth in the CLF in La Marque and Texas City lagged slightly behind that of Galveston County, and was much less than that of the state.

**Table 3**  
**Civilian Labor Force Within the Study Area**

Location	Civilian Labor Force				
	1980	1990	2000	% Change 1980-1990	% Change 1990-2000
State of Texas	6,861,977	8,618,780	10,401,557	25.6	20.7

Galveston County	97,692	113,407	119,198	16.1	5.1
La Marque	N/A	6,950	7,129	N/A	2.6
Texas City	N/A	20,232	20,881	N/A	3.2

Source: Texas Workforce Commission (TWC), 2004a

Covered Employment and Wages statistics are produced quarterly by the Texas Workforce Commission ("TWC"). This data contains employment and wage information for employers in Texas who pay unemployment insurance taxes. As of this writing, the second quarter 2003 data is the most recent covered employment data available. This data shows that the leading economic sectors in Galveston County are the following: Government (31.5 percent), Trade, Transportation, and Utilities (16.2 percent), and Leisure and Hospitality (13.1 percent) (TWC, 2004b).

The construction of the roadway improvements would likely result in increased short-term employment and revenues for local engineering and construction companies and supply and equipment businesses. Additionally, indirect and induced spending related to construction project wages would likely produce benefits within the local economy as purchases are made locally for fuel, food, lodging, and possibly building materials. No businesses or residences would be displaced by the proposed project.

## ENVIRONMENTAL JUSTICE

The proposed project is in compliance with Executive Order ("EO") 12898, federal action to address Environmental Justice ("EJ") in minority populations and low-income populations, which requires the determination of whether a proposed project would have adverse impacts on ethnic minority or low-income populations. The EO, signed on February 11, 1994, requires all federal agencies to address the impact of their programs with respect to EJ. The EO requires that minority and low-income populations not receive disproportionately high and adverse human health or environmental impacts, and requires that representatives of any low-income or minority populations that could be affected by the proposed project be involved in the community participation and public involvement process.

As defined by the Council on Environmental Quality ("CEQ"), a minority population is defined as either: (a) the minority population of the affected area exceeds 50 percent, or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate geographical analysis. Table 4 shows that the population living within the project study area has a percentage of minorities (25.4) less than 50 percent; therefore, the project study area is not considered a minority population. In addition, the project study area minority percentage is less than La Marque (51.6 percent) and Texas City (50.9 percent).

**Table 4**  
**Minority and Low-Income Characteristics**

Census Geography <sup>1</sup>		Total Pop.	Race/Ethnicity							Income	
Census Tract	Block Group		White	Black	American Indian/ Alaskan Native	Asian American	Hispanic or Latino <sup>2</sup>	Two or More Races	Racial Minority <sup>3</sup>	Below Poverty Level <sup>4</sup>	Median Household Income <sup>5</sup>
7224	4	7	42.9	0.0	57.1	0.0	0.0	0.0	57.1	0.0	\$90,957
7238	1	1,375	59.5	20.9	0.0	1.1	18.5	0.0	40.5	20.6	\$37,679
7238	2	1,016	95.3	0.0	1.0	0.0	2.6	1.1	4.7	2.0	\$88,891
Study Area Total		2,398	74.6	12.0	0.6	0.6	11.7	0.5	25.4	12.7	-
La Marque City		13,871	48.4	34.6	0.1	0.7	15.2	1.0	51.6	17.5	\$34,841
Texas City		41,391	49.1	26.9	0.4	1.2	20.7	1.3	50.9	14.9	\$35,963

Source: USBOC (2000a,b,c).

Notes: Minority populations are identified as either (a) the minority population of the affected area exceeds 50%, or (b) the minority population percentage of the affected area is meaningfully greater than the total population or other appropriate unit of geographical analysis (indicated by shading).

1. The census tract/block groups located within and/or adjacent to the study corridor were used to represent the population potentially affected by the proposed project.
2. Total of persons reporting as Hispanic or Latino ethnic origin. The U.S. Census Bureau considers ethnicity to be separate from race. Hispanic or Latino is an ethnic population and may be of any race.
3. Total of persons reporting in non-white racial categories, including Black or African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Hispanic or Latino, and Two or More Races.
4. 1999 poverty level data as reported in the 2000 Census (most recent available).
5. 1999 median household income as reported in the 2000 Census (most recent available). The U.S. Department of Health and Human Services 2008 poverty guideline for a family of four is \$21,200.

The Federal Highway Administration ("FHWA") Order 6640.23 defines "low-income" as a person whose household income is at or below the Department of Health and Human Services ("HHS") poverty guidelines. The 2008 HHS poverty guideline for a family of four is \$21,200. The median household incomes for the study area range from \$37,679 to \$90,957 and are above the HHS poverty guideline; therefore, the project study area is not considered a low-income population. The percentage of the study area population in poverty status (12.7 percent) is lower than La Marque (17.5 percent) and Texas City (14.9 percent). No impacts are anticipated to occur as a result of the proposed project, which would disproportionately impact minority or low-income populations.

## LEP Populations

EO 13166, "Improving Access to Services for Persons with Limited English Proficiency," signed by President Clinton on August 11, 2000, calls for all agencies to ensure that their federally-conducted programs and activities are meaningfully accessible to Limited English Proficiency ("LEP") individuals. Census data for "Ability to Speak English" for the population five years and over indicates an average of 2.8 percent of the population within the project study area speaks English "Not Well" or "Not at All" (Table 5). The project study area is not considered to contain a LEP population. However, no potential LEP populations would be discriminated against as a result of the proposed project because steps would be taken to ensure that such persons have meaningful access to the programs, services, and information

that TxDOT provides, i.e., accepting requests for language interpreters at the public meeting. Therefore, the requirements of EO 13166 appear to be satisfied.

**Table 5**  
**Limited English Proficiency Populations**

<b>Census Tract</b>	<b>Block Group</b>	<b>County</b>	<b>Percent of Population That Speak English "Less Than Very Well"</b>
7224	4	Galveston	0.0
7238	1	Galveston	4.7
7238	2	Galveston	0.3
<b>Study Area Total</b>			2.8

Source: USBOC, 2000d.

The proposed project is in compliance with EO 12898 regarding EJ and EO 13166 regarding LEP. The proposed project would not impact minority, low-income, or LEP populations.

## LAND USE

The surrounding area consists of a mixture of undeveloped, residential, commercial, and industrial land uses. Photographs of the project area are provided in Appendix A. Industrial development is located along the western side of existing LP 197 south of the Texas City Terminal Railway. The proposed project ROW crosses the Galveston, Houston & Henderson Railroad facilities and the Texas City Terminal Railway facilities. The MOTCO superfund site is located south of the new location direct connectors, and the Seaway Tank Farm is to the north. Substantial residential development is located farther south of the direct connectors along the southbound frontage road of IH 45 at Bayou Vista subdivision. One single-family residence is located north of the direct connectors. Commercial properties are also located south of the direct connectors. The remainder of the surrounding land use is undeveloped land. This includes the platted, undeveloped Causeway Park mobile home subdivision, Highland Bayou, and Virginia Point Wildlife Preservation. The platted mobile home subdivision was platted prior to the MOTCO site's superfund designation and is therefore unlikely to be developed. Due to the project's location between the MOTCO superfund site and Highland Bayou, development is not expected to occur on the vacant land within the study area. The proposed project will not impact future land use development.

## SOILS

According to the *Soil Survey of Galveston County, Texas*, the soils in the vicinity of the project area consist of Narta fine sandy loam (Na), Follet loam (Fo), and Leton loam (Le). All of these soils are derivatives of Pleistocene alluvium deposits. See Exhibit F for soil unit locations.

Follet loam (Fo) is a nearly level, very poorly drained, saline, loamy soil that has a loamy subsoil. It is in broad, tidal marshes and has an average slope of 0.1 percent. Typically, this soil has a surface layer that is mildly alkaline, gray loam about 8 inches thick. The upper part of the underlying material to a depth of 40 inches, is moderately alkaline, light gray loam. The lower part to a depth of 60 inches is moderately alkaline, light gray clay loam. The mapped areas are irregular in shape and range from 20 acres to several hundred acres. This soil is very slowly permeable, surface runoff is very slow, and frequently flooded by spring tides, storm tides, and rainstorms. Follet loam is listed as a hydric soil in Galveston County.

Leton loam (Le) is a nearly level, poorly drained, non-saline, loamy soil that has a loamy subsoil. It is in old stream meanders and depressional areas on the uplands. The slopes average about 0.3 percent. Typically, this soil has a surface layer that is neutral, dark gray loam about 5 inches thick. The subsurface layer to a depth of 12 inches is neutral, gray loam. The upper part of the subsoil to a depth of 26 inches is neutral, gray clay loam mixed with some gray loam. The lower part of the subsoil to a depth of 60 inches is moderately alkaline, light gray loam. The mapped areas range from oblong to long and narrow in old stream meanders and are generally circular in the depressional area that are not associated with stream meanders. This soil is slowly permeable above the high water table, surface runoff is very slow, or the soil is ponded and is occasionally flooded. These areas range from 5 to about 200 acres. Leton loam is listed as a hydric soil in Galveston County.

Narta fine (Na) sandy loam is nearly level, somewhat poorly drained, moderately saline, loamy soil that has a clayey subsoil. It is on the uplands that border the coastal marsh, and the slopes average about 0.3 percent. Typically, this soil has a surface layer that is moderately saline, mildly alkaline, dark gray fine sandy loam about 9 inches thick. The upper part of the subsoil, to a depth of 14 inches thick, is very dark gray clay. The middle part to a depth of 38 inches is gray clay. The lower part to a depth of 60 inches is light gray clay. This soil is moderately saline and moderately alkaline throughout the subsoil. This soil is very slowly permeable, surface runoff is very slow, and is rarely flooded by heavy rains and storm tides. The mapped areas are irregular in shape and range from 5 to 1,000 acres. This soil is listed as a hydric soil in Galveston County.

## **Farmland Protection Policy Act**

The Farmland Protection Policy Act ("FPPA") regulates impacts to soils designated by the Natural Resources Conservation Service ("NRCS") as prime, unique, and statewide or locally important farmland. Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, forage, oilseed, and other agricultural crops with minimum inputs of fuel, fertilizer, pesticides, and labor, and without intolerable soil erosion (NRCS, 1978). Unique farmland is land that is used for the production of specific high-value food and fiber crops. It has the special combination of soil quality, location, growing season, and moisture supply needed to economically produce sustained high quality or high yields of specific crops when treated and managed according to acceptable farming methods. The value of unique farmland is

derived from its particular advantages for growing specialty crops. Statewide and locally important farmland is defined by the appropriate state or local agency as important for the production of food, feed, fiber, forage, or oilseed crops. In accordance with the FPPA, the NRCS criteria for determining these types of soils are based on soil type and slope, regardless of whether or not the land in question is currently being used for agricultural purposes. According to a letter from the NRCS dated September 29, 2005, the project area contains Important Farmland Soils and is subject to the FPPA. A copy of this letter is on file at the TxDOT Houston District office.

In accordance with the FPPA, the additional ROW has been scored using the U.S. Department of Agricultural Farmland Conversion Impact Rating Form (Form AD-1006). The resulting score was below the required points to require coordination with the NRCS. A copy of the form is on file at the TxDOT Houston District Office.

## **BENEFICIAL LANDSCAPE PRACTICES**

In accordance with the Executive Memorandum of August 10, 1995, all agencies shall comply with the National Environmental Policy Act as it relates to vegetation management and landscape practices for all federally-assisted projects. The Executive Memorandum directs that where cost-effective and to the extent practicable, agencies would (1) use regionally native plants for landscaping; (2) design, use, or promote construction practices that minimize adverse effects on the natural habitat; (3) seek to prevent pollution by, among other things, reducing fertilizer and pesticide use; (4) implement water-efficient and runoff reduction practices; and (5) create demonstration projects employing these practices. Landscaping included with this project would be in compliance with the Executive Memorandum and the guidelines for environmentally and economically beneficial landscape practices.

## **INVASIVE SPECIES**

In accordance with EO 13112, native plant species of grasses, shrubs, or trees would be used in the landscaping and in the seed mixes. No invasive species would be used to revegetate the ROW and soil disturbance would be minimized to ensure that invasive species do not establish in the ROW.

## **VEGETATION**

According to *The Ecoregions of Texas* (Texas Parks & Wildlife Department ["TPWD"], 2002), the proposed project area is located within the Gulf Prairies and Marshes Ecoregion of Texas. The Gulf Marshes occupy a narrow strip of low, marshy, coastal area adjacent to the coast and barrier islands. No portion of the project area occurs within the Gulf Marshes. The project area lies entirely within the Gulf Prairies, a nearly flat plain that extends approximately 30 to 80 miles inland from the Gulf Marshes. The Gulf Prairies are characterized by nearly level topography with undissected plains of slow surface

drainage. Elevation extends from near sea level along the coast up to 200 feet above mean sea level. Annual precipitation averages 50.59 inches and mean annual temperature is typically 70°F.

According to *The Vegetation Types of Texas* (McMahon, et al., 1984), the proposed project area is located entirely within the "urban" community type, which consists of little or no vegetation other than ornamental species planted within commercial and residential developments.

The vegetation within the project area consists of typical maintained ROW vegetation, disturbed grassland from a remnant trailer park, a tidally-influenced salt marsh area, scrub-shrub wetlands, and emergent wetlands. A brief description of the vegetation communities found within the project area is presented below.

Along the intersections of the proposed direct connectors and IH 45, SH 3, SH 146, and LP 197, there are roadside ditches and maintained ROW vegetative communities consisting of broad-leaf cattail (*Typha latifolia*), Bermuda grass (*Cynodon dactylon*), common frog-fruit (*Phyla nodiflora*), dwarf glasswort (*Salicornia bigelovii*), sea oxeye (*Borrchia frutescens*), soft rush (*Juncus effusus*), sand spikerush (*Eleocharis montevidensis*), salt marsh bulrush (*Scripus maritimus*), and big-leaf sumpweed (*Iva frutescens*). Small areas with upland vegetation were observed on the upper banks of the existing ROW and sparsely throughout the project area. The upland pasture vegetation includes Chinese tallow-tree (*Sapium sebiferum*), Bahia grass (*Paspalum notatum*), big-leaf sumpweed, Bermuda grass, sand spikerush, gulf cordgrass (*Spartina spartinae*), huisache (*Acacia smallii*), and vines such as pepper-vine (*Ampelopsis arboea*), poison ivy (*Toxicodendron radicans*), and southern dewberry (*Rubus trivialis*).

The salt marsh located on the northwestern portion of the project near and adjacent to Highland Bayou and the intersection of IH 45 is dominated by vegetation that typically exists in hypertonic conditions. The vegetation identified in the tidally-influenced portion of the project includes gulf cordgrass, sand spikerush, salt marsh bulrush, sea oxeye, dwarf glasswort, and seashore dropseed (*Sporobulus virginicus*).

Emergent wetlands were identified throughout the project area. The vegetation observed in the emergent wetlands included black willow (*Salix nigra*), Chinese tallow, common frog-fruit, dwarf glasswort, soft rush, big-leaf sumpweed, Bermuda grass, seashore dropseed, and salt marsh bulrush.

The vegetation observed in the scrub-shrub wetlands included Chinese tallow, gulf cordgrass, green flatsedge (*Cyperus virens*), big-leaf sumpweed, lance-leaf gayfeather (*Liatris lancifolia*), sand spikerush, bushy bluestem (*Andropogon glomeratus*), and broad-leaf cattail.

## **Avoidance of Impacts to Vegetation**

Due to the land-clearing and ROW preparation, removal of the existing vegetation within the ROW is unavoidable.

## Minimization of Impacts to Vegetation

The primary impact to vegetation, resulting from site preparation and construction of the proposed project, would be the removal of existing vegetation within the proposed ROW. The extent of the area affected by the proposed project is primarily dependent upon dimensions of construction easements. Complete vegetation removal within these limits may not be necessary and would be minimized at all possible locations.

## Impacts Associated with the Build Alternative

The potential impact/removal acreages described herein are "worst case" calculations and the actual area cleared may be less. Measurements were made from an overlay based on true color aerial photography (1996) at a scale of 1 inch = 200 feet. The following list identifies the approximate aerial extent of vegetation communities within the proposed ROW that could potentially be impacted as a result of the Build Alternative (Table 6):

**Table 6**  
**Vegetative Communities Within the Proposed ROW**

Grassland	22.57 acres
Scrub-shrub	3.67 acres
Wetlands	9.35 acres

Potential indirect impacts are of the type that occur with any construction activity. For example, fugitive dust may accumulate on foliage of vegetation adjacent to the construction site, causing a temporary reduction of primary plant production. Soil erosion may result in sedimentation of downstream plant communities, and off-site pollution may occur as runoff carries oil and grease from heavy equipment to adjacent plant communities. However, these potential impacts would be minimized by implementing proper runoff and erosion control measures, dust suppression, and control and removal of accidental spills of fuel or waste oil during construction. As soon as possible after construction is complete, exposed soils would be stabilized by revegetation.

## Mitigation of Impacts to Vegetation

In accordance with Provision (4)(A)(ii) of the MOU between TxDOT and TPWD, and at the TxDOT Houston District's discretion, habitats given consideration for non-regulatory mitigation during project planning include the following:

1. Habitat for federal candidate species (impacted by the project) if mitigation would assist in the prevention of the listing of the species.
2. Rare vegetation series (S1, S2, or S3) that also locally provide habitat for a state-listed species.

3. All vegetation communities listed as S1 or S2, regardless of whether or not the series in question provide habitat for state-listed species.
4. Bottomland hardwoods, native prairies, and riparian sites.
5. Any other habitat feature considered locally important that the TxDOT District chooses to consider.

The existing vegetation within the project area does not meet the above criteria for non-regulatory mitigation. The project area does not include critical habitat for any federal candidate species, rare vegetation series, bottomland hardwoods, native prairies, or riparian sites. The vegetation within the project area is not considered to be locally important habitat; therefore, mitigation is not proposed for the impacts associated with the proposed project. Impacts to mature woody vegetation would be minimized where possible, and areas cleared of vegetation would be landscaped as outlined in the Executive Memorandum for Beneficial Landscaping Practices.

## WILDLIFE

The project area is located within Galveston County and crosses a portion of Highland Bayou. The intertidal marshes of Highland Bayou along the IH 45 Corridor provide nursery, foraging, and refuge habitats that support various recreationally and economically important marine fishery species, such as white shrimp (*Litopenaeus setiferus*), brown shrimp (*Farfantepenaeus aztecus*), Spanish mackerel (*Scomberomorus maculatus*), red drum (*Sciaenops ocellatus*), spotted seatrout (*Cynoscion nebulosus*), flounder (*Paralichthys* spp.), Atlantic croaker (*Micropogonias undulatus*), black drum (*Pogonias cromis*), gulf menhaden (*Brevoortia patronus*), striped mullet (*Mugil cephalus*), and blue crab (*Callinectes sapidus*). Other species located within Galveston County include the spotted gar (*Lepisosteus oculatus*), bay anchovy (*Anchoa mitchilli*), carp (*Cyprinus carpio*), golden shiner (*Notemigonus crysoleucas*), channel catfish (*Ictalurus punctatus*), sheepshead minnow (*Cyprinodon variegates*), Gulf killifish (*Fundulus grandis*), blackstripe topminnow (*Fundulus notatus/olivaceus*), bayou killifish (*Fundulus pulverous*), rainwater killifish (*Lucania parva*), mosquito fish (*Gambusia affinis*), sailfin molly (*Poecilia latipinna*), silverside (*Menidia beryllina*), Gulf pipefish (*Syngnathus scovelli*), warmouth (*Lepomis gulosus*), bluegill (*Lepomis macrochirus*), longear sunfish (*Lepomis megalotis*), spotted sunfish (*Lepomis punctatus*), largemouth bass (*Micropterus salmoides*), spot (*Leiostomus xanthurus*), naked goby (*Gobiosoma bosc*), clown goby (*Microgobius gulosus*), and freshwater flounder (*Achirus lineatus*) (TPWD, 2006).

Avian species known to nest in Galveston County include least terns (*Sterna antillarum*), seaside sparrow (*Ammodramus maritimus*), clapper rail (*Rallus longirostris*), and black crown night heron (*Nycticorax nycticorax*) (Sarkozi, 2006).

A variety of amphibians and reptiles are found in Galveston County. These species include marbled salamander (*Ambystoma opacum*), lesser siren (*Siren intermedia*), cricket frog (*Acris crepitans*), Gulf Coast toad (*Bufo valliceps*), Woodhouse's toad (*Bufo woodhousii*), eastern narrowmouth toad (*Gastrophryne carolinensis*), Great Plains narrowmouth toad (*Gastrophryne olivacea*), green treefrog (*Hyla cinerea*), bullfrog (*Rana catesbeiana*), southern leopard frog (*Rana sphenoccephala*), American alligator (*Alligator mississippiensis*), spiny softshell turtle (*Trionyx spinifera*), loggerhead (*Caretta caretta*), snapping turtle (*Chelydra serpentina*), chicken turtle (*Deirochelys reticularia*), leatherback (*Dermochelys coriacea*), eastern mud turtle (*Kinosternon subrubrum*), Atlantic ridley (*Lepidochelys kempi*), alligator snapping turtle (*Macrochelys temminckii*), river cooter (*Pseudemys concinna*), eastern box turtle (*Terrapene carolina*), five-lined skink (*Eumeces fasciatus*), northern prairie skink (*Eumeces septentrionalis*), house gecko (*Hemidactylus frenatus*), Texas horned lizard (*Phrynosoma cornutum*), ground skink (*Scincella lateralis*), copperhead (*Agkistrodon contortrix*), cottonmouth (*Agkistrodon piscivorus*), eastern racer (*Coluber constrictor*), western diamondback rattlesnake (*Crotalus atrox*), ringneck snake (*Diadophis punctatus*), eastern rat snake (*Elaphe obsoleta*), mud snake (*Farancia abacura*), western hognose snake (*Heterodon nasicus*), eastern hognose snake (*Heterodon platirhinos*), prairie kingsnake (*Lampropeltis calligaster*), common kingsnake (*Lampropeltis getula*), milk snake (*Lampropeltis triangulum*), coachwhip (*Masticophis flagellum*), eastern coral snake (*Micrurus fulvius*), glossy crayfish snake (*Regina rigida*), massasauga (*Sistrurus catenatus*), pygmy rattlesnake (*Sistrurus miliarius*), brown snake (*Storeria dekayi*), redbelly snake (*Storeria occipitomaculata*), western ribbon snake (*Thamnophis proximus*), common garter snake (*Thamnophis sirtalis*), and rough earth snake (*Virginia striatula*) (TAMU, 1998).

The mammals of Galveston County include the Virginia opossum (*Didelphis virginiana*), nine banded armadillo (*Dasyurus novemcinctus*), least shrew (*Cryptotis pava*), desert shrew (*Notiosorex crawfordi*), eastern red bat (*Lasiurus borealis*), hoary bat (*Lasiurus cinereus*), northern yellow bat (*Lasiurus intermedius*), Seminole bat (*Lasiurus seminolus*), western yellow bat (*Lasiurus xanthinus*), coyote (*Canis latrans*), red wolf (*Canis rufus*), red fox (*Vulpes vulpes*), common gray fox (*Urocyon cinereoargenteus*), northern raccoon (*Procyon lotor*), American mink (*Mustela vison*), northern river otter (*Lontra Canadensis*), eastern spotted skunk (*Spilogale putorius*), striped skunk (*Mephitis mephitis*), bobcat (*Lynx rufus*), eastern fox squirrel (*Sciurus niger*), Baird's pocket gopher (*Geomys breviceps*), marsh rice rat (*Oryzomys palustris*), Fulvous harvest mouse (*Reithrodontomys fulvescens*), white-footed mouse (*Peromyscus leucopus*), northern pygmy mouse (*Baiomys taylori*), hispid cotton rat (*Sigmodon hispidus*), muskrat (*Ondatra zibethicus*), nutria (*Myocastor coypus*), swamp rabbit (*Sylvilagus aquaticus*), eastern cottontail (*Sylvilagus floridanus*), and black-tailed jackrabbit (*Lepus californicus*) (Schmidly, 1994).

The proposed project is located within an urbanized area. The project area is currently bordered or traversed by LP 197, IH 45, SH 146, and two railroads; therefore, the proposed work is not expected to fragment or otherwise alter any existing wildlife habitats within the project limits. Trees observed within

the project area provide potential migratory bird habitat. A cursory nest survey was conducted during initial environmental investigations. No nests were observed during the survey.

Typical short-term construction impacts on water quality include increased turbidity and siltation. High turbidity is either tolerated by many species or temporarily displaces the fish until acceptable levels of turbidity are restored. However, high levels of turbidity can create situations that clog the gills of fish and reduce their ability to extract oxygen from the water. Turbidity and sedimentation may also affect food supplies and the ability of a fish to locate prey. While fish normally recover quickly from stress, such circumstances during spawning seasons may reduce reproductive success. Construction of the proposed project would include temporary erosion control measures to decrease turbidity and siltation during construction. These may include the use of silt fencing, inlet protection barriers, hay bales, seeding or sodding of bare areas, or other suitable means of containment. Temporary erosion control structures would be built before construction begins (where appropriate) and maintained during construction. Vegetation would be cleared only as needed, and clearing may be phased to maintain soil integrity and minimize exposure of an erosive surface.

The increased noise and activity levels during construction could potentially disturb breeding or other activities of species inhabiting the areas adjacent to the construction area. Once construction is complete and the road is in operation, traffic noise would have only a slight, if any, additional impact on wildlife. Thus, impacts from noise are expected, on the whole, to be temporary.

## **ESSENTIAL FISH HABITAT**

The Magnuson-Stevens Fishery Conservation and Management Act ("MSFCMA"), as amended on October 11, 1996, directs that all federal agencies whose actions would impact essential fish habitat ("EFH") consult with the National Marine Fisheries Service ("NMFS") regarding potential adverse effects. As a result, any project receiving federal funding must address potential impacts to EFH. EFH is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding, or growth to maturity" (16 USC 1802(10)). Areas identified as EFH include sand and mud substrates, submerged aquatic vegetation ("SAV") and shell reefs, the estuarine water column, and the tidally-connected wetlands within the project area.

EFH was evaluated for the proposed project through literature reviews and a field survey conducted in February 2006. EFH literature reviews were conducted utilizing published data from the Gulf of Mexico Fishery Management Council ("GMFMC") and scientific literature. These reviews revealed that the proposed projects are located in an area that has been identified as EFH for both juveniles and adults of the following species: brown shrimp, white shrimp, juvenile red shrimp, and juvenile Spanish mackerel. All life stages of these species are managed under MSFCMA. EFH for these species has been identified as sand, mud, and shell hash substrates, SAV, emergent marsh, and the estuarine/marine water column. Table 7 lists those four species and their potential seasonal abundances within the project area.

**Table 7**  
**Species Managed by MSFCMA Within the Project Area**

Common Name	Scientific Name	Life Stage	Abundance				EFH Within Project Area
			Low Salinity Season (Apr-Jun)	Increasing Salinity Season (Jul)	High Salinity Season (Aug-Oct)	Decreasing Salinity Season (Nov- Mar)	
Brown shrimp	<i>Farfantepenaeus aztecus</i>	Juvenile	Highly Abundant	Highly Abundant	Highly Abundant	Abundant	Y
		Adult	Common	Common	Common	Rare	Y
White shrimp	<i>Litopenaeus setiferus</i>	Juvenile	Abundant	Highly Abundant	Highly Abundant	Highly Abundant	Y
		Adult	Rare	Common	Common	Common	Y
Red drum	<i>Sciaenops ocellatus</i>	Juvenile	Common	Common	Common	Common	Y
		Adult	Common	Common	Common	Common	N
Spanish mackerel	<i>Scomberorus maculatus</i>	Juvenile	Common	Common	Common	Rare	Y
		Adult	Common	Common	Common	Rare	N

Highland Bayou is located on the west/northwest portion of the project area near the intersection of the proposed direct connectors and IH 45. Highland Bayou, two emergent wetlands, and one drainage ditch are tidally influenced and consist of 1.81 acres of open water and 0.54 acre of wetland within the project area. In addition to Highland Bayou, a total of 6.53 acres of wetlands and an additional 0.48 acre of open water occur within the proposed project area. EFH within of the ROW includes open water, scrub/shrub wetlands, silty substrate, salt marsh, and emergent marshes. The limits of the EFH follow the mean higher high water mark elevations surveyed. According to a field survey conducted in February 2006, this mark occurs at 1.4 feet.

The majority of impacts to EFH as a result of the proposed construction are expected to be temporary. Temporary water quality disturbance is anticipated from the increase in sediment deposits resuspended during the construction activities. While the short-term disruption of sediments and elevated turbidity levels may occur, turbidity levels are not expected to exceed turbidity experienced during heavy storm events.

No permanent negative impacts to oyster reefs would occur from the proposed project construction. Adult and juvenile red drum, juvenile Spanish mackerel, brown shrimp, and white shrimp may be impacted temporarily and locally by construction activities. Direct permanent impacts are not expected, while indirect impacts may occur from an increase in turbidity caused by construction activities. Although the potential exists that individuals may be affected, none of the impacts are considered to be detrimental to the habitat or existence of any species' population regulated by the NMFS.

Based on the above findings, the proposed project would not create substantial adverse impacts to EFH; therefore, no mitigation for EFH would be required. All comments and revisions received from NMFS regarding the EFH evaluation have been incorporated into the EA. A coordination letter regarding the

proposed project was sent to NMFS on October 26, 2006; however, a response has not been received. Coordination efforts will continue as TxDOT approaches the Section 404 permitting process for the proposed project.

## THREATENED AND ENDANGERED SPECIES

The state and federal threatened and endangered species indigenous to Galveston County are listed in Table 8.

**Table 8**  
**State and Federal Threatened and Endangered Species of Galveston County**

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present
<b>Birds</b>					
American peregrine falcon	<i>Falco peregrinus anatum</i>	E	DM†	Potential migrant, winters along Gulf Coast	No
Arctic peregrine falcon	<i>Falco peregrinus tundrius</i>	T	DM†	Potential migrant, winters along Gulf Coast	No
Attwater's greater prairie-chicken	<i>Tympanuchus cupido attwateri</i>	E	E	Thick 1-3' tall grass from 0'-200' above sea level along coast	No
Bald eagle	<i>Haliaeetus leucocephalus</i>	T	T, AD†	Near water areas in tall trees	No
Brown pelican (nesting)	<i>Pelecanus occidentalis</i>	E	DM, E	Island near coastal areas	No
Eskimo curlew	<i>Numenius borealis</i>	E	E	Grasslands, pastures, plowed fields	No
Piping plover (wintering)	<i>Charadrius melodus</i>	T	E, T	Beach and bayside mud or salt flats	No
Reddish egret	<i>Egretta rufescens</i>	T	*	Brackish marshes and tidal flats	Yes
White-faced ibis	<i>Plegadis chihi</i>	T	*	Freshwater marshes, but some brackish or salt marshes	Yes
White-tailed hawk	<i>Buteo albicaudatus</i>	T	*	Coastal prairies	No
Whooping crane	<i>Grus americana</i>	E	E†	Winters in Aransas NWR	Yes
Wood stork	<i>Mycteria americana</i>	T	*	Prairie ponds and flooded pastures	No
<b>Mammals</b>					
Louisiana black bear	<i>Ursus americanus luteolus</i>	T	T†	Bottomland hardwoods; large, undisturbed forested areas	No
Red wolf	<i>Canis rufus</i>	E	E†	Formerly known through eastern half of Texas in brushy and forested areas, coastal prairies	No
West Indian manatee	<i>Trichechus manatus</i>	E	E†	Gulf and bay system	No

Common Name	Scientific Name	State Status	Federal Status	Habitat Description	Habitat Present
<b>Reptiles</b>					
Alligator snapping turtle	<i>Macrolemys temminckii</i>	T	T†	Deep water of freshwater rivers and canals	No
Atlantic hawksbill sea turtle	<i>Eretmochelys imbricata</i>	E	E	Gulf and bay system	No
Green sea turtle	<i>Chelonia mydas</i>	T	E, T	Gulf and bay system	No
Kemp's ridley sea turtle	<i>Lepidochelys kempii</i>	E	E	Gulf and bay system	No
Leatherback sea turtle	<i>Dermochelys coriacea</i>	E	E	Gulf and bay system	No
Loggerhead sea turtle	<i>Caretta caretta</i>	T	T	Gulf and bay system	No
Texas horned lizard	<i>Phrynosoma cornutum</i>	T	*	Open, semi-arid regions, with bunch grass	No
Timber/canebrake rattlesnake	<i>Crotalus horridus</i>	T	*	Swamps/floodplains of hardwood/upland pine	No

\* These species occur on the state listing of threatened or endangered species; however, they are not federally listed at this time by the U.S. Fish and Wildlife Service (2006).  
 † These species are listed by the U.S. Fish and Wildlife Service; however, they are not listed to occur within this county by the Clear Lake field office of the U.S. Fish and Wildlife Service (2006).  
 E = Endangered, T = Threatened, DM = delisted taxon, recovered, being monitored first five years, AD = proposed delisting  
**NOTE:** The species in the State Status column are listed by the TPWD on the *Annotated County Lists of Rare Species* (May 2007). The species indicated in the Federal Status column are listed by the USFWS on the *County-by-County Listing: Listed/Candidate Species and Species of Concern Within Clear Lake Office Area of Responsibility* (May 2006).

In September 2003 and November 2006, a literature review of the TPWD's Natural Diversity Database ("NDD") system (formerly the Biological and Conservation Database) was conducted to identify known occurrences of threatened/endangered species within the vicinity of the project area. Based on the review of the NDD's, there are no documented occurrences of federally threatened or endangered species within the project area or within 1,000 feet of the project area.

Many rare and protected species included in Table 8 have a historic range that includes the project area. The following discussion includes a description of the preferred habitat and habitat components within the project area of those species whose range could overlap with the project area.

### Birds

The reddish egret, a state-listed threatened species, typically inhabits salt bays and marshes. Its breeding range is restricted to the Gulf Coast where it commonly nests in yucca-pricklypear thickets (Oberholser, 1974). The reddish egret may occur within the study area during post-breeding visits. The proposed project would have a negligible impact on marshes and is not likely to adversely affect any reddish egret that might be present in the vicinity of the project. In addition, this species has most likely adopted avoidance behavior in response to the existing IH 45 and surrounding roadways; therefore, no effects to reddish egrets are expected to occur as a result of the direct connectors.

The white-faced ibis, a state-listed threatened species, forages bays, marshes, lakes, and ponds (Rappole and Blacklock, 2004). The proposed project would have a negligible impact on marshes and is not likely to affect any white-faced ibis that might be present in the vicinity of the project. In addition, this species has most likely adopted avoidance behavior in response to the existing IH 45 and surrounding roadways; therefore, no effects to white-faced ibises are expected to occur as a result of the direct connectors.

The whooping crane, a federal and state-listed endangered species, winters in the Aransas National Wildlife Refuge and adjacent areas of the Central Texas Gulf Coast. During seasonal migrations, the whooping crane forages and roosts in palustrine wetlands, usually with water depths of 1 to 6 inches (Lewis, 1995). Galveston County and the project area are included in the whooping crane's migratory range. The proposed project would have a negligible impact on palustrine wetlands and more suitable habitat is available nearby. In addition, this species has most likely adopted avoidance behavior in response to the existing IH 45 and surrounding roadways; therefore, no effects to whooping cranes are expected to occur as a result of the direct connectors.

### Reptiles

The Atlantic hawksbill sea turtle, a federal and state-listed endangered species, is a small- to medium-sized ocean-dwelling turtle that prefers shallow coastal waters with rocky bottoms or coral reefs. Its normal range is the warmer waters of the Atlantic but is occasionally seen nesting on Texas beaches. There are no beaches located within the project area; therefore, suitable habitat for this turtle does not exist within the project area.

The green sea turtle, a federal and state-listed threatened species, is an ocean-dwelling turtle that prefers shallow coastal waters with abundant marine plants. Its normal range is the warmer waters of the Atlantic. It is sometimes seen nesting on the Texas beaches. There are no beaches located within the project area; therefore, suitable habitat for this turtle does not exist within the project area.

Kemp's ridley sea turtle, a federal and state-listed endangered species, prefers shallow coastal waters, coming ashore to nest on sandy beaches. This turtle's normal range is the open seas of the warmer waters of the Atlantic and the Gulf of Mexico. It is seen on the beaches of South Texas during nesting. There are no beaches located within the project area; therefore, suitable habitat for this turtle does not exist within the project area.

The normal range of the leatherback sea turtle, a federal and state-listed endangered species, is the open seas of the warmer waters of the Atlantic, moving into coastal waters only during the reproductive season. During nesting, it is seen on Texas beaches from the mouth of the Sabine River to just north of Corpus Christi. There are no beaches located within the project area; therefore, suitable habitat for this turtle does not exist within the project area.

The loggerhead sea turtle, a federal and state-listed threatened species, is an ocean-dwelling turtle, but it may also frequent large coastal bays. It comes ashore to nest on sandy beaches. These turtles are found worldwide in tropical and temperate waters where temperatures exceed 10°C. This turtle is sometimes seen nesting on Texas beaches. There are no beaches or coastal bays located within the project area; therefore, the project area is not considered suitable habitat for this turtle.

Although migrating individual sea turtles may occur within any tidally-influenced waters along the Gulf of Mexico, their occurrence is expected to be rare due to the high levels of human disturbance, high turbidity, shallow water depths, soft sand to silt substrate, little to no aquatic vegetation, and overall lack of preferred habitat within the project area. The proposed project would have a negligible impact on tidally-influenced waters; therefore, no effects to any sea turtle species are expected to occur as a result of the direct connectors.

After evaluation of the best available data and site surveys, a determination of no effect for the proposed activities was concluded. A letter was submitted to the United States Fish and Wildlife Service ("USFWS") on June 9, 2004, and on December 19, 2006, requesting written documentation regarding compliance with the Endangered Species Act of 1973. On February 9, 2007, USFWS concurred that the project is not likely to adversely affect any federally listed species under their jurisdiction. Appendix B includes all coordination with the USFWS.

## **HISTORIC PROPERTIES**

Because this project includes federal and state funding, the project must comply with the requirements of Section 106 of the National Historic Preservation Act ("NHPA"), its implementing regulations of 36 Code of Federal Regulations ("CFR") Part 800, and the Texas Antiquities Code. TxDOT has met the requirements of Section 106 under the terms and conditions of the First Amended Programmatic Agreement ("PA") among the FHWA, TxDOT, the Texas State Historic Preservation Officer ("SHPO"), and the Advisory Council on Historic Preservation regarding the Implementation of Transportation Undertakings (PA, 2005). TxDOT has satisfied the requirements of the Texas Antiquities Code by following the stipulations of the Memorandum of Understanding ("MOU") between TxDOT and the THC. As specified in the PA and MOU, the archeological Area of Potential Effect ("APE") comprises existing and new ROW and any other areas impacted by the proposed project.

Compliance with Section 106 of the NHPA also requires that FHWA consult with federally-recognized Native American tribes regarding projects with the potential to affect archaeological deposits. In addition, PA's among TxDOT, FHWA, and some federally-recognized tribes specify that consultations need only occur under certain circumstances. TxDOT, working on behalf of FHWA, would determine and initiate such consultations as required with federally-recognized Native American tribes under Section 106 of the NHPA and the PA's.

A site file and records review was conducted utilizing the records at the Texas Archeological Research Laboratory ("TARL") and the Texas Historical Commission ("THC"). The TARL records were reviewed for the location of previously recorded archeological sites within 1,000 feet of the existing and proposed ROW for the project area. The THC records were reviewed for properties listed or determined eligible for listing on the National Register of Historic Places ("NRHP") and/or for sites designated as State Archeological Landmarks ("SAL"), also within 1,000 feet of the existing and proposed ROW for the project area. Previously recorded archeological sites were not identified within the project area. Coordination with the Galveston County Historical Commission was also conducted for properties listed or determined eligible for listing on the NRHP (Appendix B). The U.S. Geological Survey ("USGS") 7.5-minute topographic map (Virginia Point, Texas) of the project area is provided in Exhibit B.

The records review indicated that no NRHP-listed properties were previously recorded within the project area. It was recognized, however, that the project area could contain resources eligible for listing in the NRHP, but not yet recognized and recorded with the THC. To help identify such "unrecorded" sites that might qualify for NRHP eligibility, reviews were conducted of official state historic marker files, published county histories, historic publications, vertical files, and newspaper articles.

## **Historic Structures**

A historic resources survey was conducted by a TxDOT-certified architectural historian in June 2004 to identify historically important buildings and structures within the proposed project's APE. The entire IH 45 Wye construction project area, which extends along IH 45 from FM 1764 to the Galveston Causeway and includes the proposed IH 45/LP 197 direct connectors, was included in the survey. For purposes of the historic structures survey, the project area and APE are defined as an area extending 500 feet beyond both sides of the existing and proposed ROW. The term "potential resource" refers to any architectural resource site that is, or will be, 50 years of age or older at the time of project construction (built prior to 1955). For purposes of project planning, a projected construction date of 2005 was selected. The 50-year age criterion is derived directly from the criteria for NRHP eligibility. However, to be eligible for NRHP listing, a resource must also meet one of four primary eligibility criteria and retain historical integrity with respect to location, design, setting, materials, workmanship, feeling, and association.

Two potentially historic resources were identified within the project area. These buildings or structures included one radio tower and one railroad. The radio tower is abandoned and no longer in use. The railroad is a portion of the Galveston, Houston and Henderson Railroad, originally constructed in 1857 at Virginia Point. Still in use, it appears that this railroad track has been rebuilt multiple times. Neither of these sites is recommended for NRHP listing. The THC concurred that none of the identified sites within the IH 45 Wye APE, including the radio tower and railroad, are eligible for NRHP listing on August 30, 2004 (Appendix B). See Exhibit F for locations of these properties. A copy of the Historic Architectural Report is on file with both the TxDOT-Houston District office and the ENV office.

In a subsequent site visit, a qualified TxDOT historian revisited the proposed project area on November 8, 2006, to determine if potential eligible structures were present within the APE, dating from 1955 to 1960. This additional five-year survey would cover any structures that would be 50 years of age at the date of letting. No resources were found. Pursuant to Stipulation VI, "Undertakings with Potential to Cause Effects," of the First Amended Statewide PA among the FHWA, the SHPO, the Advisory Council on Historic Preservation, TxDOT, and the MOU, TxDOT historians have determined no historic properties are present within the proposed project's APE and further coordination with the SHPO is not necessary (Appendix B).

## **Archeological Sites**

According to the Houston Potential Archeological Liability Map ("PALM") Geographic Information System ("GIS") database compiled by TxDOT Environmental Affairs Division, the project area traverses Map Units 0, 2, and 4 (Exhibit G). Map Unit 0 is open water and a survey is not recommended. For Map Unit 2, a surface survey is recommended; however, deep reconnaissance is not recommended. For Map Unit 4, a survey is not recommended.

In June and September of 2004, a cultural resources survey was conducted by qualified archeologists to locate cultural resource sites within the project area. The survey located no cultural resource sites and no artifacts were collected or curated. The lack of cultural resources within the project area is likely due to the high degree of modern disturbance and the high percentage of wetland. Based on these results, there are no historic archeological properties present within the project's APE; therefore, no further work and a finding of "no historic properties affected" is recommended. The THC concurred with these findings on March 10, 2005 (Appendix B).

If during construction any other unexpected archeological sites are encountered, all work in the immediate area of the discovery would cease, TxDOT archeologists would be contacted, and the accidental discovery procedures would be implemented as outlined in the PA among TxDOT, the THC, the FHWA, the Advisory Council on Historic Preservation, and the MOU between TxDOT and the THC.

## **PARKLAND**

The proposed project would not impact any wildlife or waterfowl refuges, publicly-owned parklands, or recreational areas; therefore, a Section 4(f) evaluation is not required. In addition, the proposed project would not impact any areas of unique scenic beauty or other lands of national, state, or local importance. The proposed project is located adjacent to the John M. O'Quinn I-45 Estuarial Corridor and Virginia Point Peninsula Preserve; however, these properties would not be impacted and access into the properties would be available.

## **WETLANDS AND WATERS OF THE U.S.**

A wetland delineation was conducted in the field for the proposed project during June and September of 2004 to determine the location and extent of any waters of the U.S., including wetlands, within the project area that are subject to the jurisdiction of the U.S. Army Corps of Engineers ("USACE"), Galveston District, pursuant to Section 404 of the Clean Water Act and/or Section 10 of the Rivers and Harbors Act. During field surveys, seven wetlands, eight ditches, and five water crossings were identified within the proposed project area.

The surveyed delineation boundaries, including acreage calculations for each wetland and water, are provided in Exhibit H. Table 9 presents a summary of the waters of the U.S., including wetlands, within the proposed project area.

**Table 9**  
**Waters of the U.S., Including Wetlands, Within the Project Area**

Map ID (Exhibit H)	Potential Jurisdiction (acres)				Total
	Section 10		Section 404		
	Wetland	Water	Wetland	Water	
Wet 1	0.13	--	5.59	--	5.72
Wet 2	0.07	--	--	--	0.07
Wet 3	--	--	0.17	--	0.17
Wet 4	--	--	0.01	--	0.01
Wet 5	--	--	0.04	--	0.04
Wet 6	--	--	0.19	--	0.19
Wet 7	--	--	0.12	--	0.12
Wet 8	--	--	0.15	--	0.15
Water 1	--	--	--	0.16	0.16
Water 3	--	--	--	0.18	0.18
Water 5	--	--	--	0.12	0.12
Bayou 1	0.17	0.43	--	--	0.60
Bayou 2	0.59	0.62	--	--	1.21
Bayou 3	--	0.16	--	--	0.16
Ditch 2	0.02	--	--	--	0.02
Ditch 3	--	--	0.12	--	0.12
Ditch 4	--	--	0.28	0.02	0.30
Ditch 5	--	--	0.01	--	0.01
<b>Subtotal</b>	<b>0.98</b>	<b>1.21</b>	<b>6.68</b>	<b>0.48</b>	<b>9.35</b>
<b>Upland Drainage Ditches Not Subject to §404 or §10 Jurisdiction</b>					
Ditch 1	-				0.04
Ditch 6	-				0.06
Ditch 7	-				0.05
Ditch 8	-				0.11
<b>Subtotal</b>	-				<b>0.26</b>
<b>Total Potential Jurisdictional Wetlands and Waters Within the Project Area</b>	<b>2.19</b>		<b>7.16</b>		<b>9.35</b>

## **Waters of the U.S.**

Water 1, an unnamed tributary of Highland Bayou, is located northeast of the Texas City Terminal Railway within the existing IH 45 ROW. Based on review of USGS topographic maps, the Flood Insurance Rate Map ("FIRM"), and 1995 color infrared aerial Digital Orthophoto Quarter Quadrangle ("DOQQ") photography, Water 1 is considered a jurisdictional water of the U.S. subject to Section 404 jurisdiction. Water 1 consists of 0.16 acre of waters of the U.S. (open water) within the existing ROW.

Water 3 is an open-water drainage that runs beneath IH 45 and the frontage roads. Water 3 connects to Wetland 3, which is also a direct connection to two other natural waters of the U.S. Based on review of USGS topographic maps, the FIRM, and 1995 color infrared aerial DOQQ photography, Water 3 is considered a jurisdictional water of the U.S. subject to Section 404 jurisdiction. Water 3 consists of 0.18 acre of waters of the U.S. (open water) within the existing ROW.

Water 5 is an open-water feature within the existing LP 197 ROW that is connected to drainage that once crossed LP 197. Water 5 is considered a jurisdictional water of the U.S. subject to Section 404 jurisdiction. Water 5 consists of 0.12 acre of waters of the U.S. (open water) within the existing ROW.

Highland Bayou (Bayou 1, Bayou 2, and Bayou 3) is located on the west-northwest portion of the project area, near the intersection of the proposed direct connectors and IH 45. Highland Bayou consists of 1.97 acres of waters of the U.S. (open water) within the project area. Highland Bayou is a tidally-influenced waterway and thus is subject to Section 10 jurisdiction.

## **Wetlands**

The proposed alignment crosses seven wetlands (including the fringe wetlands associated with roadside ditches) and four adjacent drainage ditches. Photographs taken during the field investigation are provided in Appendix A. Below is a brief description of each identified wetland within the project area. Wetland classifications discussed below are based on descriptions in *Classification of Wetlands and Deepwater Habitats of the U.S.* (Cowardin, et al., 1979).

Wetland 1 (Wet 1, 5.72 acres) is a palustrine emergent ("PEM") wetland located east of IH 45. The vegetation observed in Wet 1 includes big-leaf, Chinese tallow tree, gulf cordgrass, dwarf spikerush, and little bluestem. According to the FIRM map, Wet 1 is located within the 100-year floodplain. According to historic USGS topographic maps, Wet 1 is also located just below an upland ridge, suggesting it received drainage runoff from this area. The current USGS topographic map (1994) does not show this ridge. This area is located in Narta fine sandy loam soil, which is listed as a hydric soil. Approximately 0.13 acre of Wet 1 is subject to the ebb and flow of the tide present in Highland Bayou and is therefore subject to Section 10 of the Rivers and Harbors Act. Approximately 5.59 acres of Wet 1 are located within the mapped 100-year floodplain and are therefore subject to Section 404 of the Clean Water Act. These changes in jurisdiction are represented graphically in Exhibit H.

Wetland 2 (Wet 2, 0.07 acre) and Ditch 2 (0.02 acre) are located on the east side of IH 45, just south of Highland Bayou (Bayou 2). This PEM wetland and ditch are located at the intersection of the proposed LP 197 direct connectors and IH 45. The vegetation observed in Wet 2 and Ditch 2 included broad-leaf cattail, Bermuda grass, sea oxeye, dwarf glasswort, sumpweed, and seashore dropseed. Wet 2 and Ditch 2 are located within the 100-year floodplain. The mean high water elevations for Highland Bayou also extend up through Ditch 2, within the LP 197 proposed project limits, and a portion of Wet 2; therefore, Ditch 2 and Wet 2 are considered potentially subject to Section 10 jurisdiction.

Wetland 3 (Wet 3, 0.17 acre), Ditch 3 (0.12 acre), Ditch 4 (0.30 acre), and Ditch 5 (0.01 acre) are located along the eastern portion of the project area near the intersection of the proposed LP 197 direct connectors and existing LP 197. Ditch 5 is a side ditch that connects into Ditch 4. The vegetation observed along Wet 3, Ditch 3, Ditch 4, and Ditch 5 included soft rush, saltmarsh bulrush, sand spikerush, cattail, common frog-fruit, black willow, and Chinese tallow. Wet 3, Ditch 3, Ditch 4, and Ditch 5 are located within the 100-year floodplain. A review of historic USGS topographic maps and aerial photography also indicate that the ditches were historically constructed in a wetland. Therefore, Wet 3, Ditch 3, Ditch 4, and Ditch 5 are considered potentially subject to Section 404 jurisdiction by virtue of adjacency.

Wetland 4 (Wet 4, 0.01 acre) is a PEM wetland located west of SH 146 and east of Wet 4. Wet 4 is adjacent to a power line easement within the proposed LP 197 connector ROW. The vegetation observed within Wet 4 includes black willow, Chinese tallow-tree, and big-leaf sumpweed. Wet 4 is located within the 100-year floodplain; therefore, Wet 4 is considered potentially subject to Section 404 jurisdiction by virtue of adjacency.

Wetland 5 (Wet 5, 0.04 acre), Wetland 6 (Wet 6, 0.19 acre), Wetland 7 (Wet 7, 0.12 acre), and Wetland 8 (Wet 8, 0.15 acre) are located along the western/northwestern portion of the project area near the intersection of IH 45 and the Texas City Terminal Railway. The vegetation observed along Wet 5, Wet 6, Wet 7, and Wet 8 includes soft rush, Drummond's rattlebush, saltmarsh bulrush, big-leaf sumpweed, annual glasswort, sea oxeye, sand spikerush, cattail, and green flatsedge. Wet 5, Wet 6, Wet 7, and Wet 8 are located within the 100-year floodplain. Therefore, Wet 5, Wet 6, Wet 7, and Wet 8 are considered potentially subject to Section 404 jurisdiction by virtue of adjacency.

Four additional drainage ditches—Ditch 1 (0.04 acre), Ditch 6 (0.06 acre), Ditch 7 (0.05 acre), and Ditch 8 (0.11 acre, photo-interpreted)—are located within the proposed ROW. These ditches do not appear to have been historically constructed in a wetland and do not have a surface tributary connection to other waters of the U.S. Therefore, Ditch 1, Ditch 6, Ditch 7, and Ditch 8 are considered upland drainage ditches not subject to Section 10/404 jurisdiction.

## **Impacts Associated with the Build Alternative**

A total of 9.35 acres of waters of the U.S., including wetlands, are located within the proposed project area. Of the 9.35 acres, 2.19 acres are subject to Section 10 of the Rivers and Harbors Acts and 7.16 acres

are subject to Section 404 of the Clean Water Act. In order to minimize impacts to wetlands, the proposed project would use elevated sections over the wetland locations.

Detailed design information regarding fill quantities could not be determined based upon the preliminary information at the time of report preparation. Once the final design has been completed for the proposed project, fill quantities and exact impact amounts to waters of the U.S., including wetlands, would be determined.

Based on the preliminary calculations, the proposed project would require an Individual Permit due to the discharge of fill material into waters of the U.S., including wetlands, within the project area.

## **WATER QUALITY**

According to the Texas Commission on Environmental Quality's ("TCEQ") 2004 Texas Water Quality Inventory Report and Texas 303(d) List, the segment of Highland Bayou within the proposed project area has elevated levels of bacteria and depressed dissolved oxygen. The level of bacteria does not meet applicable water quality standards and therefore renders the segment partially supporting aquatic life. Because impacts to Highland Bayou may occur from the proposed project, coordination with the TCEQ regarding Section 303(d), Listed Waters, and Section 401, Water Quality Certification, is required.

No long-term water quality impacts are expected as a result of the proposed project. Subsurface water would not be required for this project; therefore, no adverse effects to groundwater are expected to occur. The proposed project is not expected to alter rainfall drainage patterns or contaminate or otherwise adversely affect the public water supply, water treatment facilities, or water distribution systems. The proposed connector ramps would not change, divert, or add to the existing water resource. Construction phase impacts may occur, but best management practices would be implemented throughout the duration of the project.

## **FLOODPLAINS**

Based on a review of the FIRM's for Galveston County, the entire project area is located within the Regulatory Floodway Zone of the 100-year floodplain and is mapped as Zone AE (Exhibit F). Zone AE includes areas in which base flood elevations have been determined. Galveston County is a participant in the National Flood Insurance Program ("NFIP").

The hydraulic design of the proposed improvements would be in accordance with the current TxDOT and FHWA policy standards. The roadway would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable, without causing substantial damage to the roadway or other property. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances.

The proposed improvements would require the placement of permanent fill material within the 100-year floodplain of Highland Bayou. Currently, a hydraulic study is being conducted by TxDOT for the proposed project to determine impacts on the 100-year floodplain. Upon completion of the hydraulic study, TxDOT will respond appropriately as directed by the Galveston County Floodplain Administrator and will devise a mitigation plan to offset the construction impacts.

## **COASTAL ZONE MANAGEMENT PLAN**

The proposed project is located within the boundary of the Texas Coastal Management Program ("CMP"). TxDOT has reviewed the proposed action for consistency with the CMP goals and policies in accordance with the regulations of the Coastal Coordination Council and has determined that the proposed action is consistent with the applicable CMP goals and policies.

## **PERMITS**

### **U.S. Army Corps of Engineers**

A total of 9.35 acres of waters of the U.S., including wetlands, are located within the proposed project area. Of the 9.35 acres, 2.19 acres are subject to Section 10 of the Rivers and Harbors Acts and 7.16 acres are subject to Section 404 of the Clean Water Act. It is anticipated that the proposed project would impact jurisdictional waters of the U.S., including wetlands, and thus require a Section 404 and/or a Section 10 Individual Permit. After completion of the USACE field verification, the total impacts to jurisdictional waters of the U.S., including wetlands, will be calculated and an Individual Permit application will be submitted to the USACE Galveston District.

### **U.S. Coast Guard**

The proposed project does not cross a navigable waterway; therefore, a U.S. Coast Guard bridge permit is not required.

### **Texas Commission of Environmental Quality**

TCEQ regulates the discharge of stormwater from certain construction sites that disturb one or more acres of land. Since this project would disturb five or more acres of land, a TCEQ Texas Pollutant Discharge Elimination System ("TPDES") Construction General Permit would be required. In addition, the project would require a Notice of Intent ("NOI") to be filed with the TCEQ.

In accordance with TxDOT policies, a Storm Water Pollution Prevention Plan ("SW3P") would be prepared before construction and followed during construction. Pollution from stormwater would be minimized through adherence to measures in the project's SW3P. Construction of the proposed project would include temporary erosion control measures to minimize impacts to water quality during construction as specified in the TxDOT manual, "Storm Water Management and Guidelines for

Construction Activities." These may include the use of silt fencing, inlet protection barriers, hay bales, seeding or sodding of bare areas, or other suitable means of containment. Temporary erosion control structures would be built before construction begins (where appropriate) and maintained during construction. Vegetation would be cleared only as needed, and clearing may be phased to maintain soil integrity and minimize exposure of an erosive surface. When construction is completed, disturbed areas would be restored and reseeded according to the TxDOT specification, "Seeding for Erosion Control."

The TCEQ has developed a tiered (Tier I and Tier II) system of review for Section 401, Water Quality Certification, to determine the extent in which projects affect water resources of the State of Texas. Tier I reviews apply to relatively small projects that impact less than 3 acres of state waters, including wetlands, or 1,500 linear feet of streams. Tier II reviews apply to projects that do not qualify for a Tier I review or projects in which the applicant does not elect to incorporate Tier I criteria or prefers to use alternatives to obtain certification. A total of 9.35 acres of waters of the U.S., including wetlands, are located within the proposed ROW. Detailed design information regarding fill quantities and impact acreages could not be determined based upon the preliminary information at the time of report preparation. Once the final design has been completed for the proposed project, exact impact amounts to waters of the U.S., including wetlands, would be determined.

Based on the preliminary calculations, the proposed project would be evaluated under criteria required for Tier II projects.

The proposed project would incorporate Best Management Practices such as sod, silt fencing, hay bale dikes, and vegetative filter strips. Vegetation within the existing ditches would be replanted after construction and act as vegetative filter strips. Other areas of the ROW would be seeded with native species of grasses, shrubs, or trees as needed.

## **AIR QUALITY**

The project is located within Galveston County, which is designated a moderate ozone non-attainment area; therefore, the transportation conformity rules apply. Design year traffic data is estimated to be 12,240 vehicles per day; therefore, a Traffic Air Quality Analysis is not required because previous analyses of similar projects did not result in a violation of National Ambient Air Quality Standards ("NAAQS"). This project is not adding single-occupancy vehicle capacity and is therefore exempt from a Congestion Management Systems analysis.

The proposed action is consistent with the area's financially constrained Metropolitan Transportation Plan (2035 RTP) and the FY 2008-2011 TIP as proposed by the Houston-Galveston Area Council. The RTP and TIP were found to conform to the State Implementation Plan ("SIP") on November 9, 2007. All projects in the Houston-Galveston Area Council TIP that are proposed for federal or state funds were initiated in a manner consistent with federal guidelines in Section 450 of Title 23 CFR and Section

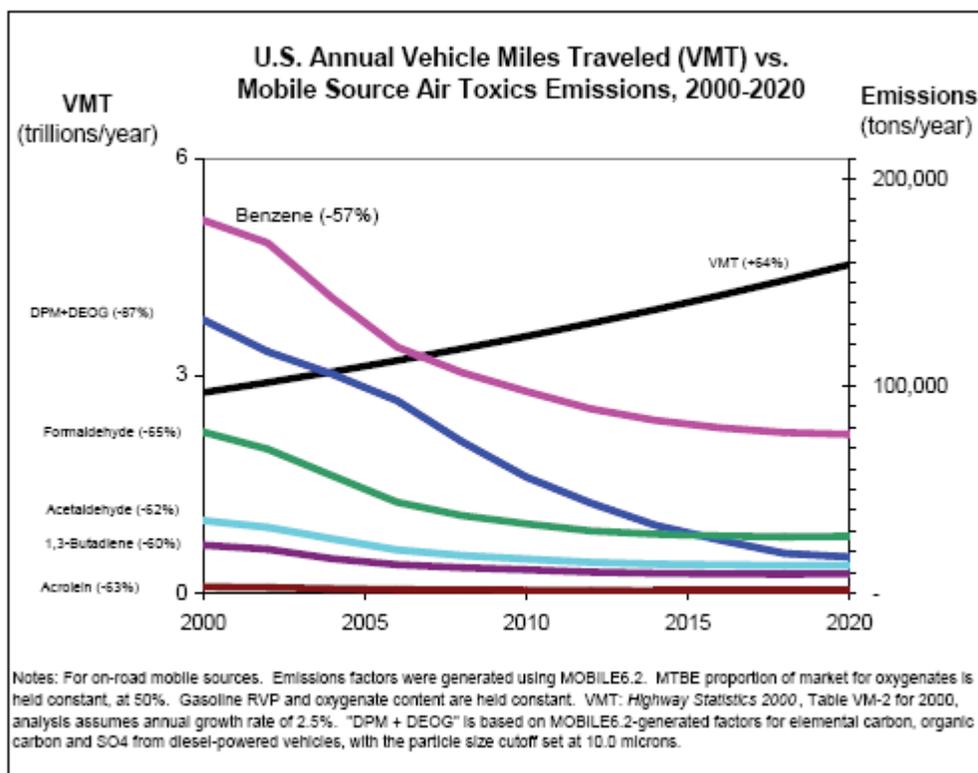
613.200, Subpart B, of Title 49 CFR. Energy, environment, air quality, cost, and mobility considerations are addressed in the programming of the TIP.

## **MSAT Analysis**

In addition to the criteria air pollutants for which there are NAAQS, the Environmental Protection Agency ("EPA") also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners) and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics ("MSAT") are a subset of the 188 air toxics defined by the Clean Air Act. MSAT's are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

The EPA is the lead federal agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSAT's. EPA issued a Final Rule on *Controlling Emissions of Hazardous Air Pollutants from Mobile Sources* (66 FR 17229, March 29, 2001). This rule was issued under the authority in Section 202 of the Clean Air Act. In its rule, EPA examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline program, its national low emission vehicle standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy-duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in vehicle miles traveled ("VMT"), these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 to 65 percent, and will reduce on-highway diesel particulate matter ("PM") emissions by 87 percent, as shown in the following graph:



As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSAT's. The agency is preparing another rule under authority of Clean Air Act Section 202(l) that will address these issues and could make adjustments to the full 21 and the primary six MSAT's.

Numerous technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project (see "Unavailable Information for Project-Specific MSAT Impact Analysis" at the end of this section for more information). However, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative assessment cannot identify and measure health impacts from MSAT's, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA entitled, A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, found at: [www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm](http://www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm).

For each alternative in this EA, the amount of MSAT's emitted would be proportional to the VMT, assuming that other variables, such as fleet mix, are the same for each alternative. Because the VMT estimated for the No-Build Alternative is higher than for the Build Alternative, higher levels of regional

MSAT's are not expected from the Build Alternative compared to the No-Build Alternative. Emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the project area are likely to be lower in the future in virtually all locations.

Because of the specific characteristics of the proposed project (i.e., new connector roadways), there may be localized areas where VMT would increase and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the direct connectors. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In summary, under the Build Alternative in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSAT reduction programs. In comparing various project alternatives, MSAT levels could be higher in some locations than others, but current tools and science are not adequate to quantify them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be significantly lower than today in most cases.

### ***Sensitive Receptor Assessment***

There may be localized areas where ambient concentrations of MSAT's are slightly higher in any build scenario than in the no-build scenario. Dispersion studies have shown that the "roadway" air toxics start to drop off at about 100 meters. By 500 meters, most studies have found it very difficult to distinguish the roadway from background toxic concentrations in any given area. An assessment of some potential sensitive receptors within both 100 and 500 meters was conducted for the proposed project. Sensitive receptors include those facilities most likely to contain large concentrations of the more sensitive population (hospitals, schools, licensed day cares, and elder-care facilities). As shown in Exhibit I, no sensitive receptors are located within 500 meters of the proposed ROW.

### ***Unavailable Information for Project-Specific MSAT Impact Analysis***

This EA includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable us to predict the project-specific health impacts of the emission changes associated with the alternatives in this EA. Due to these limitations, the following discussion is

included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information.

***Information that is Unavailable or Incomplete***

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

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

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

2. **Dispersion**: The tools to predict how MSAT's disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. The National Cooperative Highway Research Program is conducting research on best practices in

applying models and other technical methods in the analysis of MSAT's. This work also will focus on identifying appropriate methods of documenting and communicating MSAT impacts in the NEPA process and to the general public. Along with these general limitations of dispersion models, FHWA is also faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

3. Exposure Levels and Health Effects: Finally, even if emission levels and concentrations of MSAT's could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSAT's near roadways and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupported assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSAT's because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts. Consequently, the results of such assessments would not be useful to decision-makers, who would need to weigh this information against other project impacts that are better suited for quantitative analysis.

### ***Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSAT's***

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

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

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System ("IRIS") is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at <http://www.epa.gov/iris>. The following toxicity information for the six prioritized MSAT's was taken from the IRIS database Weight of Evidence Characterization summaries. This information is taken

verbatim from EPA's IRIS database and represents the agency's most current evaluations of the potential hazards and toxicology of these chemicals or mixtures.

- Benzene is characterized as a known human carcinogen.
- The potential carcinogenicity of acrolein cannot be determined because the existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure.
- Formaldehyde is a probable human carcinogen, based on limited evidence in humans and sufficient evidence in animals.
- 1,3-butadiene is characterized as carcinogenic to humans by inhalation.
- Acetaldehyde is a probable human carcinogen based on increased incidence of nasal tumors in male and female rats and laryngeal tumors in male and female hamsters after inhalation exposure.
- Diesel exhaust is likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel PM and diesel exhaust organic gases.
- Diesel exhaust also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSAT's. Prolonged exposures may impair pulmonary function and could produce symptoms such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

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

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

***Relevance of Unavailable or Incomplete Information to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based Upon Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community***

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. (As noted above, the current emissions model is not capable of serving as a meaningful emissions analysis tool for smaller projects.) Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

**NOISE**

This analysis was accomplished in accordance with TxDOT's (FHWA-approved) Guidelines for Analysis and Abatement of Highway Traffic Noise. 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." Common sound levels for indoor and outdoor noise are listed in Table 10.

**Table 10**  
**Common Sound/Noise Levels**

<b>Outdoor</b>	<b>dBA</b>	<b>Indoor</b>
Pneumatic hammer	100	Subway Train
Gas lawn mower at 3 feet		
	90	Food blender at 3 feet
Downtown (large city)	80	Garbage disposal at 3 feet
Lawn mower at 100 feet	70	Vacuum cleaner at 10 feet
		Normal speech at 3 feet
Air conditioning unit	60	Clothes dryer at 3 feet
Babbling brook		Large business office
Quiet urban (daytime)	50	Dishwasher (next room)
Quiet urban (nighttime)	40	Library

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.
- Consideration and evaluation of measures to reduce noise impacts.

The FHWA has established the following Noise Abatement Criteria ("NAC") for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur (Table 11).

**Table 11**  
**FHWA Noise Abatement Criteria**

<b>Activity Category</b>	<b>dBA Leq</b>	<b>Description of Land Use Activity Areas</b>
<b>A</b>	<b>57 (exterior)</b>	Lands on which serenity and quiet are of extraordinary 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>B</b>	<b>67 (exterior)</b>	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
<b>C</b>	<b>72 (exterior)</b>	Developed lands, properties or activities not included in Categories A or B above.
<b>D</b>	<b>--</b>	Undeveloped lands.
<b>E</b>	<b>52 (interior)</b>	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

NOTE: Primary consideration is given to exterior areas (Category A, B, or C) where frequent human activity occurs. However, interior areas (Category E) are used if exterior areas are physically shielded from the roadway or if there is little or no human activity in exterior areas adjacent to the roadway.

A noise impact would occur 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 1 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: The predicted noise level substantially exceeds the existing noise level at a receiver even though the predicted noise level does not approach, equal, or exceed the NAC. "Substantially exceeds" is defined as more than 10 dBA. For example, a noise impact would occur at a Category B residence if the existing level is 54 dBA and the predicted level is 65 dBA (11 dBA increase).

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.

The FHWA traffic noise modeling software was used to calculate predicted traffic noise levels. 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.

Existing and predicted traffic noise levels were determined at one receiver location (Table 12 and Exhibit J) that represents 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.

**Table 12**  
**Traffic Noise Levels (dBA Leq)**

<b>Receiver</b>	<b>NAC Category</b>	<b>NAC Level</b>	<b>Measured Levels</b>	<b>Predicted 2033</b>	<b>Change (+/-)</b>	<b>Noise Impact</b>
R1: Single-Family Home	B	67	53	58	5	No

As indicated in Table 12, the proposed project would not result in a traffic noise impact.

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

A copy of this traffic noise analysis will be made available to local officials to ensure to the maximum extent possible that future developments are planned, designed, and programmed in a manner that would 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.

## **HAZARDOUS MATERIALS**

The contractor would take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. The use of construction equipment within sensitive areas would be minimized or eliminated entirely. All construction materials used for this project would be removed as soon as work schedules permit. Any unanticipated hazardous materials and/or petroleum contamination encountered during construction would be handled according to applicable state and federal regulations and TxDOT Standard Specifications and Guidelines for handling emergency discovery of hazardous materials.

## **Historical Use of Property and Regulatory Records Review**

The Phase I Environmental Site Assessment ("ESA") of the Texas City Wye Interchange (November 2004) was reviewed in order to identify potential hazardous material impacts within the project area. Historical aerial photographs, historical topographic maps, and historical city directories were reviewed for the Phase I ESA. In addition, a regulatory database search provided by a commercial source, Atlas

Environmental Research, Inc. ("Atlas") was reviewed in September 2003 to identify listed hazardous material sites within 1.0 mile of the project area. The Atlas database is provided in Appendix C. There were 10 listed regulated facilities located within the search distance of the project area. In order to further evaluate potential impacts of the project area, the TCEQ or EPA files were obtained and reviewed for five of these sites. The local fire department was also contacted regarding spills within the project area. The Phase I ESA is on file at TxDOT Houston District.

## **Visual Observation**

A visual observation was conducted during May 2004 for evidence of hazardous substances and/or contamination within the proposed project area. Properties located immediately adjacent to the project area were observed to identify releases and the potential for releases of petroleum products or hazardous substances. In addition, the observation included verifying the results of a review of historical aerial photographs, historical topographic maps, city directories, and the results of a hazardous materials database search. Specifically, field personnel were tasked to identify suspect hazardous materials facilities not listed in the database and listed facilities that were not mapped correctly. The detailed results of all identified areas of concern are included in the Phase I ESA.

Based on the review of historical data, the agency database records, and the site reconnaissance, there are eight sites within the study area. These sites are listed in Table 13 below and the locations of these sites are included as Exhibit F. Of these eight sites, six have potential to impact the preferred alternative: the MOTCO Superfund site, the former trailer park, Seaway Tank Farm property, BP Amoco Land Treatment Facility, railroad tracks, and pipeline crossings.

**Table 13**  
**Sites with Potential to Impact Project Area**

Site Description	Database*	Distance from Project Area	Potential Impacts
MOTCO Superfund site	NPL CERCLIS PST	Within Project Area	Potential for encountering soil and groundwater contamination; redesign and relocation of remediation system components
T&S Fleet Services (formerly Dispose All)	LPST	Adjoining Project Area	None anticipated, but potential for contaminated stormwater to flow toward the project area
Triton Metal Buildings (formerly Central Freight)	LPST	Adjoining Project Area	Potential for relocating MOTCO groundwater monitoring wells
Former trailer park	--	Within Project Area	Potential removal of solid waste debris, septic systems, and water wells
Seaway Tank Farm	RCRIS	Within Project Area	Potential for contaminated fill material within project area
BP Amoco hazardous waste land treatment facility	RCRIS	Adjoining Project Area	Potential for contaminated soils and/or sediments in the roadside ditch
Southern Pacific, Galveston-Houston & Henderson railroad tracks	--	Within Project Area	Potential for encountering contaminated railroad ballast and/or underlying contaminated soil during any construction activities that involve excavation within the railroad ROW
Petroleum and natural gas pipeline crossings	--	Within Project Area	Pipelines may require relocation, and contamination could be encountered during construction activities

\* Resource Conservation and Recovery Information System (RCRIS), National Priorities List (NPL), Comprehensive Environmental Response, Compensation, and Liability Information System (CERCLIS), petroleum storage tank (PST), leaking petroleum storage tank (LPST)

A Phase II subsurface investigation would be required to confirm if contamination from the sites listed in Table 13 would be encountered during construction. If contamination is confirmed, then TxDOT would develop appropriate vapor, soils, and/or groundwater management plans for activities in these locations.

The petroleum and natural gas pipelines may require relocation. There is the potential for encountering contamination during construction activities. Coordination with the pipeline companies regarding potential activities would be addressed during the ROW acquisition stage of the project development. It is anticipated that all pipeline adjustments and relocations would be completed prior to construction. There is a potential for encountering contaminated railroad bed ballast and/or underlying contaminated soil during any construction activities that may involve excavation within the railroad ROW.

## CONSTRUCTION IMPACTS

Construction of the proposed project would occur during a single phase. The proposed project would not adversely impact traffic during construction. The existing traffic lanes along IH 45 and the existing LP 197 would be maintained at all times during construction.

Due to operations normally associated with road construction, there is a possibility that noise levels would be above normal in the areas adjacent to the ROW. Construction is normally limited to daylight hours when occasional loud noises are more tolerable. Extended disruption of normal activities for any one receptor is not considered likely. Every reasonable effort would be made to minimize construction noise.

Construction may temporarily degrade air quality through dust and exhaust gases associated with construction equipment. Measures to control dust would be considered and incorporated into the final design and construction specifications.

The contractor would take appropriate measures to prevent, minimize, and control the spill of hazardous materials in any construction staging areas. The use of construction equipment within sensitive areas would be minimized or eliminated entirely. All construction materials used for this project would be removed as soon as work schedules permit.

## **INDIRECT AND CUMULATIVE IMPACTS**

FHWA describes consequences of an action as falling into two broad categories—those that are "direct and observable," and those that are "indeterminate and not easily recognized" (FHWA, 1992). This second category is called "indirect and cumulative impacts." In general, indirect and cumulative impacts include those consequences of the proposed action that are not direct and may not be readily observable.

Specifically, indirect effects are "those that are caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Cumulative impacts are defined as "those which result from the incremental consequences of an action when added to other past and reasonably foreseeable future actions" (40 CFR 1508.7). Indirect and cumulative impacts are less defined than direct impacts; however, they can generally be described when they are foreseeable.

Growth and development are the principal secondary impacts related to highway improvement projects. By definition, cumulative impacts are incremental in nature and tend to be less defined than indirect impacts. A typical example of a cumulative impact may be an incremental take of a wetland first with minor portions of the wetland filled for highway use, potentially followed by further loss of the wetland as land use transitions occur.

Indirect impacts to economic, environmental, and social attributes of the project area resulting from the proposed project would be minimal. Commercial development currently exists within the project area. Local and regional economic growth would be the determining factors in future development in this area. Appreciable indirect impacts would not be expected to affect water quality or adjacent habitats. No indirect social impacts are anticipated because the project does not bisect any communities that are not already bisected by existing roadway corridors.

Cumulative impacts would be minimal based on population and economic growth projections, which are dependent on variables exclusive of the proposed construction. Existing roadway corridors would be utilized and the current socioeconomic landscape would be maintained.

In accordance with TxDOT guidelines (2006), the analysis of cumulative impacts addresses the following: (1) identification of resources; (2) definition of the study area for each resource; (3) description of the current health and historical context of each resource; (4) identification of direct and indirect impacts that may contribute to cumulative impacts; (5) identification of other reasonably foreseeable future actions that may contribute to cumulative impacts on the identified resources; (6) assessment of potential cumulative impacts to each resource; (7) report the results; and (8) assess and discuss mitigation issues for all adverse impacts.

### Determination of Resources Included in the Cumulative Impacts Analysis

According to TxDOT guidance, if a project does not cause direct or indirect impacts on a resource, it will not contribute to a cumulative impact on that resource. This analysis focuses on resources that are affected by the proposed project and considered to be at risk of declining, even though the proposed project's direct and indirect impacts are relatively minor. The proposed project would not cause significant direct impacts. Indirect impacts are described by resource category in Table 14. It is difficult to determine the degree to which a roadway induces development. Although transportation infrastructure is a key element of development, it is often built by developers if public funds are not available. Considering this is the primary indirect impact category, several resources were identified for analysis while others were dismissed as described in Table 14.

**Table 14**  
**Determination of Resources Included in the Cumulative Impacts Analysis**

<b>Resource</b>	<b>Summary of Direct Impacts</b>	<b>Indirect Impacts</b>	<b>Topic to be Included in Cumulative Impact Analysis</b>	<b>Reason Eliminated from Cumulative Impact Analysis</b>
Local and Regional Economics	Potential positive and negative impacts to property values may occur; positive economic impacts during construction and operation.	Potential positive indirect impacts due to increased tax income for city and county as the area develops.	No	No business displacements. Other economic impacts are considered beneficial.
Environmental Justice	No communities would be bisected by proposed project; proposed roadway would increase access and mobility for future truck traffic. No relocations/displacements would be required by the proposed project; socioeconomic data do not indicate the presence of minority or low-income communities in the project area.	Access and circulation for communities would be enhanced by proposed project; however, concerns regarding safety for Bayou Vista residents entering and leaving SH 6.	No	Impacts not substantial; resource not at risk.

<b>Resource</b>	<b>Summary of Direct Impacts</b>	<b>Indirect Impacts</b>	<b>Topic to be Included in Cumulative Impact Analysis</b>	<b>Reason Eliminated from Cumulative Impact Analysis</b>
Land Use	11.09 acres of existing land uses converted to transportation ROW.	Land use development adjacent to proposed roadway may be accelerated by construction of roadway.	Yes	N/A
Prime Farmland	1.63 acres of prime farmland soils converted to transportation ROW.	Although some prime farmland soils occur in the area, no land dedicated agricultural use is expected to be converted to transportation ROW through induced development.	No	Impacts not substantial; resource not at risk.
Vegetation	11.09 acres of vegetation would be converted to transportation ROW.	The vegetation within the project area consists of typical maintained ROW vegetation, disturbed grassland, a tidally-influenced salt marsh area, scrub-shrub wetlands, and emergent wetlands.	No	Impacts not substantial; resource not at risk.
Wildlife, Including Threatened and Endangered Species		The proposed project is located within an urbanized area and would not be expected to fragment or otherwise alter any existing wildlife habitats within the project limits.	No	Impacts not substantial; resource not at risk.
Historic Resources	No NRHP properties would be impacted by the proposed project.	No indirect impacts because there would be no visual impacts on the NRHP eligible properties in the APE.	No	Impacts not substantial; resource not at risk.
Archeological Resources	No recorded sites in project area APE.	Unrecorded sites in induced development areas may be affected by private development (no regulatory protection available).	No	Low probability of encountering sites.
Parkland	No parklands would be impacted by the proposed project.	The proposed project is located adjacent to the John M. O'Quinn I-45 Estuarial Corridor and Virginia Point Peninsula Preserve; however, these properties would not be impacted and access into the properties would be available.	No	Impacts not substantial; resource not at risk.
Water Resources	9.35 acres of potential jurisdictional wetlands and waters of the U.S. would be converted to transportation ROW.	Based on preliminary calculations, the proposed project would require an Individual Permit due to the discharge of fill material into waters of the U.S., including wetlands.	Yes	N/A
Floodplains	11.09 acres floodplains affected by proposed project (entire project area is located within 100-year floodplain).	The proposed project would require the placement of permanent fill material within the 100-year floodplain of Highland Bayou.	Yes	N/A

Resource	Summary of Direct Impacts	Indirect Impacts	Topic to be Included in Cumulative Impact Analysis	Reason Eliminated from Cumulative Impact Analysis
Air Quality	Projected traffic volumes require Traffic Air Quality Analysis.	There may be localized areas where vehicle miles traveled (VMT) would increase, and other areas where VMT would decrease.	No	Under the Build Alternative in the design year, it is expected there would be reduced MSAT emissions in the immediate area of the proposed project, relative to the No-Build Alternative.
Noise	The proposed project would not result in a traffic noise impact.	Concerns were raised during the public meeting regarding noise along IH-45 South; however, sensitive noise receivers were identified and no noise impacts were observed.	No	No impacts; resource not at risk.
Hazardous Materials	There were five sites with the potential to impact the proposed project.	The petroleum and natural gas pipelines may require relocation. There is a potential for encountering contaminated railroad bed ballast and/or underlying contaminated soil during any construction activities that may involve excavation within the railroad ROW.	No	A Phase II subsurface investigation would be required to confirm if contamination from the sites would be encountered during construction.

### Definition of Study Area for Each Resource Considered in Cumulative Impacts Analysis

The Resource Study Area ("RSA") for each resource was chosen based on the determination of the potential direct impacts and indirect impacts arising primarily from changes in land use occurring along the proposed project, as well as other known projects that may contribute to cumulative impacts. The RSA's are reviewed from both temporal and geographic perspectives. The timeframe in which impacts to resources are considered for this analysis is the five decades from 1980 to 2030. Table 15 lists the geographic area reviewed for the RSA for each resource.

**Table 15**  
**Resource Study Area (RSA) for Each Resource Considered in the Cumulative Impacts Analysis**

Resource	RSA
Land Use	City of La Marque, City of Texas City, Galveston County
Water Resources	Galveston County
Floodplains	Galveston County

## **Current Health and Historical Context of Resources**

### *Land Use*

Land uses in the RSA consist primarily of undeveloped, residential, commercial, and industrial land uses. Industrial development is located along the western side of existing LP 197 south of the Texas City Terminal Railway. Substantial residential development is located to the south of the direct connectors along the southbound frontage road of IH 45 at Bayou Vista subdivision. Commercial properties are located south of the direct connectors. Rural transportation and urban land uses have increased in recent years (1992 to 1997), while most other land uses have remained fairly stable. Future land uses are expected to be residential with some commercial at intersections.

### *Water Resources*

During field surveys, seven wetlands, eight ditches, and five water crossings were identified within the proposed project area. A total of 9.35 acres of waters of the U.S., including wetlands, are located within the proposed project area. Of the 9.35 acres, 2.19 acres are subject to Section 10 of the Rivers and Harbors Act and 7.16 acres are subject to Section 404 of the Clean Water Act. Based on the preliminary calculations, the proposed project would require an Individual Permit due to the discharge of fill material into waters of the U.S., including wetlands, within the project area. Historical trends in the RSA have resulted in the widespread utilization of wetlands for grazing and forage/crop production.

### *Floodplains*

Galveston County is a participant in the Federal Emergency Management Agency's ("FEMA") NFIP. According to FEMA's FIRM's for Galveston County, the entire project area is located within the Regulatory Floodway Zone of the 100-year floodplain and is mapped as Zone AE (Exhibit F). Historical trends in the RSA have resulted in the widespread utilization of floodplains for grazing and forage/crop production. Developed land uses are minimal within mapped floodplains because floodplains and floodway mapping deters development.

## **Identification of Direct and Indirect Impacts That May Contribute to Cumulative Impacts**

A summary of direct and indirect impacts that may contribute to cumulative impacts are summarized in Table 16.

## **Other Past, Present, and Reasonably Foreseeable Future Actions**

In addition to the direct and indirect impacts of the proposed project, several other actions have affected, or are likely to affect, local land use and water resources.

*Other Non-Transportation Projects*

**Development of Shoal Point Terminal Facility.** The City of Texas City is currently constructing a new container terminal on a 400-acre undeveloped site northeast of the proposed project at Shoal Point. The Shoal Point Container Terminal would meet a regional need for development of a containerized cargo gateway driven by the growth in container traffic within the Texas Central Gulf region. Over 10,000 daily truck trips are expected to be generated in 2025 by the proposed container terminal. The Shoal Point Container Terminal project will provide access from the terminal to LP 197 at the FM 519 intersection.

*Other Transportation Projects*

**16th Avenue Exit from SH 146 to 29th Street.** The City of Texas City proposes to construct a two-lane concrete roadway with curb and gutter on new location from SH 146 to 29th Street (Houston-Galveston Area Council ["H-GAC"] 2006-2008 TIP, 2006).

**25th Avenue from SH 3 to SH 146.** Galveston County and the City of Texas City propose to construct a four-lane divided road from SH 3 to SH 146 (H-GAC 2006-2008 TIP, 2006).

**Holland Road Exit from IH 45 to Attwater Avenue.** The City of Texas City proposes to construct a four-lane roadway on new location from IH 45 to Attwater Avenue (H-GAC 2006-2008 TIP, 2006).

**Potential Cumulative Impacts**

The proposed project, in combination with other past, present, and reasonably foreseeable future actions discussed above, would cumulatively impact the health of these three resources. Some impacts would be positive, some negative, but all are considered generally mild in terms of their intensity and context. Table 16 provides a matrix for understanding the cumulative impacts on the two resources within their respective RSA's.

**Table 16**  
**Summary of Potential Cumulative Impacts**  
**(Direct and Indirect Impacts)**

Resource	Proposed Alternative		Past Transportation Infrastructure Construction	Development of Shoal Point Terminal Facility	16th Avenue Exit from SH 146 to 29th Street	25th Avenue from SH 3 to SH 146	Holland Road Exit from IH 45 to Altwater Ave.	Potential Cumulative Impacts	Health of Resource
	Direct Impacts	Indirect Impacts							
Land Use	11.09 acres of existing land uses converted to transportation ROW.	Land use development adjacent to proposed roadway may be accelerated by construction of roadway.	Conversion from undeveloped land uses to transportation ROW and residential, commercial, and industrial development.	Land use development adjacent to proposed roadway may be accelerated by construction of terminal facility.	Land use development adjacent to proposed roadway may be accelerated by construction of new roadway.	Land use development adjacent to proposed roadway may be accelerated by construction of new roadway.	Land use development adjacent to proposed roadway may be accelerated by construction of new roadway.	Minor potential acceleration of existing development trends.	Stable
Water Resources	9.35 acres of potential jurisdictional wetlands and waters of the U.S. would be converted to transportation ROW.	Land use development adjacent to proposed roadway may be accelerated by construction of roadway.	Wetlands converted to transportation and residential, commercial, and industrial land.	Wetlands could be converted to transportation and residential, commercial, and industrial land.	Wetlands could be converted to transportation and residential, commercial, and industrial land.	Wetlands could be converted to transportation and residential, commercial, and industrial land.	Wetlands could be converted to transportation and residential, commercial, and industrial land.	Loss of wetlands due to increased urbanization.	Generally good
Floodplains	11.09 acres floodplains affected by proposed project (entire project area is located within 100-year floodplain).	Potential increased stormwater runoff impacts to floodplain anticipated should additional development occur.	Some increased impervious cover and stormwater runoff.	Some increased impervious cover and stormwater runoff.	Some increased impervious cover and stormwater runoff.	Some increased impervious cover and stormwater runoff.	Some increased impervious cover and stormwater runoff.	Some increased urbanization could bring about more rapid discharge, diminished flood control capacity, and floodplain encroachment. Within cities, floodplain/floodway mapping deters development within these features.	Generally good

## **Discussion of Mitigation Issues**

### *Land Use*

Development plans are subject to city and county subdivision plat approval processes and/or land use development codes. The proposed project includes mostly vacant land within the cities of La Marque and Texas City. Any land use development taking place within the cities or the extraterritorial jurisdiction would be subject to the cities' land use development regulations and policies. Development proposed within the cities would be subject to the county's development review process.

### *Water Resources*

TCEQ regulates the discharge of stormwater from certain construction sites that disturb one or more acres of land. Since this project would disturb five or more acres of land, a TCEQ TPDES Construction General Permit would be required. In addition, the project would require an NOI to be filed with the TCEQ.

The TCEQ has developed a tiered system of review for Section 401, Water Quality Certification, to determine the extent in which projects affect water resources of the State of Texas. Tier I applies to projects that impact less than 3 acres of state waters, including wetlands, or 1,500 linear feet of streams. Tier II applies to projects that do not qualify for a Tier I review or projects in which the applicant does not elect to incorporate Tier I criteria or prefers to use alternatives to obtain certification. Once the final design has been completed for the proposed project, exact impact amounts to waters of the U.S., including wetlands, would be determined. Based on the preliminary calculations, the proposed project would be evaluated under criteria required for Tier II projects.

In accordance with TxDOT policies, an SW3P would be prepared before construction and followed during construction. Construction of the proposed project would include temporary erosion control measures to minimize impacts to water quality during construction. These Best Management Practices would include sod, silt fencing, hay bale dikes, and vegetative filter strips. Vegetation within the existing ditches would be replanted after construction and act as vegetative filter strips. Other areas of the ROW would be seeded with native species of grasses, shrubs, or trees as needed.

### *Waters of the U.S., Including Wetlands*

If the discharge of fill material into jurisdictional waters of the U.S., including wetlands, is unavoidable as a result of the proposed project, the appropriate level of USACE coordination would be initiated. Detailed design information regarding exact fill quantities could not be determined based upon the preliminary design information at the time of report preparation. Once the final design has been

completed for the proposed project, fill quantities and exact impact amounts to waters of the U.S., including wetlands, would be determined. Based on preliminary calculations, the proposed project would require an Individual Permit due to the discharge of fill material into waters of the U.S., including wetlands, within the project area. Compensatory mitigation is anticipated and TxDOT Houston District will consider its mitigation options once the types of impacts can be further assessed during the permitting process.

### *Floodplains*

EO 11988 requires federal agencies to avoid actions, to the extent practicable, that will result in the location of facilities in floodplains and/or affect floodplain values. Any road structures required for this project that lie within floodplains will be planned and located so as not to interfere with stream flow or create a flood hazard. The hydraulic design for this project would be in accordance with current TxDOT and FHWA design policies and procedures. The alternatives considered would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable, without causing significant damage to the roadway, floodplain, or other property along the route.

## **PUBLIC INVOLVEMENT**

A public meeting was held on March 31, 2004, to gather input from the public on the design alternatives for proposed direct connect ramps between LP 197 and IH 45 in the Texas City/La Marque/Bayou Vista area of Galveston County. Presented alternatives included constructing new direct connectors within existing ROW (Alternative 1), constructing new direct connectors between the existing interchange and the Texas City Terminal Railway bridge (Alternative 2), constructing new direct connectors initiating at the Texas City Terminal Railway bridge (Alternative 3, Recommended), and the No-Build option (Alternative 4). This meeting consisted of an open house format with exhibits and handouts. Exhibits included various informational displays detailing the project purpose/objectives, roadway considerations, environmental considerations, schematic design considerations, and preliminary alternative alignments. Handouts included an informational program and a comment form. The meeting was attended by seven TxDOT representatives, 14 consultants, 12 public officials, and 131 citizens. A total of 78 comments were received at the public meeting. Sixty-six of these comments indicated a preference for Alternative 3. Concerns were raised during the meeting and on comment forms that included safety for Bayou Vista residents entering and leaving SH 6, noise along IH 45 South, wetland impacts, and drainage in the Bayou Vista area.

## SUMMARY

The existing IH 45/LP 197 interchange does not provide a direct connection between IH 45 and LP 197. Three alternatives were evaluated for the proposed construction of LP 197 direct connector ramps at the intersection of IH 45. The proposed build alternative (Alternative 3) would construct two new direct connectors (one southbound/eastbound and one westbound/northbound) from IH 45 to LP 197. Alternative 3 is the recommended alternative because it utilizes a portion of the existing LP 197 ROW, minimizes environmental impacts by avoiding the entire MOTCO superfund site, uses an elevated section to minimize impacts to wetlands, meets current safety and operational standards, improves driving conditions on a designated hurricane evacuation route, and facilitates future expansion of SH 6 (also a designated hurricane evacuation route). Alternative 3 provides suitable geometry for heavy truck traffic to maintain speed within the flat curve radius, thus facilitating a smooth merge and transition to the IH 45 mainlanes. The geometry would reduce elevated noise levels that result from downshifting, braking, and acceleration of heavy trucks, minimizing impacts to the communities of Omega Bay, Bayou Vista, La Marque, and Hitchcock.

The proposed interchange design would eliminate the three-way intersection and would provide an interchange that meets current standard design criteria and therefore function more efficiently and safely. Without the proposed project, the IH 45/LP 197 interchange would not be able to accommodate the increased truck traffic resulting from the Shoal Point Container Terminal. By creating an alternative route for traffic traveling between LP 197 and IH 45, the LP 197 improvements project would provide a more efficient travel route for cargo traffic traveling to IH 45.

New ROW would be required for the construction of the direct connectors between the two existing roadways for a distance of approximately 0.91 mile. The proposed project would also require the addition of northbound and southbound 12-foot auxiliary lanes with 10-foot shoulders along IH 45. No new ROW would be required; however, the existing northbound mainlanes and shoulders would be restriped from the Texas City Terminal Railway bridge for a distance of approximately 2.07 miles to FM 519. East of the Texas City Terminal Railway at the proposed LP 197 ramp locations, the existing ramps connecting IH 45 to the frontage roads would be removed. The proposed project would replace these ramps approximately 1,000-2,000 feet east of the existing locations.

The proposed project would require the acquisition of 11.09 acres of new ROW. There would be no residential or commercial displacements as a result of the proposed project. Several utility adjustments to pole-mounted transmission lines would be necessary as a result of the proposed project. All impacts to utilities resulting from the proposed project would be addressed in the project construction plans. Utility adjustments within the project limits would be the responsibility of the utility companies.

Temporary construction effects may be a temporary annoyance but would not be considered substantial and would not disproportionately affect people living within Census Tracts 7224 or 7238. Since construction would occur within the current ROW limits and there are no residential areas immediately adjacent to this ROW area, effects to those residents living adjacent or nearby would be minimal. Every reasonable effort would be made during construction to minimize temporary construction-related effects.

There are no archeological resources or historic properties present within the project area.

A total of 9.35 acres of waters of the U.S., including wetlands, are located within the proposed project area. Of the 9.35 acres, 2.19 acres are subject to Section 10 of the Rivers and Harbors Act and 7.16 acres are subject to Section 404 of the Clean Water Act. Detailed design information regarding fill quantities could not be determined based upon the preliminary information at the time of report preparation. Once the final design has been completed for the proposed project, fill quantities and exact impact amounts to waters of the U.S., including wetlands, would be determined. Based on the preliminary calculations, the proposed project would require an Individual Permit due to the discharge of fill material into waters of the U.S., including wetlands, within the project area.

The proposed project area includes waters listed as threatened or impaired stream segments in the State of Texas 303(d) list; therefore, coordination with TCEQ regarding §303(d) and §401, Water Quality Certification, is required.

The entire project area is located within the Regulatory Floodway Zone of the 100-year floodplain of Highland Bayou. The proposed improvements would require the placement of permanent fill material within the 100-year floodplain. Currently, a hydraulic study is being conducted by TxDOT for the proposed project to determine impacts on the 100-year floodplain. Upon completion of the hydraulic study, TxDOT would respond appropriately as directed by the Galveston County Floodplain Administrator and devise a mitigation plan to offset the construction impacts.

Construction activities would disturb a total of 35.38 acres of land within the project area. Consequently, TxDOT would be required to obtain a National Pollutant Discharge Elimination System General Permit and to file an NOI with the EPA.

Appreciable indirect and cumulative impacts may affect land use, water resources, and floodplains. Appreciable indirect and cumulative impacts would not affect EFH or any adjacent habitats. No indirect social impacts would be anticipated because the project does not bisect any communities that are not already bisected by the existing roadway corridor. No adverse impacts to parklands, land use, community cohesion, vegetation, wildlife, threatened and endangered species, water quality, air quality, or existing noise conditions would occur as a result of the proposed project. There is evidence of hazardous

substances and/or contamination within the project area. The six sites identified as having potential hazardous materials that could affect the proposed project include the MOTCO Superfund site, the former trailer park, Seaway Tank Farm property, BP Amoco Land Treatment Facility, railroad tracks, and pipeline crossings. A Phase II subsurface investigation would be required to confirm if contamination from the sites would be encountered during construction. If contamination is confirmed, then TxDOT would develop appropriate vapor, soils, and/or groundwater management plans for activities in these locations.

One public meeting with the local community was held for the proposed project. Based on public comments, the proposed project is well received within the local community.

In conclusion, the engineering, social, economic, and environmental investigations conducted thus far indicate that impacts to the environment as a result of the proposed project are not significant; therefore, a Finding of No Significant Impact is anticipated.

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