ENVIRONMENTAL ASSESSMENT
VOLUME 1

US 77 HIGHWAY
UPGRADE
IH 37 TO US 83

NUECES, KLEBERG, KENEDY, WILLACY, AND CAMERON COUNTIES

CSJ: 1111-07-004

Prepared by:

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TABLE OF CONTENTS

SECTION 1.0 - INTRODUCTION 1
1.1 PROJECT BACKGROUND 1
1.1.1 Freeway Standards 3
1.1.2 Planning and Programming Status 4
1.1.3 Corridor Trade Influences 7

SECTION 2.0 - NEED AND PURPOSE OF THE PROPOSED PROJECT 10
2.1 NEED FOR THE PROJECT 10
2.1.1 At-Grade Intersections Compromise Safety on this High-Speed Facility 10
2.1.2 At-Grade Intersections within the Project Limits Experience Higher Crash Rates 10
2.1.3 Projected Increases in Traffic on US 77 Will Increase the Potential for Incidents Associated with the Numerous At-Grade Intersections 12
2.1.4 System Continuity Does Not Meet Driver Expectations 14
2.2 PURPOSE OF THE PROJECT 14

SECTION 3.0 - DESCRIPTION OF ALTERNATIVES 15
3.1 OPTIONS EVALUATED 16
3.1.1 Options Considered 16
3.1.2 Options Dismissed from Detailed Further Study 27
3.2 ALTERNATIVES ADVANCED FOR DETAILED STUDY 32
3.2.1 Existing Facility – No Build Alternative 32
3.2.2 Proposed Facility – Build Alternative 32
3.3 SELECTION OF THE BUILD ALTERNATIVE 37

SECTION 4.0 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES 38
4.1 ROW DISPLACEMENTS/RELOCATIONS 38
4.1.1 Legal and Regulatory Context 38
4.1.2 No Build Alternative – ROW Displacements/Relocations Consequences 39
4.1.3 Build Alternative – ROW Displacements/Relocations Consequences 39
4.2 SOCIOECONOMIC DATA 46
4.2.1 Demographics 46
4.2.2 LEP Populations 47
4.2.3 Economics 50
4.2.4 Community Cohesion 57
4.2.5 Visual Quality and Aesthetics 62
4.2.6 No Build Alternative – Socioeconomic Consequences 67
4.2.7 Build Alternative – Socioeconomic Consequences 67
4.3 ENVIRONMENTAL JUSTICE 69
4.3.1 Population, Race, and Ethnicity 70
4.3.2 Income 72
4.3.3 Household Occupancy 76
4.3.4 Tolling and Environmental Justice - Overview 79
4.3.5 No Build Alternative – Environmental Justice Consequences 87
4.3.6 Build Alternative – Environmental Justice Consequences 87
4.4 LAND USE 93
4.4.1 Existing Conditions 93
4.4.2 Local Land Use Plans/Policies 96
4.4.3 Legislation and Other Regulations 99

4.4.4 No Build Alternative – Land Use Consequences 101
4.4.5 Build Alternative – Land Use Consequences 101
4.5 PRIME FARMLANDS INCLUDING SOILS 102
4.5.1 Existing Conditions 102
4.5.2 No Build Alternative – Prime Farmlands Consequences 104
4.5.3 Build Alternative – Prime Farmlands Consequences 104
4.6 VEGETATION/WILDLIFE HABITATS 105
4.6.1 Existing Conditions 105
4.6.2 No Build Alternative – Vegetation /Wildlife Habitats Consequences 111
4.6.3 Build Alternative – Vegetation /Wildlife Habitats Consequences 111
4.7 THREATENED AND ENDANGERED SPECIES 114
4.7.1 Existing Conditions 115
4.7.2 No Build Alternative – Threatened and Endangered Species Consequences 138
4.7.3 Build Alternative – Threatened and Endangered Species Consequences 138
4.8 CULTURAL RESOURCES 142
4.8.1 Historic Resources 143
4.8.2 Archeology 147
4.9 SECTION 4(F) AND SECTION 6(F) RESOURCES 151
4.9.1 Existing Conditions 151
4.9.2 No Build Alternative – Section 4(f) and Section 6(f) Resources Consequences 151
4.9.3 Build Alternative – Section 4(f) and Section 6(f) Resources Consequences 151
4.10 WATER RESOURCES/WATER QUALITY 151
4.10.1 Existing Conditions 152
4.10.2 No Build Alternative – Water Resources and Water Quality Consequences 162
4.10.3 Build Alternative – Water Resources and Water Quality Consequences 162
4.11 AIR QUALITY 170
4.11.1 Traffic Air Quality Analysis (TAQA) 170
4.11.2 Mobile Source Air Toxics (MSATs) 171
4.11.3 No Build Alternative – Air Quality Consequences 179
4.11.4 Build Alternative – Air Quality Consequences 179
4.12 NOISE 179
4.12.1 No Build Alternative – Noise Consequences 190
4.12.2 Build Alternative – Noise Consequences 190
4.13 HAZARDOUS MATERIALS 191
4.13.1 No Build Alternative – Hazardous Materials Consequences 191
4.13.2 Build Alternative – Hazardous Materials Consequences 191
4.14 UTILITY RELOCATION IMPACTS 198
4.14.1 No Build Alternative – Utilities Consequences 198
4.14.2 Build Alternative – Utilities Consequences 198
4.15 CONSTRUCTION IMPACTS 199
4.15.1 No Build Alternative – Construction Consequences 199
4.15.2 Build Alternative – Construction Consequences 199
4.16 TRAFFIC OPERATION IMPACTS 201
4.16.1 No Build Alternative – Traffic Operation Consequences 201
4.16.2 Build Alternative – Traffic Operation Consequences 201

SECTION 5.0 - INDIRECT IMPACTS 204
5.1 STEP 1 - SCOPING 205
5.2 STEP 2 - IDENTIFY THE STUDY AREA'S GOALS AND TRENDS 207
5.3 STEP 3 - INVENTORY OF STUDY AREA'S NOTABLE FEATURES 213

5.4 STEP 4 - IDENTIFY IMPACT-CAUSING ACTIVITIES OF THE PROPOSED PROJECT 216
5.5 STEP 5 - IDENTIFY POTENTIALLY SUBSTANTIAL INDIRECT EFFECTS FOR ANALYSIS.....217
5.6 STEP 6 – ANALYZE INDIRECT EFFECTS AND EVALUATE THE RESULTS.....220

SECTION 6.0 - CUMULATIVE IMPACTS 223
6.1 STEP 1: IDENTIFY RESOURCES TO CONSIDER.....223
6.2 STEP 2: DEFINE THE STUDY AREA FOR EACH RESOURCE 224
6.3 STEP 3: DESCRIBE THE CURRENT HEALTH AND HISTORICAL CONTEXT FOR EACH RESOURCE 225
6.4 STEP 4: IDENTIFY THE DIRECT AND INDIRECT IMPACTS OF THE PROJECT.....230
6.5 STEP 5: IDENTIFY OTHER REASONABLY FORESEEABLE FUTURE ACTIONS....230
6.6 STEP 6: ASSESS POTENTIAL CUMULATIVE IMPACTS TO EACH RESOURCE 232
6.7 STEP 7: REPORT THE RESULTS.....233
6.8 STEP 8: ASSESS THE NEED FOR MITIGATION.....235

SECTION 7.0 - COMMENTS AND COORDINATION 237
7.1 COMMUNICATION TOOLS 237
7.2 AGENCY COORDINATION.....238
7.3 EARLY PUBLIC/AGENCY OUTREACH.....239
7.3.1 First Round of Public Officials Briefings 239
7.3.2 First Round of Public Information Meetings.....240
7.4 DEVELOPMENT OF PRELIMINARY ALIGNMENT OPTIONS 243
7.4.1 Second Round of Public Officials Briefings 243
7.4.2 Second Round of Public Information Meetings.....243
7.5 PUBLIC HEARINGS FOR PREFERRED ALTERNATIVE.....246
7.5.1 Public Officals and Stakeholder Workshops.....246
7.5.2 Public Hearings.....247
7.6 OTHER OUTREACH.....250
7.7 AGENCY/GOVERNMENT RESOLUTIONS 250
7.8 DOCUMENTS IN PROJECT'S TECHNICAL FILES 250

SECTION 8.0 - CONCLUSION 251
8.1 IDENTIFICATION & RATIONALE FOR THE PREFERRED ALTERNATIVE 251
8.1.1 Proposed Action 251
8.1.2 Support Rationale 251
8.1.3 Summary of Environmental Mitigation and Monitoring Commitments.....252
8.1.4 Recommendation for Alternative Selection.....258

SECTION 9.0 - REFERENCES.....259

LIST OF TABLES

Table 1.1-1 – US 77 Project Sections 5
Table 1.1-2 Top US Ports of Entry: US/Mexico Border (US$ Billions), 2007.....8
Table 2.1-1 2005 to 2007 Crash Rates for Corpus Christi and Pharr Districts 11
Table 2.1-2 AADT for the US 77 Corridor.....12
Table 2.1-3 2005 Truck Volumes at Screenlines Average Daily Commercial Trucks.....13
Table 4.1-4 ROW Impacts by Land Use.....40

Table 4.1-5 Relocations and Displacements – Total Structures Displaced by Land Use 40
Table 4.1-6 MLS Housing Availability by City Zip Codes for the Project Area.....44
Table 4.1-7 MLS Availability by City Zip Codes for the Project Area.....44
Table 4.2-1 2000 Demographics 47
Table 4.2-2 LEP for Population Five Years and Older 48
Table 4.2-3 Major Employers 51
Table 4.2-4 Forecasted 2030 Employment.....53
Table 4.2-5 Employment By Industry Within The Surrounding Area 54
Table 4.2-6 Potential Displacements within Census Blocks Classified as Minority 56
Table 4.2-7 Neighborhoods-Colonias Within 0.25 Mile of the Proposed Project Boundaries 57
Table 4.2-8 Schools Within 0.25 Mile of the Proposed Project Boundaries 58
Table 4.2-9 Places of Worship Within 0.25 Mile of the Proposed Project Boundaries 59
Table 4.2-10 Health Care/Adult Day Care Facilities Within 0.25 Mile of the Proposed Project Boundaries.....59
Table 4.2-11 Cemeteries Within 0.25 Mile of the Proposed Project Boundaries.....59
Table 4.2-12 Public Facilities/US Post Offices Within 0.25 Mile of the Proposed Project Boundaries.....60
Table 4.2-13 Public Facilities/Prisons Within 0.25 Mile of the Proposed Project Boundaries 60
Table 4.2-14 Visual Assessment Evaluation Criteria 62
Table 4.2-15 Visual Assessment Segments 64
Table 4.3-3 Potential Displacements within Census Blocks Classified as Minority 72
Table 4.3-4 Household Income Percent Distribution 73
Table 4.3-5 Housing Occupancy 76
Table 4.3-6 Attractors and Generators 82
Table 4.4-1 Existing Land Use 93
Table 4.4-2 US 77 Corridor Land Use – Nueces County 94
Table 4.4-3 US 77 Corridor Land Use – Kleberg County.....95
Table 4.4-4 US 77 Corridor Land Use – Kenedy County 95
Table 4.4-5 US 77 Corridor Land Use – Willacy County.....95
Table 4.4-6 US 77 Corridor Land Use – Cameron County 96
Table 4.5-1 Hydric and Prime Farmland Soils within the Project Area.....102
Table 4.6-1 NDD Elements of Occurrence of Plant Communities near the Project Area 106
Table 4.6-2 Summary of Vegetation/Wildlife Habitats in the Project Area.....107
Table 4.6-3 Potential Permanent Impacts to Vegetation/Wildlife Habitats 112
Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative 115
Table 4.7-2 NDD Elements of Occurrence Records Within 1.5 Miles of Project Area.....124
Table 4.7-3 Slender Rush-Pea Populations in the Project Area 133
Table 4.7-4 South Texas Ambrosia Populations in the Project Area.....134
Table 4.8-1 Previously Recorded Resources in the APE.....144
Table 4.10-1 Waters of the US in the Project Area.....153
Table 4.10-2 Potentially Non-jurisdictional Water Resources in the Project Area 154
Table 4.10-3 Water Quality Segments Receiving Runoff from Project Area 156
Table 4.10-4 Coastal Natural Resource Areas within Project Area.....160
Table 4.10-5 Potential Impacts to Waters of the US Resulting from the Proposed Build Alternative.....163
Table 4.10-6 Impacts to Potentially Non-Jurisdictional Features Resulting from the Proposed Build Alternative 165
Table 4.10-7 Approved 401 Best Management Practices for Nationwide Permits 167
Table 4.11-1 Sensitive Receptors by Distance 174
Table 4.11-2 Sensitive Receptors in the Study Area 174

Table 4.12-1 FHWA Noise Abatement Criteria 180
Table 4.12-2 VPD Traffic By County 182
Table 4.12-3 Traffic Noise Levels for Nueces County (dBA Leq) 182
Table 4.12-4 Traffic Noise Levels for Kleberg County (dBA Leq) 184
Table 4.12-5 Traffic Noise Levels for Kleberg County (dBA Leq) 186
Table 4.12-6 Traffic Noise Levels for Kenedy County (dBA Leq) 187
Table 4.12-7 Traffic Noise Levels for Willacy County (dBA Leq) 187
Table 4.12-8 Noise Barrier Proposal for Willacy County 190
Table 4.13-1 Identified Potential Hazardous Materials Sites 192
Table 4.15-1 Potential Phases for Construction 199
Table 5.1-1 Seven-Step Approach to Estimate Indirect Impacts 204
Table 5.1-2 Local Interview Participants 206
Table 5.2-1 Historical Population 209
Table 5.2-2 AOI Historical Population Growth 209
Table 5.2-3 AOI Population Projection 2000-2030 210
Table 5.2-4 Area of Influence – Current and Projected Land Use[1] 211
Table 5.2-5 Study Area Counties Single-Family Building Permits (1990 – 2007) 211
Table 5.2-6 School District Enrollment Totals 212
Table 6.1-1 Proposed Transportation Projects 231
Table 7.2-1 Agency Coordination 239
Table 7.3-1 First Round of Public Officials Briefings and Attendance 240
Table 7.3-2 First Round of Public Information Meetings and Attendance 241
Table 7.4-1 Second Round of Public Officials Briefings and Attendance 243
Table 7.4-2 Second Round of Public Information Meetings and Attendance 244
Table 7.5-1 Public Official and Stakeholder Workshops Attendance 246
Table 7.5-2 Public Hearing and Attendance 249
Table 8.1-1 Summary Comparison of the Build and No Build Alternatives 251
Table 8.1-2 Environmental Mitigation and Monitoring Commitments 252

APPENDICES

Volume 2 and 3
Appendix A Figures

Volume 4
Appendix B Agency Coordination
Appendix C Section 4 – Additional Tables for Sections 4.1 to 4.15
Appendix D Project Area Photographs
Appendix E TPWD's *Annotated County Lists of Rare Species* and USFWS's *Endangered Species List*
Appendix F Project Listings in Transportation Improvement Program
Appendix G Preliminary Schematic

GRAPHS

Graph 2.1-1 US 77 Crash Data Analysis (2003-2008): Crash Rate at Intersections
Graph 2.1-2 US 77 Crash Data Analysis (2003-2008): Fatal Crashes by Collision Type
Graph 4.11-1 US Annual VMT vs. MSAT Emissions, 1999-2050

SECTION 1.0 - INTRODUCTION

1.1 PROJECT BACKGROUND

The Federal Highway Administration (FHWA) and the Texas Department of Transportation (TxDOT) have proposed the completion of upgrading United States (US) Highway 77 (US 77) to Interstate highway standards, including two highway relocations around Driscoll and Riviera. The existing US 77 is functionally classified as a rural principal arterial. The proposed US 77 Upgrade Project area is approximately 122 miles in length and is defined by its northern logical terminus at the interchange of US 77 and Interstate Highway 37 (IH 37) in Corpus Christi, Texas to the interchange of US 77 and US 83 in Harlingen, Texas at its southern terminus, as illustrated in **Appendix A, Figure A.1.1-1 – US 77 Project Location Map**.

Between the project termini, the majority of the existing US 77 configuration consists of a four-lane facility divided by a center grassy median except through Driscoll, Ricardo, and Riviera where the facility is four-lane with a center turning lane. The right-of-way (ROW) width varies between 200 feet and 380 feet and consists of two 12 feet wide lanes in both the northbound and southbound direction for a total of four main lanes. Outside shoulders are eight to 10 feet wide, and inside shoulders are four to 10 feet wide. All intersection crossings along this segment of US 77 are at-grade with the exception of the existing overpasses and ramps in the vicinities of Robstown, Kingsville, Bishop, and Raymondville. The at-grade cross-overs generally consist of one 12 feet wide eastbound and one 12 feet wide westbound lane, with 10 feet wide outside shoulders. The posted speed is 70 miles per hour (mph) outside of urban areas. There are many at-grade crossroads that intersect US 77 within the project limits.

The estimated cost for the US 77 Upgrade Project proposed improvements is $1.06 Billion, which includes:

- construction including: excavation, embankment, pavement, retaining walls, structures, drainage
- construction engineering
- miscellaneous costs (including supplemental work, cost escalation, bond options, contingencies)
- signing, striping, barricades, signs, and traffic handling
- environmental mitigation
- environmental analysis
- ROW acquisition
- mitigation of hazardous materials sites
- design including preliminary engineering
- utility relocations.

The upgrade of US 77 between IH 37 and US 83 to meet Interstate standards has been an ongoing program. Several sections of US 77 within the project limits already meet Interstate standards as a result of past projects **(Figure A.1.1-1)**. In addition, several upgrade projects are in various stages of completion within the project limits and have been or are being advanced under separate environmental documents. The intent of this project is to upgrade the remaining sections of US 77 to Interstate standards. The US 77 Upgrade project would be phased based on the availability of federal and state funding. Currently, a total of approximately $179 million has been obligated to advance the US 77 upgrade program, of which $119 million is obligated

for this project. TxDOT is in the process of developing a project development plan to complete the US 77 upgrade program. This plan will identify the construction phasing, project costs, and reasonably anticipated funding for the next 25 years (2037).

The Texas Transportation Commission (TTC) has identified congestion reduction and safety improvement projects statewide which could be accelerated by an element that would allow for managed or tolled lanes for new additional capacity. The US 77 Upgrade Project would provide additional capacity in the form of new relief routes around Driscoll and Riviera. As such, the decision to toll the relief routes around Driscoll and Riviera was based on the TTC policy that transportation projects that provide added capacity and/or on new location are to consider tolling as a mechanism to generate funding for the project and/or its maintenance. In recent years, traditional funding sources have not kept up with maintenance needs of existing statewide highways and previously authorized transportation projects that received appropriations. Therefore, major highway projects will be delayed without new funding methods that consider how to supplement traditional funding sources such as gasoline tax revenue.

Section 3.2 describes US 77 in detail and identifies what modifications are necessary to effectively upgrade the existing facility to Interstate highway standards. The primary component of the US 77 Upgrade Project which is to upgrade the existing facility to Interstate highway standards would not be eligible for tolling, as there is no added capacity. However, the secondary component of the US 77 Upgrade Project, which would be considered eligible for tolling, includes the relief routes around Driscoll and Riviera (as discussed in **Section 3.2.2**), as the relief routes would provide new added capacity. System users would continue to have the non-tolled option of US 77 existing main lanes (not including the relief routes around Driscoll and Riviera) by using the future Business US 77 lanes through Driscoll and Riviera.

In order to ensure meaningful evaluation of alternatives and to avoid commitments to any transportation improvements before they are fully evaluated, the proposed highway project shall:

1. Connect logical termini and be of sufficient length to address environmental matters on a broad scope; therefore, the termini chosen for this project are regionally significant freeways – IH 37 in Corpus Christi, Texas and US 83 in Harlingen, Texas. The project is 122 miles in length and connects the large population centers of the Corpus Christi area and the Rio Grande Valley in South Texas.
2. Have independent utility or independent significance, i.e., be usable and a reasonable expenditure even if no additional transportation improvements in the area are made. The proposed US 77 Upgrade Project is a reasonable expenditure of funds and not dependent on other projects to fully function.
3. Not restrict consideration of alternatives for other reasonably foreseeable transportation improvements that may address the need for action. A variety of alternatives were considered. Relief routes are proposed for two locations along the US 77 project area.

FHWA has developed federal regulations for highway projects. These regulations, Title 23 of the Code of Federal Regulations (CFR), Part 771, provide instructions for assessing the environmental impacts specific to federally-funded transportation projects. This Environmental Assessment (EA) provides the public and decision makers with adequate and appropriate information on potential social, economic, and environmental impacts with respect to the alternatives.

FHWA's approval to prepare an EA for the US 77 Upgrade Project was issued on July 26, 2007. A copy of the letter from FHWA is located in **Appendix B**. Therefore, TxDOT, in cooperation with FHWA as the lead federal agency, has undertaken the EA preparation for this project. The EA also complies with the National Environmental Policy Act (NEPA) of 1969 (as amended) and allows FHWA to determine whether an Environmental Impact Statement (EIS) would be necessary.

The EA presents the potential social, economic, engineering, and environmental impacts for the alternatives. The issues analyzed in this EA were identified through a planning and public involvement process that defined both the design objectives and the potential environmental constraints and opportunities associated with the proposed US 77 Upgrade Project.

The project team for this project consisted of TxDOT staff and consultants. Throughout the planning process, the project team attempted to resolve conflicts between design requirements and environmental constraints. The first attempt to resolve conflicts was to avoid environmental constraints, if possible and feasible. However, where conflicts would result in unavoidable effects, measures to minimize adverse effects were considered and, where appropriate, integrated into the design.

The *1991 Intermodal Surface Transportation Efficiency Act (ISTEA)* named US 77 as a desirable location for an Interstate facility. The Rio Grande Valley is extremely qualified to have an Interstate facility on the strength of its population centers, military installations, and presence of major border crossings. As of the date of this document, the Rio Grande Valley consists of the largest population in the US that is not serviced by an Interstate facility.

With passage of *ISTEA* in 1991 and subsequent legislation that includes the *National Highway System Designation Act of 1995 (NHS Act of 1995)*, the *Transportation Efficiency Act for the 21st Century of 1998 (TEA-21)*, and the *Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users of 2005 (SAFETEA-LU)*, the US Congress established a series of "High Priority Corridors" on the National Highway System. These High Priority Corridors included "United States Route 77 from the Rio Grande River to IH 37 at Corpus Christi" as part of "Corridor 18." In addition, this *specific* section of US 77 was one of several routes designated by Congress as "future parts of the Interstate System" in the NHS Act of 1995. In 1998, it was further directed by Congress through TEA-21 that this segment of US 77 "shall be designated as Interstate Route I-69 East."

Existing US 77 corridor background characteristics such as current corridor design standards, local support, and trade influences in the corridor are considered in the following subsections.

1.1.1 Freeway Standards

US 77 is a national north-south highway that spans from the US/Mexico border to the US 20 junction in Iowa. The Texas portion spans approximately 565 miles and serves as a major Texas route linking the Dallas and Corpus Christi areas to the Rio Grande Valley. As a result, it is an important route for trade with Mexico. US 77 from the US/Mexico border to just south of Victoria serves as a major route transferring in Victoria to US 59 to the industrial Houston area.

US 77 connects many of the major non-Interstate and Interstate routes that serve the entire nation.

During the 1920s and 1930s, US 77 was originally constructed as a two-lane undivided highway mostly parallel to the east of the St. Louis, Brownsville, and Mexico railroad now known as the Union Pacific Railroad (UPRR) that traverses the corridor. In the 1950s, TxDOT initiated construction of two additional lanes to the facility from the Rio Grande Valley north to Corpus Christi converting the facility to a four-lane divided highway with a center median. From the 1960s through 2010, TxDOT began upgrading small sections of US 77 to freeway standards with the most notable change being the conversion of at-grade intersections to grade-separated interchanges at major cross streets in isolated locations throughout the corridor.

The *Federal-Aid Highway Act of 1956* mandated uniform geometric and construction standards for the Interstate System. The standards were developed by the state highway agencies, acting through the American Association of State Highway and Transportation Officials (AASHTO) and adopted by the FHWA. The standards are included in the AASHTO publication, *A Policy on Design Standards -- Interstate System*, available from the AASHTO website. For purposes of this document, freeway standards are interchangeably used with the term Interstate highway standards.

According to AASHTO standards, the highest type of arterial highway is the freeway, and is further defined as an expressway with full control of access where the right of owners or occupants of abutting land to access a highway is fully controlled by public authority. The principal advantages of control of access are the preservation of the as-built capacity of the highway, higher speed, and improved safety to highway users.

Essential design elements that are required to meet AASHTO standards for a freeway include:

- Medians
- Grade separations at cross streets
- Ramp connections for entrance to and exit from the through pavement and (in some cases) access roads
- Design speeds of 50 to 70 mph dependent on terrain type
- A minimum of two through-traffic lanes (12 feet in width) for each direction of travel
- Continuous 10 feet paved shoulders on the right (outside) and four feet shoulders on the left (inside) sides of all freeway facilities.

1.1.2 Planning and Programming Status

The proposed US 77 Upgrade project extends along 122 miles of existing highway. It is located within the Corpus Christi Metropolitan Planning Organization (MPO), at its northern terminus, and the Harlingen-San Benito MPO (HSBMPO), at its southern terminus, with a rural section between the two MPO limits. This project is part of an ongoing overall program to upgrade US 77 to Interstate standards between IH 37 and US 83. The limits of this program have been divided into 27 sections of which 21 sections would require construction to meet Interstate standards and to convert existing two-way frontage roads to one-way frontage roads **(Table 1.1-1 and Figure A.1.1-1)**. Currently, $179 million has been obligated to advance the upgrade and improve 11 construction sections. Those construction sections that are scheduled to be built within the next four years are being added to the Metropolitan Transportation Plan (MTP), Unified Transportation Program, and the fiscally constrained Transportation Improvement Program (TIP)/Statewide Transportation Improvement Program (STIP) in the 2012 update, as appropriate.

In addition, a *US 77 from IH 37 to US 83 Project Development Plan* is being prepared, in coordination with the FHWA, to document the approach TxDOT is taking to fully fund these remaining construction sections. The proposed Development Plan will present and disclose the anticipated construction phasing and project costs, based on reasonably anticipated funding from federal, state, and other sources over the next 25 years.

Table 1.1-1 – US 77 Project Sections

Section	CSJ	Limits	Description	Total Year of Expenditure Project Cost Estimate	Estimated Let Date	Funding Status
A	**Section Currently at Interstate Standards**					
B	0039-07-230*	SH 107/FM 508 interchange in Combs, TX to 3.7 miles north of SH 107/FM 508 interchange	Conversion of 2-way frontage road to 1-way frontage roads with ramp reconfiguration	$1,769,040.00	Aug-12	Funded
C	0327-08-083*	3.7 miles north of SH 107/FM 508 interchange to Cameron/Willacy county line	Conversion of 2-way frontage road to 1-way frontage roads with ramp reconfiguration	$2,558,790.00	Aug-12	Funded
D	**Section Currently at Interstate Standards**					
E**	0327-10-053	FM 1018 to 0.3 miles north of FM 498	Construct main lanes	$13,977,857.57	Jul-11	Funded
F**	0327-10-054	0.3 miles north of FM 498 to FM 3168	Construct overpass and main lanes	$19,055,494.77	Jul-11	Funded
G	**Section Currently at Interstate Standards**					
H	0327-10-901	Business 77 to Willacy/Kenedy county line	Construct main lanes and overpass	$87,483,986.60	Jan-37	Included in Development Plan
I	0327-05-900	Willacy/Kenedy county line north to Norias Road	Construct main lanes and overpasses	$139,772,567.95	Jan-35	Included in Development Plan
J	0327-04-902	Norias Road north 9.6 miles (Armstrong Ranch Gate)	Construct main lanes and overpasses	$93,376,821.25	Jan-33	Included in Development Plan
K	0327-03-902	9.6 miles north of Norias Road to 8 miles south of La Parra Ave.	Construct main lanes and overpasses	$148,210,302.67	Jan-31	Included in Development Plan

Table 1.1-1 – US 77 Project Sections

Section	CSJ	Limits	Description	Total Year of Expenditure Project Cost Estimate	Estimated Let Date	Funding Status
L	0327-02-902	8 miles south of La Parra Ave. to Kenedy/Kleberg county line	Construct main lanes and overpasses	$94,964,057.25	Jan-29	Included in Development Plan
M**	0327-02-050	0.87 miles south of La Parra Ave. to 0.71 miles north of La Parra Ave.	Construct overpass in Sarita	$11,319,740.00	Aug-12	Funded
N	0327-01-030	Kenedy/Kleberg county line to SH 285	Construct relief route around Riviera	$43,669,769.98	Sep-25	Included in Development Plan
O	0102-04-098	SH 285 to 1.5 miles north of SH 285	Construct relief route around Riviera	$69,662,884.79	Sep-25	Included in Development Plan
P	0102-04-097	1.5 miles north of SH 285 to County Road 2130	Construct main lanes, frontage roads and structures	$112,617,332.69	Feb-23	Partially Funded
Q	0102-04-099	County Road 2130 to FM 1356	Construct main lanes, frontage roads and structures	$41,056,118.32	Feb-17	Included in Development Plan
R	**Section Currently at Interstate Standards**					
S**	0102-04-095	FM 425 to SH 141	Construct main lanes and overpass at Caesar Ave	$16,516,500.00	Feb-12	Funded
T	**Section Currently at Interstate Standards**					
U	0102-04-096	FM 1898 to Kleberg/Nueces county line	Construct main lanes and partial frontage roads	$12,849,580.20	Feb-15	Partially Funded
V	0102-03-081	Kleberg/Nueces county line to FM 70	Construct main lanes and overpasses	$35,470,819.14	Sep-19	Partially Funded
W	0102-03-082	FM 70 to County Road 16	Construct main lanes and overpasses	$39,513,086.26	Feb-15	Included in Development Plan
X	0102-03-083	County Road 16 to south of County Road 28	Construct relief route around Driscoll	$103,031,478.65	Sep-21	Included in Development Plan
Y	0102-02-096	South of County Road 28 to FM 892	Construct main lanes and overpasses	$40,829,092.00	Jul-13	Partially Funded

Table 1.1-1 – US 77 Project Sections

Section	CSJ	Limits	Description	Total Year of Expenditure Project Cost Estimate	Estimated Let Date	Funding Status
Z**	0102-02-095	FM 892 to SH 44	Construct main lanes (to correct curve in Robstown)	$14,454,000.00	Jul-12	Funded
AA	**Section Currently at Interstate Standards**					

Source: TxDOT, Design and Construction Information System, November 2011.
Note: * Construction section is included in the fiscally constrained TIP/STIP and is shown in **Appendix F.**
****** These sections are being advanced as independent projects with independent utility and under separate environmental documents. Therefore, the estimated costs of these sections are not included in this project.

1.1.3 Corridor Trade Influences

The US 77 Upgrade Project area is subject to many trade influences including the presence of several important military bases including naval air stations (NAS) and ports of entry (POE). The corridor's close proximity to Mexico also heightens the possibility of truck-related trade traffic due to the NAFTA. The corridor is in close proximity to the many POEs that further contribute to the potential of higher truck traffic volumes. These ports and NAS's have, in concert with NAFTA, influenced trade along the US 77 corridor.

Military Bases and Ports
The Port of Corpus Christi website identifies the port as a strategic deployment seaport for US military forces. A partnership with the Port Authority has been crafted to enhance the surge capability of any sealift. Port facilities continue to be expanded to further accommodate trade needs including the future La Quinta Trade Gateway facility, which is intended to facilitate the multi-modal movements between highway, rail, and port facilities. The planned improvements include the development of a major marine terminal, enlarged wharf area, additional loading crane, and rail yard. Improved access to US 77 is pivotal for movement of these goods. (http://www.portofcorpuschristi.com/BaySurgeSealift.html accessed in September 2009).

NAS Corpus Christi is home to the Naval Air Training Command Headquarters, the Naval Hospital, and Training Air Wing Four. Staffing includes more than 2,836 active and 1,185 reserve service members as well as 1,240 civilian employees as identified by:

- Training Air Wing 4
  https://www.cnatra.navy.mil/tw4/
- Commander Navy Installations Command | Naval Air Station Corpus Christi
  https://www.cnic.navy.mil/CorpusChristi/index.htm
- Military Homefront. "Overview of NAS Corpus Christi"
  http://apps.mhf.dod.mil/pls/psgprod/f?p=107:6:4333924280666100::::P6_INST_ID:4480.

NAS Kingsville is home to Training Air Wing Two. The facility is reported to have 1,850 military, government civilian, and contractor personnel as identified by:

- Training Air Wing 2.
  https://www.cnatra.navy.mil/tw2/index.asp

- Commander Navy Installations Command | Naval Air Station Kingsville. https://www.cnic.navy.mil/Kingsville/Programs/CommandandStaff/HumanResources/index.htm.

NAS Ingleside is in the process of being decommissioned as part of the 2005 Base Realignment and Closure (BRAC) recommendations to Congress and is not included in this discussion.
The US 77 Upgrade Project corridor is home to several unique features that all contribute to trade-related truck traffic. Trade flows across the US/Mexico border will have a short and long-term influence on truck volumes. Truck traffic related to trade fluctuates with the economic trade between the US and Mexico.

As of 2007, Mexico was the third most important US trading partner in terms of the total value of exports and imports. The US accounts for about 80 percent of Mexico's total exports and about 50 percent of its imports. According to the Bureau of Transport Statistics (BTS), Texas accounts for about five percent of all US exports to Mexico, with a value of over $60 billion in 2008.

Since the enactment of NAFTA in 1994, the POEs at Hidalgo and Brownsville have become critical to the movement of trade between the US and Mexico. In a recent ranking of the ten largest POEs along the US/Mexico border, Hidalgo and Brownsville ranked fourth and sixth, respectively. Correspondingly, both of these POEs have grown steadily in terms of total trade volume and truck traffic since 1995. **Table 1.1-2**, which was drawn from a February 2009 special report on NAFTA trade prepared by the Bureau of Transportation Statistics (BTS), summarizes the ten largest POEs along the US/Mexico border. Transport of electrical machinery and computer equipment represented 52 percent and 35 percent of trade movements in Hidalgo and Brownsville, respectively.

Table 1.1-2 Top US Ports of Entry: US/Mexico Border (US$ Billions), 2007

City	Truck	Rail	Other	Total	Truck as % of Total	Rail as % of Total
Laredo, TX	82.6	27.3	0.4	110.3	75	25
El Paso, TX	43.5	5.2	0.4	49.1	89	11
Otay Mesa, CA	30.7	0.0	0.0	30.7	100	0
Hidalgo, TX	21.7	0.0	0.2	21.9	99	0
Nogales, AZ	13.3	4.8	0.1	18.2	73	27
Brownsville, TX	11.6	1.4	0.3	13.3	87	10
Eagle Pass, TX	4.8	7.2	0.0	12.0	40	60
Calexico, CA	11.4	0.3	0.2	11.9	96	2
Del Rio, TX	3.2	0.0	0.0	3.2	100	0
Santa Teresa, NM	1.4	0.0	0.0	1.4	100	0

Source: Beningo, Steven, and Mohamed, Fahim, "*Bureau of Transportation Statistics, Special Report, North American Trade Growth Continued in 2007,*" US Bureau of Transportation Statistics, US Department of Transportation (USDOT), February 2009

Because of the importance of these POEs to the local and state economies, improving connectivity, particularly to the Port of Houston (via US 59 and US 77) and the Port of Corpus Christi, remains important for economic growth.

The *Trade and Transportation Activities Report* prepared by TxDOT in January 2009 along with additional information compiled by the US Department of State and the Hidalgo County MPO (HCMPO) cited that there are two bridge projects under development in the McAllen-Brownsville area. These proposed projects include:

1. Planned improvements to the rail bridge in Brownsville
2. Planned expansion to the Veterans International Bridge between Brownsville and Los Tomates.

The *Trade and Transportation Activities Report* has cited that initial planning work for the expansion and upgrade is expected to begin for the Pharr-Reynosa International Bridge and for the Free Trade Bridge at Los Indios. With the development of these planned and proposed crossings, traffic to and from Mexico on US 77 may increase.

International Border Crossings

US 77 provides the closest route from the ports and military bases to the Port of Brownsville at the US/Mexico border. According to TxDOT, there are 11 existing international border crossings/POEs between Mexico and the Texas communities along the Lower Rio Grande Valley (LRGV):

1. Los Tomates/Veterans International Bridge POE, Brownsville
2. Gateway International Bridge POE, Brownsville
3. Brownsville/Matamoros International Bridge POE, Brownsville
4. Free Trade Bridge at Los Indios, Los Indios POE, Los Indios
5. Progreso/Nuevo Progreso International Bridge, Progreso POE, Progreso
6. Pharr-Reynosa International Bridge, Pharr POE, Pharr
7. McAllen-Hidalgo-Reynosa International Bridge, Hidalgo POE, McAllen
8. Roma-Ciudad Miguel Alemán International Bridge, Roma
9. Rio Grande City-Camargo International Bridge, Rio Grande City
10. Donna-Rio Bravo International Bridge, Donna
11. Anzalduas International Bridge, Mission

These POEs cumulatively carry an average of 90,500 vehicles per day (vpd), including 3,900 commercial trucks per day. This accounts for 46 percent of the automobiles and approximately 25 percent of the heavy trucks crossing the US/Mexico Border daily into Texas. In addition, the opening of the Anzalduas International Bridge between Mission and Reynosa and the Donna-Rio Bravo Bridge in Donna provides two new POEs to the regional area and consequently more traffic in the near future, which may contribute to US 77 truck traffic.

SECTION 2.0 - NEED AND PURPOSE OF THE PROPOSED PROJECT

2.1 NEED FOR THE PROJECT

Within the US 77 corridor, there are transportation problems that would support the following need statements for major transportation improvements to US 77:

- At-grade intersections compromise safety on this high-speed highway facility
- At-grade intersections within the project limits experience higher crash rates
- Projected increases in traffic on US 77 will increase the potential for incidents associated with the numerous at-grade intersections
- System continuity does not meet driver expectations.

2.1.1 At-Grade Intersections Compromise Safety on this High-Speed Facility

US 77 operates at 70 mph for most of its length within the US 77 project limits. The high-speed traffic mixed with the existence of at-grade intersections/crossings compromises safety. These at-grade intersections/crossings require users to cross or enter US 77 without traffic signals or dedicated entrance ramps into the through movement of 70 mph traffic. These at-grade intersections/crossings are located at perpendicular side streets and in areas where ranching operations occur on each side of US 77. Traffic exiting US 77 onto side streets must also exit from the main lanes without the protection of exit ramps or traffic signals, which slows traffic flow on the main lanes and directly affects safety. US 77 and crossroad traffic are both constrained by existing at-grade intersection configurations that lack separation between through-traffic and local traffic in communities along US 77.

The speed of through-traffic is frequently reduced below the rural posted speed limit of 70 mph due to cross-traffic movements and merging traffic from side streets to US 77 and adjacent businesses. Correspondingly, cross-traffic movements are often substantially hindered and delayed at the intersections, particularly during peak traffic periods on US 77.

2.1.2 At-Grade Intersections within the Project Limits Experience Higher Crash Rates

Crash data for 2005 through 2007 were obtained from the Crash Record Information System (CRIS) of the TxDOT Corpus Christi and Pharr Districts. The analyses of the crash data showed a three-fold difference in crash rates for the areas where there are existing at-grade intersections and cross-overs as compared to the grade-separated portions of the US 77 corridor. This analysis showed a notable difference in the rate of crashes per one million entering vehicles between at-grade and grade-separated intersections. The crash rates for at-grade intersections were more than twice that of grade-separated intersections. (**Table 2.1-1**)

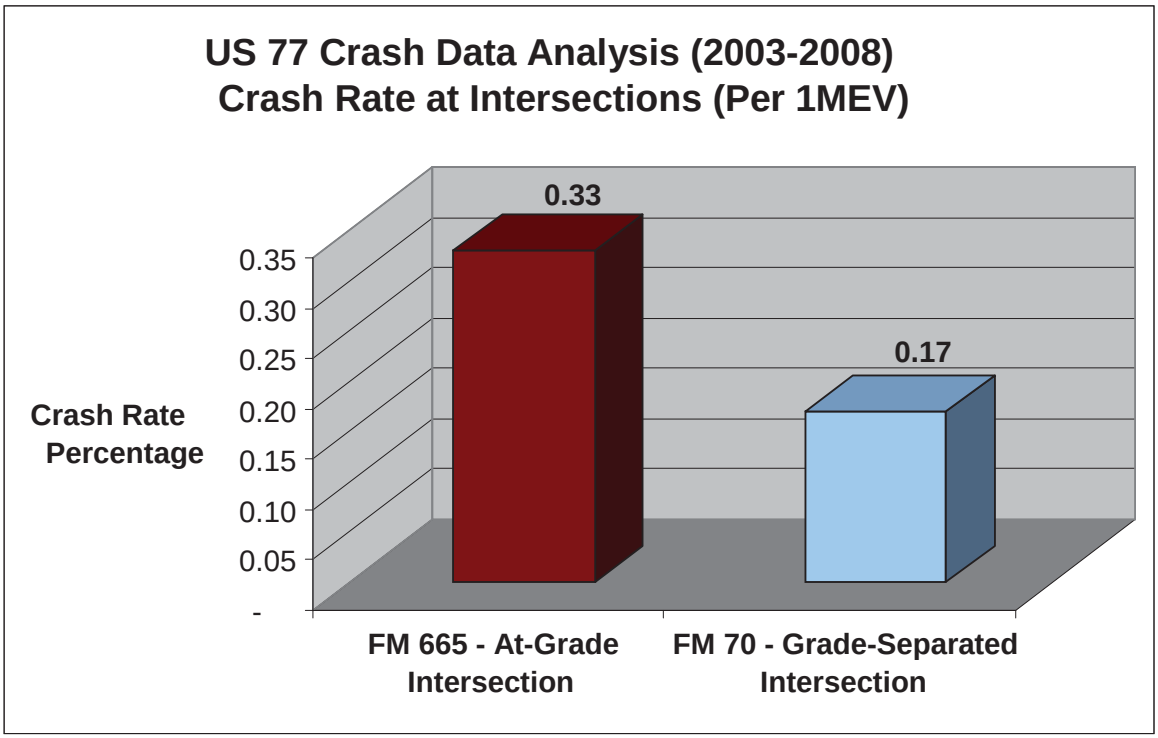
Table 2.1-1 2005 to 2007 Crash Rates for Corpus Christi and Pharr Districts

County[1]	Crashes (2005 – 2007)		Vehicles Entering Intersections (2005-2007)		Crash Rates (per 1 MEV)[2]	
	At-Grade	Grade-Separated	At-Grade	Grade-Separated	At-Grade	Grade-Separated
Nueces-Kleberg	29	2	213,492,150	32,696,700	0.14	0.06
Willacy	13	3	30,326,025	17,870,400	0.43	0.17

Source: *Accident Data Record, Years 2005-2007, TxDOT Corpus Christi & Pharr District,* December 2009
1. Kenedy County was excluded due to lack of crash records or intersections.
2. MEV = Million Entering Vehicles

Graph 2.1-1 shows a comparison of two similar intersections FM 665 is an at-grade intersection and FM 70 is a grade-separated intersection). The traffic volumes for both intersections were also quite comparable: FM 665 had about 70 million entering vehicles and FM 70 had 65 million entering vehicles. With comparable volumes, the number of crashes is higher at at-grade intersections when compared to grade-separated intersections.

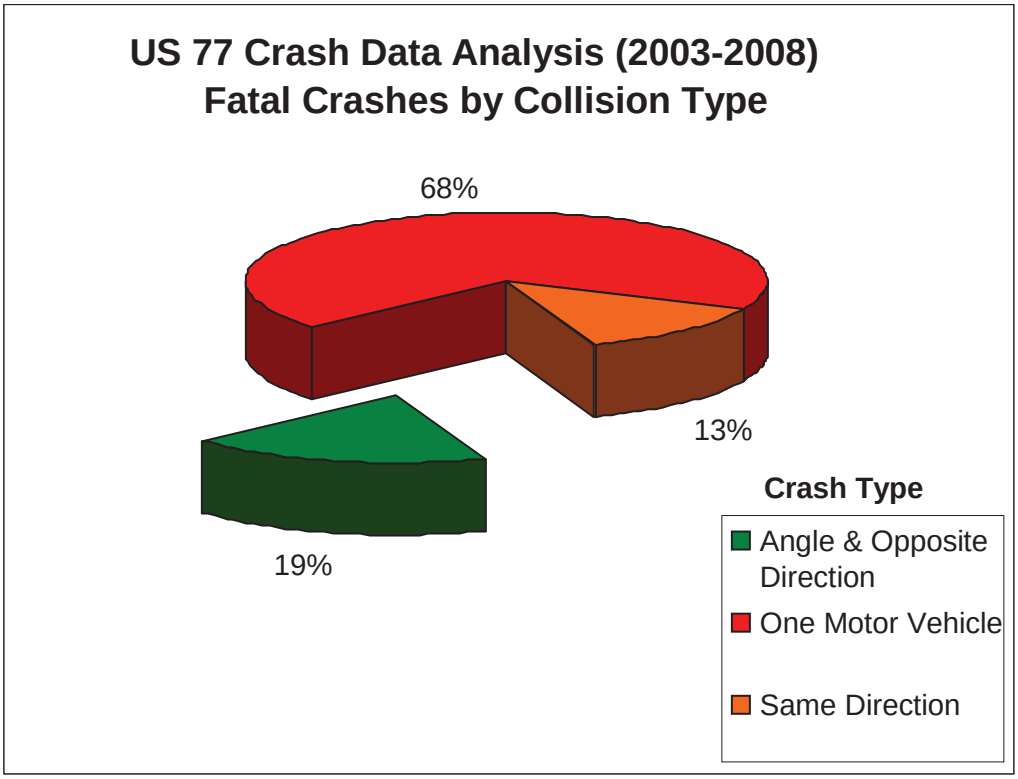
Graph 2.1-1 US 77 Crash Data Analysis (2003-2008): Crash Rate at Intersections



Source: *Accident Data Record, Years 2003-2008, TxDOT Corpus Christi & Pharr District,* December 2009

Graph 2.1-2 provides the distribution of fatal crashes on US 77 in the project area based on the collision type between 2003 and 2008. There were a total of 32 fatal crashes along US 77 project area, of which the majority were comprised of single vehicle crashes. Most crashes were due to vehicles running off the road and hitting stationary objects. The second highest category includes crashes at an angle or head-on collisions.

Graph 2.1-2 US 77 Upgrade Project Crash Data Analysis (2003-2008): Fatal Crashes by Collision Type



Source: *Accident Data Record, Years 2003-2008, TxDOT Corpus Christi & Pharr District,* December 2009

2.1.3 Projected Increases in Traffic on US 77 Will Increase the Potential for Incidents Associated with the Numerous At-Grade Intersections

Annual average daily traffic (AADT) data for US 77 were obtained from TxDOT TP&P. These data contained 2004, 2010, 2024, and 2030 AADTs, and truck percentages. This information separated the US 77 corridor into several segments and included access road volumes as shown in **Table 2.1-2**.

Table 2.1-2 AADT for the US 77 Corridor

Limits	2004 AADT	2010 AADT	2024 AADT	2030 AADT	2004 Percent Trucks	Percent Change (2004 – 2030)
IH 37 to SH 44	39,200	46,125	67,300	79,150	26	102
SH 44 to Business US 77 south of Kingsville	28,300	32,125	43,100	48,900	25	73
Business US 77 south of Kingsville to Kleberg/Kenedy County Line	20,600	24,400	36,100	42,725	20	107
Kleberg/Kenedy Line to Business	11,400	13,100	18,100	20,800	25	83

Table 2.1-2 AADT for the US 77 Corridor

Limits	2004 AADT	2010 AADT	2024 AADT	2030 AADT	2004 Percent Trucks	Percent Change (2004 – 2030)
US 77 north of Harlingen						
Business US 77 north of Harlingen to US 83	37,600	45,000	68,400	81,850	13	118

Source: TP&P, TxDOT, December 2009

As shown in **Table 2.1-2**, general traffic on US 77 is projected to continue to grow at a steady pace ranging from 73 to 118 percent. The concentration of trucks within this corridor is notably higher than the urban and rural state averages of 9.3 percent and 20 percent, respectively.

The projected traffic growth is related to the projected population growth, economic activity, and traffic patterns in the US 77 project area. These factors are discussed in detail in the subsequent paragraphs.

Another factor that directly affects traffic flow and safety is the existing vehicle mix of passenger cars and commercial trucks. Within the US 77 project area, the truck volume varies between 13 percent and 26 percent as shown in **Table 2.1-2**. Total truck traffic is expected to continue to increase in the coming years due to greater economic activity and trade flows in the region. Higher truck volumes, with different rates of acceleration, deceleration, and stopping distances than passenger cars, coupled with the lack of grade-separated intersections may increase the risk of serious crashes on US 77.

The concentration of trucks on main roads connecting these communities with the rest of the US appears to be related to international trade as well as the economic activity generated within the region. **Table 2.1-3** shows that the total number of trucks traveling between the border communities and the rest of the US in 2005 is almost double the number of trucks crossing the US/Mexico Border. This indicates that the approximately 67 percent of the 2005 truck traffic generated is involved in trade supporting the local communities.

Based on data from TxDOT and the Texas Center for Border Economic and Enterprise Development within the Texas A&M International University, trucks accounted for about 71 percent of export traffic from Mexico and 66 percent of imports.

Table 2.1-3 2005 Truck Volumes at Screenlines Average Daily Commercial Trucks

Screenline Location	Average Daily Commercial Trucks
US/Mexico Border Crossings	3,900
North of Rio Grande Communities	7,000
Total	10,900

Source: http://texascenter.tamiu.edu/ and *TxDOT 2005 truck flow maps,* December 2009

The anticipated continued growth in the project area has led the port authorities for the Port of Brownsville and the Port of Corpus Christi to announce plans to increase their respective capacities. Additionally, there are infrastructure improvements in Mexico that may also result in increased truck traffic on US 77. Truck traffic already represents 13 percent to 26 percent of the traffic within the US 77 project area, which is noticeably higher than the statewide average. As infrastructure improvements occur and traffic increases, the conflict between high-speed

through-traffic and local traffic could increase the numbers and severity of incidences at the numerous at-grade intersections. Improved crossing movements and turning movements would become increasingly important to ensure traffic flow and safety on US 77.

US 77 also serves as a principal route for vacation traffic headed to beaches and other tourism destinations in South Texas. Although US 77 is not a TxDOT-designated hurricane evacuation route, it does provide important connections to westbound evacuation routes in South Texas.

2.1.4 System Continuity Does Not Meet Driver Expectations

There is a lack of system continuity along US 77. Sections of US 77 have been upgraded to freeway standards with high-speed main lanes with exit and entrance ramps to provide access to the local roadway network. However, in the majority of the corridor where upgrades have not been constructed, US 77 main lanes connect directly to the local roadway network via at-grade intersections as well as at-grade cross-overs. For example, drivers heading south on US 77 from IH 37 may expect continuous freeway conditions and would not be prepared to encounter the cross-traffic at the existing at-grade intersections south of Robstown (one of many areas with at-grade intersections), reduced speed limits within city limits, and traffic signals, which are all uncharacteristic of Interstate travel.

As US 77 passes through the various communities, through-traffic encounters non-freeway conditions such as traffic signals, school zones, and other speed zones with posted traffic speeds as low as 30 mph. The discontinuous traffic patterns paired with speed changes may contribute to the increased potential for incidents and hazardous conditions that impact the safety of the traveling public on US 77.

As a result, the mixing of local through-traffic with high-speed traffic and the abrupt changes in roadway conditions do not meet driver expectations along the high-speed freeway sections of US 77.

2.2 PURPOSE OF THE PROJECT

In response to the need for improvements, the purpose of the proposed project is to improve safety, mobility, and continuity within the US 77 project corridor. To achieve this purpose, proposed improvements for the US 77 corridor would address the following objectives to improve:

- Traffic-related safety within communities located on US 77
- Safety for through-traffic
- Traffic mobility
- System continuity

The purpose of the proposed project is to improve safety by grade-separating through-traffic and cross-traffic at the major intersections and ranch gates and by separating through-traffic from local traffic turning onto side streets by the use of access roads. Mobility would be improved by allowing through-traffic to proceed without the need to reduce speed to accommodate cars entering or exiting the highway at these intersections.

SECTION 3.0 - DESCRIPTION OF ALTERNATIVES

The project area of the proposed US 77 Upgrade Project is approximately 122 miles in length and is defined by its northern logical terminus at the interchange of US 77 and IH 37 in Corpus Christi, Texas and the interchange of US 77 and US 83 in Harlingen, Texas at its southern terminus.

The US 77 Upgrade Project consists of two design components. The upgrading of the facility within the existing ROW or with additional adjacent ROW serves as the primary component of the Build Alternative. The secondary component of the Build Alternative consists of the construction of isolated additional capacity in the form of relief routes for Driscoll and Riviera.

The design process for the US 77 Upgrade Project consisted of three stages. The first stage began with a Conceptual Design presented at the first set of public meetings accompanied by Environmental Constraints Maps. The Conceptual Design was limited to showing the early design of the primary component – the upgrade portion of the project. The public viewed and made comments/suggestions for changes, environmental constraints, and also identified potential types of relief route options for Driscoll and Riviera. The second stage began with the refinement of the Conceptual Design based on public comment and identification of the four options suggested to be developed as the secondary component of the US 77 Upgrade Project and was presented at the second set of public meetings. The public viewed and made comments/suggestions for changes to the upgrade and to the relief route options. The third stage further refined the Preliminary Schematic based on public comment. This design was modified further as a result of additional public comment regarding the relief route access for both Driscoll and Riviera. **Appendix G** contains the most recent Preliminary Schematic identifying the primary and secondary components that serve as the Build Alternative.

The project team considered a wide array of transportation options for addressing the project's need and purpose. The project team utilized a screening process for determining which options and alternatives would be dismissed and which would be further evaluated and developed in more detail.

Section 3.1 of this EA describes the transportation strategy options and the relief route options that were considered in the development of the secondary component of the Build Alternative. **Section 3.1.1** describes the initial assessment of the options, while **Section 3.1.2** presents the comparison of the options and the subsequent rationale for dismissal of various options from further study.

Section 3.2 presents the No Build Alternative and a more detailed description of the main lane upgrade improvements with the proposed relief route options as the Build Alternative. This section also describes the iterative design process that has responded to the ongoing public involvement effort and has driven the development and revision of the Build Alternative. **Section 3.3** presents the selection of the Build Alternative as the Preferred Alternative.

The study has been open to the public to ensure that the evaluation process reflected the communities' needs and interests. This was supported by public comments solicited and received at public meetings held in March 2008 and September through October 2008 regarding route selection of the relief route options for Driscoll and Riviera. Options to the west, east, and through (at-grade and elevated) Driscoll and Riviera were suggested by the stakeholders during

the March 2008 public meetings. Comments were received in favor of each of these options and a Conceptual Design was then prepared for each of the four options and presented in the September through October 2008 meetings at each location. During the public comment period, comments were received in favor and against each of these options, and further refinement of the options continued. TxDOT requested an additional fifth option be developed. The options were then compared resulting in the dismissal of four of the five options for Driscoll and Riviera and the forwarding of the two options that would serve as the secondary component of the Build Alternative for the US 77 Upgrade Project. Below is a discussion of the design changes that were made resulting from the public meetings.

3.1 OPTIONS EVALUATED

3.1.1 Options Considered

Subsections 3.1.1.1 through **3.1.1.4** discuss transportation options considered for the US 77 Upgrade Project.

3.1.1.1 Transportation Systems Management (TSM)

TSM strategies are relatively low-cost enhancements to the existing transportation network that can greatly improve operational efficiency. These strategies include freeway bottleneck removal, widening of arterials, intersection improvements, traffic signal improvements, signage improvements, traffic management systems and other enhancements that make it easier for traffic to flow through the transportation network. These include a variety of Intelligent Transportation System (ITS) improvements such as communication systems, mobility assistant patrols, and advanced traffic management.

TSM options for this project would consist of the existing transportation projects along with the consideration for additional traffic and demand management programs such as:

- Synchronized traffic signals
- Ramp metering
- Motorist information systems
- Incident management systems
- Localized channelization/intersection improvements
- Access control strategies.

3.1.1.2 Transportation Demand Management (TDM)

TDM is aimed at reducing the volume of vehicles on the transportation network. These strategies include carpooling and ridesharing to combine person-trips into fewer vehicle-trips. This group of improvements also includes bicycle and pedestrian facility improvements. TDM has the potential to increase the efficiency of existing transportation facilities.

The TDM option for this project would consist of the existing and committed improvement or transportation projects along with the consideration for additional traffic and demand management programs such as:

- Additional park-and-pool facilities
- Increased bus service
- Rideshare support programs.

3.1.1.3 Existing Facility – No Build Alternative

The existing US 77 crosses through or is adjacent to 13 communities within the project area: Corpus Christi, Robstown, Driscoll, Bishop, Kingsville, Ricardo, Riviera, Sarita, Raymondville, Lyford, Sebastian, Combes and Harlingen. The roadway network in these populated areas include cross streets that represent sources of traffic generation on US 77. In addition, US 77 serves as the primary route for agricultural products and ranching operations throughout the majority of the study area, and is a trade route with Mexico.

The existing US 77 configuration consists of a four-lane facility divided by a center grassy median except through the communities of Driscoll, Ricardo, and Riviera where the facility is four-lane with a center turning lane. The ROW width varies between 200 feet and 380 feet and consists of two, 12 feet wide lanes in both the northbound and southbound direction. Outside shoulders are eight to 10 feet wide, and inside shoulders are four to 10 feet wide. All intersection crossings along this segment of US 77 are at-grade with the exception of the existing overpasses and ramps in the vicinities of Robstown, Kingsville, Bishop, and Raymondville. The at-grade cross-overs generally consist of one 12 feet wide eastbound and one 12 feet wide westbound lane, with 10 feet wide outside shoulders. The posted speed is 70 mph outside of urban areas. There are many at-grade crossroads that intersect US 77 within the project limits.

The No Build Alternative would maintain the existing facility without any improvements except for routine maintenance and those projects currently planned and programmed. This alternative has the least capital expense, would not cause construction phase traffic disruptions, and would not cause any human and environmental impacts due to this project. However, the No Build Alternative would not improve safety and mobility, or bolster system continuity along US 77.

3.1.1.4 Build Alternative with Relief Route Options

The Build Alternative includes the completion of upgrading US 77 to Interstate highway standards, including two highway relocations around Driscoll and Riviera. US 77 would remain a four-lane divided highway for the entire project length with additional capacity isolated to only the two relief routes. In select locations throughout the corridor, the four main lanes would be supplemented by access roads, overpasses, and interchanges to facilitate local access. Although the total project length is 122 miles, the proposed construction area is approximately 88 miles in length along or near US 77 in Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties. There are sections of US 77 that have been upgraded, are under construction, or are being advanced under separate environmental documents to bring US 77 up to Interstate standards **(Table 1.1-1 Figure A.1.1-1)**. They include:

- Sections A, D, E, F, and G from US 83 in Harlingen to the Business 77 relief route merge north of Raymondville, Texas.
- Section M at La Parra Avenue in Sarita, Texas.
- Section R from FM 1356 to FM 425 in Kingsville, Texas.
- Section S from FM 425 to SH 141 in Kingsville, Texas.
- Section T from SH 141 to FM 1898 in Kingsville, Texas.
- Section Z from FM 892 to SH 44 in Robstown, Texas.
- Section AA from SH 44 to IH 37 in Nueces County, Texas.

The upgrade of US 77 would be accomplished by undertaking improvements within the existing ROW where possible, with additional adjacent ROW when necessary (Build Alternative) and the

addition of relief routes proposed in the vicinity of Driscoll and Riviera.

The decision to potentially toll the relief routes around Driscoll and Riviera was based on the TTC policy that transportation projects that provide added capacity and/or on new location are to consider tolling as a mechanism to generate funding for the project and/or its maintenance.

As the majority of the project involves upgrading existing facilities to include control of access with no additional capacity, the only roadway segments that meet the tolling policy requirements are the relief routes around the two small towns of Riviera and Driscoll.

All US 77 proposed relief route options include tolling as they provide additional capacity. Two basic scenarios exist for the relief route toll facility:

- All options through Driscoll and Riviera (including elevated) would include the relief route toll facility and would be separate from the existing US 77 general purpose main lanes, with ingress and egress available at two locations within Driscoll and Riviera. The same number of existing through-lanes would be provided as access roads directly adjacent to the relief route toll facility. Although the relief routes could be tolled, no tollbooths would be necessary as the facility would employ electronic toll collection with toll gantries. The relief route toll facility would provide added capacity in both Driscoll and Riviera.
- West and east options for Driscoll and Riviera would construct a new facility on new location. These relief routes would provide US 77 general purpose main lanes with limited access roads. Although the relief routes could be tolled, no tollbooths would be necessary as the facility would employ electronic toll collection with the use of toll gantries. The relief route toll facility would provide added capacity in Driscoll and Riviera.

The relief routes have been designed for regional trips providing the most reliable, time-saving commute and additional capacity in Driscoll and Riviera. Drivers using this facility can anticipate traffic to flow at a minimum of 70 mph with no interruption from the traffic intersections and turning movements that are currently present in these areas. Drivers could pay a toll for this time-saving commute and additional capacity provided by the relief route toll facility. The potential toll rate would be evaluated and adjusted during the procurement stage of the project, as the actual toll rates for the US 77 Upgrade Project relief routes have not yet been established.

The toll would be strictly limited to the relief routes and would not be applicable to the upgraded portions of existing US 77. Motorists would not have to pay a toll to drive on US 77 with the exception of a motorist choosing to use the US 77 relief routes at Driscoll and Riviera. In these areas, they may choose between the existing non-tolled main lanes or the tolled relief routes, as applicable. At its widest point, the US 77 Upgrade Project would include four non-tolled main lanes plus four tolled main lanes in each direction.

Below is a description of the relief route options considered for Driscoll and Riviera. Typical sections of the Driscoll relief route options are shown in **Figure A.3.1-1.A** through **Figure A.3.1-1.E.** Typical sections of the Riviera relief route options are shown in **Figure A.3.1-2.A** through **Figures A.3.1-2.E.**

Figures A.3.1-3 and **A.3.1-4** compare the initial four relief route options in the vicinity of Driscoll and Riviera and an additional fifth option developed after the second round of public meetings. All four options for each relief route are presented in the following sections. Each option discussion identifies the potential social, economic, cultural, and natural impacts of the options considered during the alternative development phase of the project.

Descriptions of Driscoll Relief Route Options

The following paragraphs explain each of the relief route options considered for Driscoll.

Driscoll West Option
The Driscoll west option would meet project needs by providing main lanes and grade-separated interchanges on new location beginning to the north of Driscoll near CR 28 and heading to the west and ending south of Driscoll as shown in the typical section in **Figure A.3.1-1.A**. This relief route option is shown in **Figure A.3.1-5**. This option would require approximately 3,300 to 8,360 feet of additional length of roadway compared to the other Driscoll options as curved approaches would be needed for the roadway to cross the railroad. In order to minimize the overall length, steel-span bridges would be necessary to cross the railroad tracks twice at very severe angles. This west option would also require an 1,800 feet bridge crossing over one of the widest riparian habitat areas of Petronila Creek. The area of affected floodplain associated with this option is 73.4 acres, the highest of all options for Driscoll. This west relief route would require approximately 400 feet of additional ROW width.

Driscoll Through Option
The Driscoll through option would meet project needs by adding main lanes and access roads to the existing US 77 facility through Driscoll. This relief route option is shown in **Figure A.3.1-6**. As the UPRR abuts the existing US 77 facility along the west side, an additional 200 feet of ROW width would need to be acquired to the east of the existing US 77. The main lanes would be access-controlled requiring access roads adjacent to this option to provide local circulation, access to commercial areas, and access to US 77. The area of affected floodplain associated with this option is 22.0 acres, the second highest of all options for Driscoll. This through option would require approximately 200 feet of new ROW width to the east of existing US 77 through Driscoll.

Driscoll Elevated Option
The Driscoll elevated option would meet project needs by providing elevated main lanes and access roads to the existing facility. This option is shown in **Figure A.3.1-7**. The elevated option is similar to the through option, except that the main lanes are elevated for nearly a mile through the center of Driscoll. The elevated concrete structure would contain both the northbound and southbound main lanes and shoulders and would be supported by concrete piers. The main lanes would be access-controlled requiring access roads under this option to provide local circulation, access to commercial areas, and access to US 77. The access roads would be partially placed under the structure to conserve ROW width. The area of affected floodplain associated with this option is 5.6 acres, the lowest of all options for Driscoll. This option would also require 100 feet of additional ROW width in the elevated structure area.

Driscoll East Option
The Driscoll east option would meet the project needs by providing at-grade main lanes and grade-separated interchanges on new location east of Driscoll. This relief route option is shown in **Figure A.3.1-8**. It would begin on new alignment just north of Driscoll approximately three-quarters of a mile north of CR 24 and curve to the east then parallel CR 75 and curve to the west before rejoining future Business US 77 approximately 0.5 mile south of CR 18 south of Driscoll. The total length of this option is 3.6 miles. The area of affected floodplain associated with this option is 17.4 acres.

The Driscoll east option originally proposed access through diamond interchanges to the north and south of Driscoll. Additional public input regarding this design was received after the September through October 2008 public meetings. Stakeholders expressed concern that the proposed access would serve as a deterrent to visiting the Driscoll community where travelers would exit US 77 by using the proposed diamond interchange, then drive approximately 0.25 mile and then make a left or right turn onto Business US 77. Consequently, direct access to Driscoll has been proposed through the addition of direct connectors for the four traffic movements in four locations:

1. Southbound travelers exiting US 77 to enter Driscoll from the north would exit the farthest right lane (west) at-grade onto future Business US 77, while the northbound and southbound main lanes of the relief route would be elevated to the east.
2. Southbound travelers exiting Driscoll to the south on Business US 77 would access the future US 77 main lanes directly on the most western southbound auxiliary lane.
3. Northbound travelers entering Driscoll from the south would be provided access by exiting east at-grade onto future Business US 77, while the northbound and southbound main lanes of the relief route would be elevated to the east.
4. Northbound US 77 travelers exiting Driscoll to the north would access the US 77 main lanes through an at-grade entrance ramp/lane beginning just north of CR 24 (near the convergence of the relief route), passing under the relief route and joining the eastern most main lane through an auxiliary lane. This option's lanes would be elevated for this direct connector to access the northbound access road and enter US 77 main lanes near CR 28.

This east option would require approximately 400 feet of additional ROW width.

Descriptions of Riviera Relief Route Options

The following paragraphs explain each of the relief route options considered for Riviera.

Riviera West Option

The Riviera west option would meet project needs by providing main lanes and grade-separated interchanges on new location. This relief route option is shown in **Figure A.3.1-9**. It would be longer than the other Riviera options because curved approaches are needed for the roadway to cross the railroad at two locations. North of Riviera, the UPRR crossing angle is severe and would require steel-span bridges. The increasing separation of the railroad and US 77, south of Riviera, would lessen the crossing angle so a steel-span bridge would not be necessary. The west option would potentially affect 18.4 acres of floodplain.

The King Ranch is listed on the National Register of Historic Places (NRHP), as a National Historic Landmark (NHL), and is a Section 4(f) resource. The King Ranch NHL serves as the western boundary of US 77 in the vicinity of Riviera. There is no option west of Riviera that could avoid affecting the King Ranch NHL. See **Section 4.9 – Section 4(f)/Section 6(f) Resources** for more discussion of this NHL. Nevertheless, the west option was evaluated due to public comment favoring a western option.

An additional item identified by the public for the Riviera relief route options included improving the connection between SH 285 and US 77, which is currently an at-grade intersection served by a traffic signal. During peak hours, long wait times are experienced by vehicles on SH 285 at the traffic signal. The west option would also improve the connection between SH 285 and US

77 by providing a grade-separated interchange approximately 0.8 mile west of the existing intersection. This west option would require approximately 400 feet of width of additional ROW.

Riviera Through Option

The Riviera through option would meet project needs by adding at-grade main lanes and access roads to the existing facility. This relief route option is shown in **Figure A.3.1-10**. An additional 200 feet of ROW width would need to be acquired to the east of existing US 77 due to the existing railroad on the western edge of the road. North of the intersection between SH 285 and US 77 in Riviera, there is an average width of approximately 70 feet between the railroad and US 77; at the south end of the community it widens to approximately 1,200 feet but the land between the railroad and US 77 is within the boundaries of the King Ranch NHL. If the through option were placed within this tract, the two gas stations/convenience stores located north of SH 285 would be displaced. It should also be noted there is a distance of approximately 50 miles between the fuel facilities in Riviera and the next facilities southbound on US 77. The area of affected floodplain associated with this option is 19.6 acres, the highest of all options for Riviera.

Since the main lanes of the relief route would be access-controlled, access roads would be needed under this option to provide local circulation, access to commercial areas, and access to US 77. The through option would also provide at-grade traffic signal controlled intersections with the access roads of US 77, which would lead to ramps providing access to the US 77 relief route main lanes. The through option would require approximately 200 feet additional ROW width.

Riviera Elevated Option

The Riviera elevated option would meet project needs by providing main lanes and access roads to the existing facility. This relief route option is shown in **Figure A.3.1-11**. The main lanes would be elevated for less than a mile through the center of Riviera. The elevated concrete structure would contain the main lanes and shoulders and would be supported by concrete bents and piers. The access roads would be placed partially under the structure to conserve additional ROW width. This option would require 100 feet of additional ROW in the elevated structure area for a total ROW width of 200 feet. As with the through option, the elevated option would avoid the tract of land between US 77 and the railroad for the same reasons. Also, as with the through option, the elevated option would provide an at-grade traffic signal controlled intersection with the US 77 access roads, which would lead to ramps providing access to the US 77 relief route main lanes. Since the main lanes would be access-controlled, access roads would be needed under this option to provide local circulation, access to commercial areas, and access to US 77. The area of affected floodplain associated with this option is 9.8 acres. This elevated relief route option would require approximately 100 feet of additional ROW width.

Riviera East Option

The Riviera east option would meet the project needs by providing main lanes and grade-separated interchanges on new location. This relief route option is shown in **Figure A.3.1-12**. It would not require the bridge length or steel bridges of the west option because the option would not cross the railroad. The initial design presented at the public meetings did not provide for direct connectors to access Riviera. During the public meetings, comments were received to provide direct access. As a result, direct access to Riviera was provided through the addition of direct connectors at four locations.

In addition, the Riviera east option received public input regarding access after the September through October 2008 public meetings. Stakeholders expressed concern that the proposed diamond interchanges would serve as a deterrent to visiting the Riviera community and businesses where travelers would exit US 77 by using the proposed diamond interchange, then drive approximately 0.25 mile and then make a left or right turn onto Business US 77. Therefore, direct access to Driscoll has been proposed through the addition of direct connectors for the four traffic movements in four locations:

1. Southbound travelers exiting US 77 to enter Riviera from the north would exit the farthest right lane (west) at-grade onto future Business US 77 while the northbound and southbound main lanes of the relief route would be elevated to the east.
2. Southbound travelers exiting Riviera to the south on Business US 77 would access the future US 77 main lanes directly on the most western southbound auxiliary lane.
3. Northbound travelers entering Riviera from the south would be provided access by exiting east at-grade onto future Business US 77, while the northbound and southbound main lanes of the relief route would be elevated to the east.
4. Northbound US 77 travelers exiting Riviera to the north would access the US 77 main lanes through an at-grade entrance ramp/lane through a lane beginning just north of CR 2295 (near the convergence of the relief route), passing under the relief route, and joining the eastern most main lane through an auxiliary lane. This option's lanes would be elevated for this direct connector to access to northbound access road and enter US 77 main lanes near CR 2280.

The area of affected floodplain associated with this option is 22 acres. This east option would require approximately 400 feet of additional ROW width.

Elevated Options not Presented at Public Meetings

The Driscoll and Riviera relief route options mentioned above were shown at the public meetings in Fall 2008. Public comments regarding the configuration of a separate TxDOT project, the US 281 at Premont project, prompted the consideration of an additional elevated option for both Driscoll and Riviera. The Premont elevated configuration was studied to determine if a similar structure would be feasible for US 77 in both Driscoll and Riviera. The Premont initial configuration included an elevated option limited to 150 feet of ROW as described below.

Driscoll Elevated Option – 150 FEET ROW

The Driscoll elevated option – 150 feet ROW would meet project needs by providing main lanes and access roads to the existing facility. The main lanes would be elevated approximately 20 feet for approximately 1.0 mile through the center of Driscoll. This option would further minimize the ROW to a total of 150 feet for the length of the elevated structure, requiring only the acquisition of approximately 70 feet of additional ROW versus 100 feet of ROW for the other Driscoll elevated option. The elevated concrete structure would include the main lanes and shoulders and would be supported by concrete bents and piers. Bridge specialists developed five distinct bridge configurations that would fit within the 150 feet ROW. These configurations included three-column bent, two-column bent, two-single column bents, single column bent with typical reinforcement, and single column bent with pre-stressed concrete configurations, which range in cost from $28 million to $45 million for structures only.

The area of affected floodplain associated with this option is 5.6 acres, the lowest of all options for Driscoll. The access roads would be placed partially under the elevated structure to conserve ROW width. Since the main lanes would be access-controlled, access roads would be needed under this option to provide local circulation, access to commercial areas, and access to US 77. As with the other through option, this option would provide an at-grade traffic signal controlled intersection with the US 77 access roads, which would lead to ramps providing access to the US 77 main lanes. This elevated option would require approximately 70 feet of additional ROW width.

Riviera Elevated Option – 150 FEET ROW

The Riviera elevated option – 150 feet ROW would meet project needs by providing main lanes and access roads to the existing facility. The main lanes would be elevated approximately 20 feet for slightly less than a mile through the center of Riviera. The elevated concrete structure would provide the main lanes and shoulders and would be supported by concrete bents and piers. Bridge specialists developed five bridge configurations: three-column bents, two-column bents, two-single column bents, single column bent with typical reinforcement, and single column bent with pre-stress steel. The bridge configurations range in cost from $28 million to $45 million for structures only.

The area of affected floodplain associated with this option is 9.8 acres. Access roads would be placed partially under the structure to conserve ROW width. This option would further minimize the total ROW width including existing to 150 feet for the length of the elevated structure requiring only the acquisition of approximately 70 feet of additional ROW versus 100 feet of ROW for the other elevated option. Local access would be maintained along the at-grade access roads and would be controlled with traffic signals. Access to the main lanes would be provided by ramps. Since the main lanes would be access-controlled, access roads would be needed under this option to provide local circulation, access to commercial areas, and access to US 77. This elevated option would require approximately 70 feet of additional ROW width.

Public and Agency Input on the Development of the Build Alternative

The following two sections summarize the design changes made to date resulting from the two rounds of public meetings. A more in-depth description of the public involvement process is documented in **Section 7.0 – Comments and Coordination**.

Design Changes due to First Round of Public Meetings for the US 77 Upgrade Project

The first round of public meetings was held in March 2008 with approximately 63 attendees. The first round comment period ended on April 7, 2008 with a total of 79 comments received. The majority of these comments were submitted in writing at the meetings or following the meetings by postal mail. A comment and contact database was established to track attendance and comments. The database was updated to include all who attended the briefings and meetings and anyone who submitted comments. The database continues to serve as a tracking system of comments and contacts for future use in the environmental process. (All comments received from the public are recorded in the Comment Summary – see **Section 7.0 – Comments and Coordination**). All comments were reviewed and suggestions were considered. The following suggestions (regarding the Preliminary Conceptual Design for main lane upgrade of US 77 that was presented at the first round of meetings) were integrated into the design for evaluation in the EA as shown below.

Interchanges and Access

A member of the Ricardo Independent School District (ISD) Board stated a proposed pedestrian underpass that was planned for Ricardo is unnecessary because school children have been instructed to ride the provided bus service from the east side of US 77 to the school on the west side. Even if a pedestrian underpass were to be provided, the railroad tracks would still pose a potential safety hazard and the children should continue to ride the buses. Therefore, a proposed pedestrian underpass in Ricardo that was previously added specifically for the children's access to the school has been removed.

Complete interchanges were added to the Revised Conceptual Design at the following two locations in response to comments regarding usage of ranch gates:

- Four ranches that use the Butler Gate/Hacienda Yturria South and Gate 2/Diamond Ranch Gate, Santa Berta/El Devisadero Road (one complete interchange with two separation structures)
- Four ranches that utilize the Yturria County Road gates.

Comments were also received to consider an interchange at Armstrong Avenue on the north edge of Sarita. There are three residences east of US 77 and two residences west of US 77 at that location. It appeared that an additional interchange was warranted at Armstrong Avenue to provide access to the residences and provide circulation to Sarita. As a result, the interchange was added to the Revised Conceptual Design.

Relief Routes

In certain developed areas where relief routes were considered, the public was given the opportunity to provide comments and suggestions on the development of potential options for relief routes to best serve communities while avoiding potential adverse effects.

Based on public comments received regarding Riviera, four relief route alignment options were developed:

- Through Riviera holding the west edge of the alignment on the existing highway and expanding the typical section to the east to avoid the King Ranch NHL
- West of Riviera and within the King Ranch NHL
- East of Riviera on new alignment
- Through Riviera holding the west edge of the alignment on the existing highway and expanding the typical section to the east to avoid the King Ranch NHL and including elevation of the main lanes to reduce the amount of ROW required.

Three of these alignments would include connectivity of SH 285 with US 77, a feature that is lacking in the alignment option east of Riviera.

Based on public comments received regarding Driscoll, four relief route alignment options were developed:

- Through Driscoll holding the west edge of the alignment on the existing railroad tracks and expanding the typical section to the east
- West of Driscoll on new alignment
- East of Driscoll on new alignment
- Elevated through Driscoll holding the west edge of the alignment on the existing railroad

tracks and expanding the typical section to the east including elevation to reduce the amount of ROW required.

Design Changes due to Second Round of Public Meetings for the US 77 Upgrade Project

The second round of public information meetings was held in September through October 2008 to solicit input from the public as part of the EA process as defined by NEPA. All comments and suggestions received were reviewed and considered. The following suggestions, as is shown for the Preliminary Schematic and the four Conceptual Design options for relief routes in Driscoll and Riviera presented at the meetings, were integrated into the design for evaluation in the EA.

Interchanges and Access

At the second public meeting held on October 21, 2008, a pedestrian underpass in Ricardo was again requested. The Ricardo Elementary and Middle School complex is located on CR 1118/CR 2160, and an underpass is being provided at that location. Therefore, the design was modified to incorporate a safe pedestrian crossing by providing sidewalks and Americans with Disabilities Act (ADA) compliant crossings of the access roads.

Complete interchanges have been added to the Preliminary Schematic at the following locations in response to comments received during the second round of public information meetings and meetings with the stakeholders.

- In Nueces County at CR 4 – There is a neighborhood in Bishop whose main access is directly onto US 77 and the proposed project would limit the north access onto US 77. Also, there is a large chemical plant, Hoechst Celanese, which generates large traffic volumes that utilize CR 4 to access US 77. Both the neighborhood and chemical plant workers would benefit by having an interchange at CR 4 to facilitate access to US 77.
- In Kleberg County, north of Sage Road in Kingsville – There is an auto dealership located on the proposed southbound access road of US 77 of the presented schematic. The previous design would restrict access to northbound travelers and would require a commute of over 7.5 miles to access. An interchange located approximately 1.0 mile north of Sage Road would reduce the commute by over 6.5 miles and has been added to the Preliminary Schematic.
- In Kleberg County at CR 2280 – There is a community just north of Riviera with only external access to US 77. With the design presented at the public meetings, the proposed project would require this community to commute approximately 14 miles to access Riviera. Therefore, the addition of this newly proposed interchange would provide the community full access in both directions and would help the Riviera ISD bus routes to pick up school children in that community.

Riviera East Relief Route Option

At the Riviera public meeting, there were numerous requests to revise the access road pattern on the east option for the relief route. The concern was the relationship of the school bus routes on the north side of Riviera and the lack of access roads in that section of the relief route option. The project team coordinated with Riviera ISD and obtained bus route mapping, which was overlaid on the schematics to determine any conflicts. The Preliminary Schematics design was subsequently changed: the access roads were made continuous and the new interchange at CR 2280 was added to maximize effective circulation for the bus routes.

Because all relief route options could be tolled, the access roads cannot be continuous on new location. Therefore, the access roads were modified to be discontinuous throughout the Riviera east relief route option.

The interchange at CR 2340 was modified due to a request made at the Riviera public meeting. The previous access was provided by an interchange approximately 6.0 miles north of Riviera. Based on the public comments and the identification of a small subdivision, the interchange at CR 2340 was added to provide shorter trip length for these local community users. Direct access to Riviera for northbound travelers would be provided just north of the Los Olmos Creek bridges and just south of the relief route option entrance by exiting to the east at-grade. The northbound and southbound main lanes would be elevated to provide access onto future Business US 77. This would allow an easier connection for traffic originating south of Riviera to access US 77 south of town, would alleviate the concern for the existing businesses in Riviera, and would allow ease of traffic to obtain services.

For southbound travelers on future US 77 main lanes, direct access into Riviera is provided by exiting the most western southbound main lane just north of the relief route entrance onto future Business US 77. This would allow an easier connection for traffic to access Riviera, would alleviate the concern for the existing businesses in Riviera, and would allow ease of traffic to obtain services.

For northbound travelers on Business US 77 in Riviera, direct connection would be provided onto the future US 77 main lanes through a lane beginning just south of CR 2210 (near the convergence of the relief route). The relief route would be elevated for this direct connector to access to the northbound access road and enter US 77 main lanes near CR 2280. This would allow an easier connection for traffic exiting Riviera to access US 77 northbound, would alleviate the concern for the existing businesses in Riviera, and would allow ease of traffic to obtain services.

Kleberg County Weigh Station

There is a weigh station operated by the Texas Department of Public Safety (DPS) located just south of Riviera on existing US 77. A series of meetings were held with Kleberg County and DPS Corpus Christi Region III on September 29, 2008, February 12, 2009, and April 29, 2009. The Riviera east relief route would require moving the weigh station. DPS requested that the weigh station be moved to the north of Riviera and located off the northbound lanes of US 77 to facilitate access and simplify enforcement. The Preliminary Schematic was revised and a weigh station location was established between Ranch-to-Market Road (RM) 628 and CR 2230 on the east side of US 77. The design of the weigh station was modeled after the New Waverly weigh station located north of Houston on I-45 as requested by DPS.

Direct Connectors at Driscoll and Riviera

The Kleberg County meeting held on February 10, 2009 resulted in the addition of four direct connectors being added to the Build Alternative for Riviera.

Southbound travelers exiting Riviera on Business US 77 would access the future US 77 main lanes directly on the most western southbound main lane. This would allow an easier connection for traffic originating from Riviera to access US 77 south of town, would alleviate the concern for the existing businesses in Riviera, and would allow ease of traffic to obtain services.

For southbound travelers on future US 77 main lanes, direct access into Riviera is provided by exiting the most western southbound main lane just north of the relief route entrance onto future Business US 77. This would provide an easier connection for traffic to access Riviera, would alleviate the concern for the existing businesses in Riviera, and would allow ease of traffic to obtain services.

For northbound travelers on Business US 77 in Riviera, direct connection would be provided onto the future US 77 main lanes through a lane beginning just south of CR 2210 (near the convergence of the relief route). The relief routes main lanes would be elevated for this direct connector to access to the northbound access road and enter US 77 main lanes near CR 2280. This would provide an easier connection for traffic exiting Riviera to access US 77 northbound, would alleviate the concern for the existing businesses in Riviera, and would allow ease of traffic to obtain services.

A meeting was held on February 11, 2009, to collect indirect and cumulative impacts data with the Mayor Pro Tem John Aguilar of Driscoll. During this meeting, concern was expressed for access to Driscoll as was presented in the public meetings. What was of most concern were the economic effects that may result to existing businesses without direct access. This resulted in the addition of four direct connectors being added to the Build Alternative for Driscoll.

Design Changes due to Endangered Species

The interchange for Sage Road on the north edge of Kingsville was moved approximately 0.75 mile to the south to avoid a field-identified population of an endangered plant species – slender rush-pea (*Hoffmannseggia tenella*). This species is considered in detail in **Section 4.7 – Threatened and Endangered Species**. In addition, three wildlife crossings have been incorporated into the design in southern Kenedy and northern Willacy Counties as conservation measures for the endangered ocelot (*Leopardus pardalis*) and jaguarundi (*Herpailurus yaguarondi cacomitli*).

3.1.2 Options Dismissed from Detailed Further Study

Below is a description of the comparative analysis of the options and the rationale of why certain options were dismissed from further study.

3.1.2.1 TSM Options

These strategies as discussed in Section 3.1.1.1 are all strongly encouraged by and are an integral part of the 2035 MTP and 2011-2014 TIP of the Corpus Christi MPO and the HSB MPO. A variety of TSM and TDM measures are currently included in the Corpus Christi MPOs Congestion Management Process (CMP). Although implementation of these strategies may ease congestion on existing roadways, they would not fully or adequately address the project's need for transportation safety improvements within the US 77 corridor.

These low-to-moderate investment options – as a stand alone action – would not fully address the project's purpose to improve safety by grade-separating through-traffic and cross-traffic at the major intersections and ranch gates and by separating through-traffic from local traffic turning onto side streets by the use of access roads. Therefore, while many aspects of the TSM option may enhance other alternatives, the TSM options in and of themselves do not fully address the project's need and purpose and were dismissed from further study.

3.1.2.2 TDM Options

The TDM options as discussed in Section 3.1.1.2 were not able to meet the needs of the project as they are related to safety improvements requiring grade-separation of through-traffic and cross-traffic.

These low-to-moderate investment options – as a stand alone action – would not fully address the project's need and purpose to improve safety by grade-separating through-traffic and cross-traffic at the major intersections and ranch gates and by separating through-traffic from local traffic turning onto side streets by the use of access roads. Therefore, while many aspects of the TDM options may enhance other alternatives, the TDM options in and of themselves do not fully meet the project's need and purpose and were dismissed from further study.

3.1.2.3 Build Alternative – Relief Route Design Options

Matrices comparing potential impacts were prepared using data gathered from existing sources and field observations that could be made without right-of-access for each option as shown in **Figures A.3.1-3** and **A.3.1-4**. The options were then compared to determine the option that meets the need and purpose while minimizing social, economic, cultural, engineering, and natural impacts. As a result of this analysis, options were dismissed from further study or forwarded for inclusion in the Build Alternative.

Driscoll Options Analysis

Below is the summary of rationale for dismissal of the following relief route options for Driscoll:

Driscoll West Option

- This option would cross Petronila Creek at one of the widest riparian zones along the creek.
- The potential for archeological sites in this area is very high as Petronila Creek is one of the few fresh water bodies, and many sites have been previously recorded along the creek. This option would cross at one of the widest points in a previously undisturbed area of the creek.
- This option would require splitting of some of the agricultural field parcels.

The west option's estimated construction cost of $44.1 million is approximately 2.2 times the cost of the east option and 1.9 times the cost of the through option. This is primarily due to the length and configuration of the facility required by the railroad crossings and the 100-year floodplain.

Driscoll Through Option

- This option would require acquisition of a portion of Driscoll City Park (which is likely protected under Section 4(f) of the Department of Transportation Act of 1966).
- This option would require the relocation of 19 residences, nine businesses, one church, and the Nueces County Driscoll Senior Center. Included in the nine businesses are four operating gas stations with convenience stores.
- The acquisition/relocation of these properties including the gas stations, commercial stores, park, church, and community gathering places would affect the socioeconomic character of Driscoll and community cohesion.
- The socioeconomic impacts of this option would be substantial, as the nine active businesses represent the majority of businesses within the community. Moreover,

commercial space is limited in the immediate area, and business relocations would have limited options for sites to relocate.

- Maintaining existing traffic on US 77 during construction could increase construction costs, as traffic detours through local residential neighborhoods would not be practical.
- The existing two-way access would convert to one-way access roads resulting in more circuitous local access.
- The cost of the through option is estimated to be $22.8 million.

Driscoll Elevated Option – 200 FEET ROW

- This elevated option reduces the additional ROW required by the through option by 100 feet to a total ROW width of 200 feet, and would avoid impacts to the Driscoll City Park and the Nueces County Driscoll Senior Center. However, it would still result in the removal and relocation of 13 residences and nine businesses.
- The socioeconomic impacts of this option would be substantial, as the nine active businesses represent the majority of businesses within the community. Moreover, commercial space is limited in the immediate area, and business relocations would have limited options for sites to relocate.
- Because of the roadway's higher elevation, there is a higher potential for noise impacts due to noise propagating further out. Mitigation measures for such effects are limited and would potentially increase costs.
- The 20 feet elevated structure would be introduced through Driscoll and would act as a visual barrier, which could further isolate the east and west sections of Driscoll resulting in community cohesion impacts.
- Maintaining existing traffic on US 77 during construction could substantially increase construction costs, as traffic detours through local residential neighborhoods would not be practical.
- The existing two-way access would convert to one-way access roads resulting in more circuitous local access.
- The cost of the elevated structure is estimated to be $46.9 million, approximately 2.4 times the cost of the east option, and 2.1 times the cost of the through option.

Driscoll Elevated Option – 150 FEET ROW

- This elevated option would cause the relocation of eight residences and all nine active businesses along existing US 77.
- The socioeconomic impacts of this option would be substantial, as the nine active businesses represent the majority of businesses within the community. Moreover, commercial space is limited in the immediate area, and business relocations would have limited options for sites to relocate.
- Because of the roadway's higher elevation, there is a higher potential for noise impacts due to noise propagating further out. Mitigation measures for such effects are limited and would potentially increase costs.
- The 20 feet elevated structure would be introduced through Driscoll and would act as a visual barrier which could further isolate the east and west sections of Driscoll resulting in community cohesion impacts.
- Maintaining existing traffic on US 77 during construction could substantially increase construction costs, as traffic detours through local residential neighborhoods would not be practical.
- The existing two-way access would convert to one-way access roads resulting in more circuitous local access.

- The estimated $50.9 million construction cost of the elevated option is approximately 2.6 times the cost of the east option, and 2.2 times the cost of the through option.

Riviera Options Analysis

Below are the summaries of rationale for dismissal of the following relief route options for Riviera:

Riviera West Option

- The Riviera west option was dismissed because of the potential use (e.g., ROW acquisition) of the King Ranch NHL property, which is protected by Section 4(f) of the Department of Transportation Act of 1966 (see Section 4.9) and Section 106 of the National Historic Preservation Act (NHPA) of 1966 (see Section 4.8). The King Ranch is still in use for ranching. The US 77 Upgrade Project was developed to avoid the use of property within the King Ranch NHL throughout the project length.
- The Riviera west option's estimated construction cost of $30.5 million, not including the cost of ROW and retaining walls, is more than 1.5 times the cost of the east option and 1.3 times the cost of the through option. Despite the diminished crossing angle over the railroad, the bridge configuration requires a longer spanning bridge than the other options, which contributes to the increased cost.

Riviera Through Option

- The Riviera through option would create community impacts, including the relocation of six residences, eight active businesses and one church.
- Of the displaced businesses that have been identified, two are recently constructed gas stations with convenience stores. One gas station is located at the intersection of US 285 and US 77, and the other is located at the north end of the Riviera community on the east side of existing US 77. The northern facility has 10 gas pumps in the front and a truck facility with eight pumps in the rear. The convenience stores also serve as local food markets. The distance between the Riviera fuel facilities and the next fuel facilities southbound on US 77 is approximately 50 miles.
- The socioeconomic impacts of this option would be substantial, as the eight active businesses represent the majority of businesses within the community. Moreover, commercial space is limited in the immediate area, and business relocations would have limited options for sites to relocate.
- The other active businesses that would be relocated are a recently constructed Dairy Queen, Barn Door Restaurant, and a gift shop.
- Maintaining existing traffic on US 77 during construction could substantially increase construction costs, as traffic detours through local residential neighborhoods would not be practical.
- The existing two-way access would convert to one-way access roads resulting in more circuitous local access.
- The area of affected floodplain associated with this option is 19.6 acres, the highest of all options for Riviera.
- The through option's estimated construction cost of $24.3 million.

Riviera Elevated Option – 200 FEET ROW

- Although this option would narrow the proposed ROW of the through option by 100 feet, it does not substantially reduce the impact on natural and cultural resources when compared to the through option or the east option.
- The elevated option would cause the relocation of six residences, eight active businesses, and one church.
- The socioeconomic impacts of this option would be substantial, as the eight active businesses represent the majority of businesses within the community. Moreover, commercial space is limited in the immediate area, and business relocations would have limited options for sites to relocate.
- Community impacts of relocations would be similar to the through option.
- The potential effect on historic resources would also be the same as the through option.
- Maintaining existing traffic on US 77 during construction could substantially increase construction costs, as traffic detours through local residential neighborhoods would not be practical.
- The existing two-way access would convert to one-way access roads resulting in more circuitous local access.
- Because of the roadway's higher elevation, there is a higher potential for noise impacts due to noise propagating further out. Mitigation measures for such effects are limited and would potentially increase costs.
- The elevated option's estimated construction cost of $52.2 million is approximately 2.5 times the cost of both the east option and the through option.

Riviera Elevated Option – 150 FEET ROW

- This elevated option would cause the relocation of three residences. It would likely affect the seven active businesses.
- The socioeconomic impacts of this option would be substantial, as the seven active businesses represent almost the majority of businesses within the community. Moreover, commercial space is limited in the immediate area, and business relocations would have limited options for sites to relocate.
- Maintaining existing traffic on US 77 during construction could significantly increase construction costs, as traffic detours through local residential neighborhoods would not be practical due to existing infrastructure limitations.
- Because of the roadway's higher elevation, there is a higher potential for noise impacts due to noise propagating further out. Mitigation measures for such effects are limited and would potentially increase costs.
- The existing two-way access would convert to one-way access roads resulting in more circuitous local access.
- The elevated option's estimated construction cost of $52.4 million is approximately 2.5 times the cost of both the east option and the through option.

In summary, the options above for Driscoll and Riviera have been considered and eliminated from further consideration due to potential community impacts, noise impacts, historic areas, ROW restrictions related to natural resources impacts, and increased costs. Therefore, the options included in the Build Alternative that have been advanced for further study address project objectives with potentially lower impacts at a lower estimated cost to the affected communities in the project area.

3.2 ALTERNATIVES ADVANCED FOR DETAILED STUDY

Descriptions of the two alternatives advanced for detailed study are provided below.

3.2.1 Existing Facility – No Build Alternative

The existing US 77 crosses through or is adjacent to 13 communities within the project area: Corpus Christi, Robstown, Driscoll, Bishop, Kingsville, Ricardo, Riviera, Sarita, Raymondville, Lyford, Sebastian, Combes and Harlingen. The roadway network in these populated areas included cross streets that represent sources of traffic generation on US 77. In addition, US 77 serves as the primary route for agricultural products and ranching operations throughout the majority of the study area and is a trade route with Mexico.

The existing US 77 consists of a four-lane facility divided by a center grassy median except through Driscoll, Ricardo, and Riviera where US 77 is a four-lane facility with a center turning lane. The ROW width varies between 200 feet and 380 feet, and consists of two 12 feet wide northbound and two 12 feet wide southbound travel lanes. Outside shoulders are eight to 10 feet wide, and inside shoulders are four to 10 feet wide. All intersection crossings along this segment of US 77 are at-grade with the exception of the existing upgraded overpasses and ramps in the vicinity of Robstown, Kingsville, Bishop, and Raymondville. The at-grade cross-overs generally consist of one 12 feet wide eastbound and one 12 feet wide westbound lane, with 10 feet wide outside shoulders. Outside of urban areas, the posted speed is 70 mph. There are many crossroads that intersect US 77 at-grade.

The No Build Alternative would maintain the existing facility without any improvements except for routine maintenance and those projects currently planned and programmed. This alternative has the least capital expense, would not cause construction phase traffic disruptions, and would not cause any human and environmental impacts resulting from the Build Alternative. However, the No Build Alternative would not improve safety and mobility, or bolster system continuity along US 77.

3.2.2 Proposed Facility – Build Alternative

The US 77 Upgrade Project analysis and incorporated public comments resulted in the recommendation that the primary component of upgrades to existing US 77 main lanes to a controlled access facility that meets Interstate standards, along with the secondary component of the Driscoll and Riviera east option relief routes, be forwarded for further study. The east option for Driscoll and the east option for Riviera best meet the project needs while minimizing impacts and were forwarded for further study and comprise the secondary component of the Build Alternative. The rationale for forwarding these eastern options are more fully described and analyzed in this section.

Driscoll East Option

- The proposed main lanes crossing over Petronila Creek would be bridged at a relatively narrow area of riparian habitat that is approximately 600 feet wide (compared to about 1,800 feet of riparian habitat for the other options). The through and elevated options required at-grade access roads in addition to the existing bridge. There is high potential for archeological, wildlife, and other ecological impacts at Petronila Creek. By avoiding the additions of access roads at Petronila Creek, the east option is favorable. This east relief route correspondingly has less impact on floodplains.

- This option compares favorably to the west option in all categories except impacts to prime farmland (as defined by the US Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS)) and residences.
- This option would affect one residence. Adequate relocation opportunities for one residence appear to be available in the Driscoll area.
- This option configuration is able to avoid the division of farmland properties more than the west option because it was designed to generally follow existing tract boundaries as much as possible.
- The east option would affect one combined oil and gas well, one parallel pipeline, two crossing pipelines, and two aboveground metering facilities/valve stations.
- The area of affected floodplain associated with this option is 17.4 acres.
- Direct access to Driscoll for both northbound and southbound travelers would be provided through direct connectors.

Riviera East Option

- The Riviera east relief route meets all of the project needs while comparing favorably to the through and elevated options in all categories except USFWS National Wetland Inventory (NWI) features (four compared to two). The NWI features have been field-verified and are likely to be minor in size and quality, as they appear not to be connected to waters of the US, and therefore might not be jurisdictional waters of the US.
- Businesses along the existing US 77 would still be directly on route for traffic traveling between SH 285 and US 77 if the Riviera east relief route were built.
- This option would affect three residences. Adequate relocation opportunities for three residences appear to be available in the Riviera area.
- Motorists may also be enticed to utilize the existing US 77 through Riviera due to the lack of roadside services (e.g., fuel facilities) to the south for 50 miles.
- Direct access to Riviera for both northbound and southbound travelers would be provided through direct connectors.

The typical section is anticipated to remain a four-lane divided roadway for the entire project length. In select locations, the four main lanes would be supplemented by access roads, overpasses, and interchanges to facilitate local access.

The Build Alternative would require approximately 689.74 acres of additional ROW due to intersection and access improvements such as access roads, overpasses, as well as the highway relocations at Driscoll and Riviera. Existing fencing would be relocated from the existing ROW line to the new ROW line, where necessary. There would be no additional fencing on the project with the exception of at ocelot crossings. At each of three proposed

ocelot crossings, 200 feet of fencing would be placed to the north and south of the crossing on both sides of US 77.

Main lane upgrade improvements within the existing ROW or with additional adjacent ROW serve as the primary component of the Build Alternative. The secondary component consists of relief route options for Driscoll and Riviera. The proposed Build Alternative described below includes the identification of areas where upgrades are not needed or are being advanced as independent projects with independent utility and under separate environmental documents, as shown in **Figure 1.1-1** and noted in **Table 1.1-1**. This information is being provided to disclose what the US 77 Program would consist of upon completion. **Appendix G** contains the

Preliminary Schematic with more detailed design of the upgrades. Typical section diagrams have been developed for the sections where construction is proposed and are shown in **Appendix A**.

The 27 sections of the US 77 Upgrade Project are described below, as they occur from south to north:

A. No construction is anticipated in the section between US 83 in Harlingen to SH 107/FM 508 because upgrading to Interstate standards has already been completed by the TxDOT Pharr District. No additional ROW is required in this section.

B. Within this section, the work to be performed includes the conversion of the existing two-way access roads to one-way access roads from SH 107/FM 508 interchange to 3.7 miles north of the interchange. The existing ramps would be realigned and converted from two-way operation to one-way operation. No additional ROW is required in this section.

C. Within this section, the work to be performed includes the conversion of the existing two-way access roads to one-way access roads from 3.7 miles north of the interchange at SH 107/FM 508 to the Cameron/Willacy county line. The existing ramps would be realigned and converted from two-way operation to one-way operation. No additional ROW is required in this section.

D. No construction is anticipated in the section between the Cameron/Willacy county line to FM 1018 because upgrading to Interstate standards has already been completed by the TxDOT Pharr District.

E. The section beginning at FM 1018 to near FM 498 would include the construction of main lanes. No additional ROW is required in this section. This section is being advanced under a separate environmental document and is being included for information purposes only.

F. The section beginning near FM 498 to FM 3168 would include the construction of main lanes and an overpass. No additional ROW is required in this section. This section is being advanced under a separate environmental document and is being included for information purposes only.

G. No construction is anticipated in the section between the FM 3168 and Business 77 because upgrading to Interstate standards has already been completed by the TxDOT Pharr District.

H. This section beginning at Business 77 to the Willacy/Kennedy county line would include the construction of main lanes and overpasses. No additional ROW is required in this section.

I. This section beginning at the Willacy/Kennedy county line to Norias Road would include the construction of main lanes and overpasses. No additional ROW is required in this section.

J. This section beginning at Norias Road and extending 9.6 miles (Armstrong Ranch Gate) would include the construction of main lanes and overpasses. No additional ROW is required in this section.

K. This section beginning 9.6 miles north of Norias Road to 8 miles south of La Parra Avenue would include the construction of main lanes and overpasses. No additional ROW is required in this section.

L. This section beginning 8 miles south of La Parra Avenue to Kenedy/Kleberg county line would include the construction of main lanes and overpasses. No additional ROW is required in this section.

M. This section includes the construction of an overpass at La Parra Avenue in Sarita, Texas. No additional ROW is required in this section. This section is being advanced under a separate environmental document and is being included for information purposes only.

N. This section from the Kleberg/Kenedy County line at Los Olmos Creek to SH 285 would include the construction of a new Riviera relief route around the east side of Riviera on approximately 400 feet of new ROW, while maintaining the existing US 77 configuration through Riviera. Interchanges would be provided at CR 2340 and FM 771. See Figure A.3.1-12 for the Riviera Build Alternative. This relief route could be tolled. Toll gantries could be placed near the north and south locations along the relief route. Direct access to Riviera for both northbound and southbound travelers has been provided through direct connectors.

O. This section from SH 285 to 1.5 miles north of SH 285 would complete the construction of a new Riviera relief route around the east side of Riviera on approximately 400 feet of new ROW, while maintaining the existing US 77 configuration through Riviera. Interchanges would be provided at CR 2290 and CR 2280. See Figure A.3.1-12 for the Riviera Build Alternative. This relief route could be tolled. Toll gantries could be placed near the north and south locations along the relief route. Direct access to Riviera for both northbound and southbound travelers has been provided through direct connectors.

P. This section from 1.5 miles north of SH 285 to CR 2130 would include the construction of main lanes, frontage roads, and interchanges at RM 628, FM 772, and CR 2160. This section would require the acquisition of approximately 35 additional feet of ROW widening to the east. In addition, a proposed truck weigh station would be located north of RM 628 to the east of US 77.

Q. This section from CR 2130 to FM 1356 would include the construction of main lanes, frontage roads, and interchanges at CR 2120 and FM 1717. This section would require the acquisition of up to 200 feet of additional ROW along existing US 77.

R. No construction is anticipated in the section between FM 1356 and FM 425 in Kingsville, Texas because upgrading to Interstate standards has already been completed by the TxDOT Corpus Christi District.

S. This section from FM 425 to SH 141 would include the construction of main lanes between the existing frontage roads and an interchange at Caesar Avenue. No additional ROW is required in this section. This section is being advanced under a separate environmental document and is being included for information purposes only.

T. No construction is anticipated in the section between SH 141 to FM 1898 in Kingsville, Texas because upgrading to Interstate standards has already been completed by the TxDOT Corpus Christi District.

U. This section from FM 1898 to Kleberg/Nueces county line would include the construction of main lanes and an interchange at East Sage Road. No additional ROW is required in this section.

V. This section from the Kleberg/Nueces county line to FM 70 would include the construction of main lanes between the existing frontage roads and interchanges at CR 4, East 6th Street, and East 4th Street. No additional ROW is required in this section.

W. This section from FM 70 to CR 16 would include the construction of main lanes, frontage roads, and interchanges at CR 10 and CR 12/FM 3354. This section would require the acquisition of approximately 200 additional feet of ROW widening to the east.

X. This section from CR 16 to South of CR 28 would include the construction of a new Driscoll relief route around the east side of Driscoll on approximately 400 feet of new ROW, while maintaining the existing US 77 configuration through Driscoll. Interchanges would be provided at CR 18, FM 665, and CR 24. See Figure A.3.1-8 for the Driscoll Build Alternative. This relief route could be tolled. Toll gantries could be placed near the north and south locations along the relief route. Direct access to Driscoll for both northbound and southbound travelers has been provided through direct connectors.

Y. This section from South of CR 28 to FM 892 would include the construction of main lanes, frontage roads, and interchanges at FM 2826 and CR 36. This section would require the acquisition of approximately 200 additional feet of ROW widening to the east.

Z. This section from FM 892 to SH 44 (Industrial Boulevard) would include the construction of main lanes to correct the Robstown curve. This section was cleared under a previous environmental document and is being included for information purposes only.

AA. No construction is anticipated in the section between the SH 44 and IH 37 because upgrading to Interstate standards has already been completed by the TxDOT Corpus Christi District. This portion of US 77 was designated as IH 69 in 2011.

3.3 SELECTION OF THE BUILD ALTERNATIVE

The Build Alternative was developed as a result of public input along with federal, state and local agency input. The facility would provide for a fully controlled access freeway that would meet Interstate standards. Therefore, the alternatives selection process concludes with the selection of the Build Alternative for further analysis in this EA.

The No Build Alternative is also carried forward as a baseline for comparing impacts of the Build Alternative.

SECTION 4.0 - AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the social, economic, and environmental setting of US 77 that would potentially be affected by the proposed US 77 Upgrade Project. It also provides information on the direct effects of the recommended Build Alternative on the natural and built environment. The No Build Alternative is brought forward in the analysis as a baseline for comparison.

4.1 ROW DISPLACEMENTS/RELOCATIONS

This section presents the potential ROW acquisitions and displacements/relocations of residences and businesses as a result of ROW requirements for the proposed US 77 Upgrade Project.

The methodology used to prepare this section included an initial database search of potential properties affected by the Build Alternative using the existing and proposed ROW limits based on the proposed design, Global Information System (GIS) mapping, and appraisal district records obtained from the Nueces and Kleberg County Appraisal Districts. It should be noted that ROW acquisitions are limited to Nueces and Kleberg Counties as there are no acquisitions in the other three counties. This information, combined with high-resolution aerial imagery, was then used to identify potential business and residential displacements for the Build Alternative. A field inspection was conducted where possible to verify that the potential displaced structure was occupied and to determine if the current use was single-family residential, multi-family residential, commercial, or other.

4.1.1 Legal and Regulatory Context

The *Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970* (42 USC 4601 ET SEQ., P.L. 91-646), as amended by the *Uniform Relocation Act Amendments of 1987* (P.L. 100-17), known as the *Uniform Act*, contains specific requirements that determine the manner in which a government entity acquires private property for public use when federal funds are used for any phase of a project. The purpose of this act is to provide a uniform policy for fair and equitable treatment of persons and businesses displaced as a result of federal and federally assisted programs in accordance with the following objectives:

A. To ensure that owners of real property to be acquired for federal and federally-assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owners, to minimize litigation and relieve congestion in the courts, and to promote public confidence in federal and federally-assisted land acquisition programs.

B. To ensure that persons displaced as a direct result of federal or federally-assisted projects are treated fairly, consistently, and equitably so that such persons would not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole.

C. To ensure that agencies implement these regulations in a manner that is efficient and cost effective.

4.1.2 No Build Alternative – ROW Displacements/Relocations Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not require ROW acquisitions, relocations, or displacements.

4.1.3 Build Alternative – ROW Displacements/Relocations Consequences

The Preliminary Schematic (**Appendix G**) was prepared for the Build Alternative and illustrates proposed ROW to be acquired. The Preliminary Schematic also shows in detail the geometry of the proposed US 77 construction. Based on the proposed project design, a database was prepared listing properties to be potentially impacted as a result of proposed project construction using the existing and proposed ROW limits, GIS mapping, and the appraisal district records obtained from the Nueces County and Kleberg County Appraisal Districts (additional ROW needed for the construction of the project would only be acquired in Nueces and Kleberg Counties). This information combined with high-resolution aerial imagery and limited field investigations, was then used to identify potential displacements for the Build Alternative.

A total of approximately 689.74 acres (440.43 acres in Nueces County and 249.31 acres in Kleberg County) of additional ROW would be required for the proposed construction of the Build Alternative. **Table 4.1-1** and **Table 4.1-2** located in **Appendix C** provides a preliminary listing of the names, addresses, impacted acres (amount of acreage needed), legal description, land use, and appraised value of each property identified for ROW acquisitions. **Figures A.4.1-1** through **A.4.1-9** illustrates the location of these proposed ROW acquisitions.

Table 4.1-3 located in **Appendix C** provides a list of the potential displacements and relocations of 43 structures for the Build Alternative including 19 residential (all single-family homes and mobile homes), 15 industrial, three commercial, four farmland, one ranch, and one public (*public land use is property owned by the government). **Table 4.1-3** also provides the number of building structures that would potentially be displaced for all land uses identified per parcel, the square footage of each structure (where possible), a brief description of land use for each property, and the appraised value. In addition, **Table 4.1-3** provides a list of the names of the businesses to potentially be displaced, as compiled from the appraisal district records and limited field investigation. Based on the Texas Workforce Commission (TWC) database, all businesses identified would be considered small businesses of less than 100 employees. **Table 4.1-3** also identifies residential structures to potentially be displaced; however, information regarding the numbers of rooms, baths, and bedrooms was not provided in the appraisal district records. This information would be obtained during actual ROW acquisition. For the purposes of this document, all properties identified for displacement and relocation are assumed full takings. This assumption was based on the following:

A. Some of the businesses identified are businesses that are dependent on having adequate ground spacing (natural ground, paved and/or parking spaces) and/or building structures (such as warehouses, sheds, barns) for storage of some form to accommodate large inventories.

B. Acquisition of property used for agricultural purposes (farmland and ranching) could affect business.

C. Existing structures may no longer meet minimum setback requirements in accordance with residential, commercial, and industrial zone requirements based on the proposed project ROW line.

The proposed project is not expected to impact any publicly-owned park, recreational area, wildlife or waterfowl refuge or historic site; therefore, a Section 4(f) statement would not be required. Multiple utilities would require adjustments as a result of the proposed project. **Figures A.4.1-10** through **A.4.1-19** illustrates potential displacements and relocations.

Based on **Table 4.1-1** and **Table 4.1-2** located in **Appendix C**, **Table 4.1-4** shows the anticipated ROW acreage needed for the Build Alternative and number of parcels affected by land use type. **Figures A.4.1-20** through **A.4.1-59** and **A.4.1-60** through **A.4.1-99** illustrate existing parcels and tracts, respectively.

Table 4.1-4 ROW Impacts by Land Use

Section/ Alternative	Acreage of Impacts	Number of Parcels Affected							
		Residential	Industrial	Commercial	Farmland	Ranch	Public*	Vacant	Utility
Build Alternative	689.74	72	11	17	54	55	1	14	1

Source: Jacobs Engineering Group, Inc., December 2009
Some of the parcels identified consist of two or more tracts having different land uses.
*Public land use is property owned by the government.

Table 4.1-5 summarizes the number of structures that would potentially be displaced as a result of the proposed project based on **Table 4.1-3**.

Table 4.1-5 Relocations and Displacements – Total Structures Displaced by Land Use

Section/ Alternative	Residential	Industrial	Commercial	Farmland	Ranch	Public*	TOTAL
Build Alternative	19	15	3	4	1	1	43

Source: Jacobs Engineering Group, Inc., December 2009
Some of the parcels identified consist of two or more tracts having different land uses.
*Public land use is property owned by the government.

Table 4.1-3 located in **Appendix C**, also lists potentially displaced commercial and industrial properties (businesses). It has not been determined whether the properties identified for displacement and relocation would be partial or full takings. However, for the purposes of this document, all properties identified for displacement and relocation are assumed full takings until they can be further assessed during actual ROW acquisition. Business properties identified for this project are as follows:

- The Hanson Pipe & Precast, Inc. located at 1610 South Highway 77, Robstown, Texas 78380 in Nueces County, is a pipe and precast concrete manufacturer as noted at their website: www.hansonpipeandprecast.com. This business is situated on three parcels. All three parcels are designated by the Nueces County Appraisal District as industrial land use. Only two of the parcels (parcel numbers 743700000030 and 743700000040) have been identified as having potential displacements as a result of the proposed project. Parcel number 743700000030 consists primarily of a 15,500 square feet asphalt lot for much of it appears to be used to store precast piping. Parcel number 743700000040 consists of a 4,450 square feet warehouse, 960 square feet office, 900 square feet shed, and a 600 square feet canopy, a storage yard also used for storing precast piping as well as various tanks (uses are unknown), and parking lot. According to the TWC database, the industry

designation for this business location is a metal merchant wholesaler with an employer size class of 20-49 employees. As shown in **Table 4.2-5 - Employment by Industry** within the surrounding area (2000 Census) is 3.0 percent wholesale trade (census tract level). www.tracer2.com/cgi/databrowsing/employerQSSelection.asp?menuChoice=emp This business is dependent on having adequate ground spacing (natural ground, paved and/or parking spaces) and/or building structures (such as warehouses, sheds, barns) for storage of some form to accommodate large inventories. Property to be acquired from this business would impact portions of areas used to store precast piping.

- Black Angus Containers located at 1620 South Highway 77, Robstown, Texas in Nueces County is a Cargo & Freight Containers wholesaler. This business is designated by the Nueces County Appraisal District as industrial and identified as parcel number 743700000052. This parcel consists of one 275 square feet office building with a 1,000 square feet carport, a 275 square feet warehouse and a storage yard. This business was identified in the field as having only one sign in front of parcel specifying the sale/rent of dumpsters. According to the TWC database, the industry designation for this business location is an industrial supplies merchant wholesalers with an employer size class of 5-9 employees. As shown in **Table 4.2-5 - Employment by Industry** within the surrounding area (2000 Census) is 3.0 percent wholesale trade (census tract level). http://www.tracer2.com/cgi/databrowsing/employerDetails.asp?menuchoice=emp&geogArea=4801000048&empId=675531032. This business is dependent on having adequate ground spacing (natural ground, paved and/or parking spaces) and/or building structures (such as warehouses, sheds, barns) for storage of some form to accommodate large inventories. Property to be acquired from this business would impact portions of areas used to store cargo and freight containers.

- Atlas Tubular Inc. located at 1710 South Highway 77, Robstown, Texas in Nueces County, is a 32 acre facility that buys and sells new application programming interface (API) prime pipe with material test reports (MTR's), new surplus casing and tubing, and used oil country tubular goods worldwide. www.atlastubular.com. This business is designated by the Nueces County Appraisal District as industrial and is located on two parcels (parcel numbers 450200010015 and 450200010025). Parcel number 450200010015 consists of a 700 square feet office, three warehouses – 7,200 square feet, 600 square feet, and 400 square feet an additional 240 square feet building (unknown use), and a 216 square feet shed. Parcel number 450200010025 consists of a 3,000 square feet office, a 160 square feet building (unknown use) with 100 square feet open porch, a 4,000 square feet asphalt lot, and 848 square feet storage yard. The TWC database lists Atlas Tubular Inc. as a metal merchant wholesaler with an employer size class of 50-99 employees. According to **Table 4.2-5 - Employment by Industry** within the surrounding area (2000 Census) is 4.7 percent wholesale trade (census tract level). www.tracer2.com/cgi/databrowsing/employerQSSelection.asp?menuChoice=emp. Property to be acquired from this business would impact portions of the asphalt lot.

- Veterans Land Board State of Texas is located at 1514 US Highway 77 South Bishop, TX 78343, in Nueces County. This business is designated by the Nueces County Appraisal District as farmland and is located on parcel number 70601040309. Based on field investigation, this property has one structure onsite which appears to be a converted one-story single-family residence used as an office. The TWC database lists the Veterans Land Board State of Texas as residential building construction, with an employer size class of 1-4 employees. According to **Table 4.2-5 Employment by Industry** within the surrounding area

(2000 Census) is 15.7 percent construction (census tract level). Displacement of this structure would need to be confirmed during ROW acquisition.

- The Texas Department of Transportation (TxDOT) Maintenance Facility is located at 1750 South Highway 77, Robstown, Texas in Nueces County. This business is designated by the Nueces County Appraisal District as public and is located on parcel number 648900290010. Based on field investigation, this property as multiple structures on site; however, only one structure appears to be within close proximity to the proposed ROW with the potential of being displaced as a result of it's location to the proposed ROW line. It is not anticipated that this structure would be impacted; however, displacement would need to be confirmed during ROW acquisition. TWC database lists TxDOT as state government-transportation program/legislative bodies, with an employer size class of 10-19 employees. According to **Table 4.2-5 Employment by Industry** within the surrounding area (2000 Census) is 4.7 percent transportation and warehousing, and utilities (census tract level).

- Pops Jerky Store located at 663 US 77 South Bypass, Bishop, Texas 78343 in Nueces County, is a family owned business since July 1, 2001 maker and seller of a variety of beef jerkys and old fashioned candies. http://popsjerkystoreinc.goestores.com. This property is designated by the Nueces County Appraisal District as residential/commercial and is located on parcel number 70601040300. This site consists of two building structures - 2,400 square feet and 1,404 square feet, and two storage areas - 100 square feet and 704 square feet. Based on field investigation, only one structure appears to be a converted single-story house used for business. Displacement would need to be confirmed during ROW acquisition. TWC database lists Pops Jerky Store as supermarkets and other grocery store, with an employer size class of 5-9 employees. According to **Table 4.2-5 - Employment by Industry** within the surrounding area (2000 Census) is 8.3 percent employment for arts, entertainment, recreation, accommodation and food services (census tract level). www.tracer2.com/cgi/databrowsing/employerQSSelection.asp?menuChoice=emp

- Based on field investigation, the property located at 1442 US Highway 77 South Bypass, Bishop, Texas in Nueces County, appears to consist of single-story house converted into a business (nature of the business unknown). This property is designated by the Nueces County Appraisal District as residential and is located on parcel number 758000010010. The property consists of two single-story residences -1,360 square feet and 2,256 square feet, a 648 square feet carport, and 1,440 square feet canopy. Displacement of these structures would need to be confirmed during ROW acquisition.

- The Rodeway Inn/Valero is located at 3430 US Highway 77 South Bypass, Kingsville Texas in Kleberg County. (http://www.rodewayinn.com/hotel-kingsville-texas-TX868?sid= and http://www.valero.com/Stores/Pages/Home.aspx) is located at 3430 US Highway 77 South Bypass, Kingsville, Texas in Kleberg County. This property is designated by the Nueces County Appraisal District as commercial and is located on parcel number 12480. The Rodeway Inn is 12,994 square feet consisting of 72 guest rooms, a business center, fitness center and outdoor pool, Meeting rooms, an on-site restaurant**,** which serves breakfast, lunch and dinner, and a cocktail lounge. The TWC database lists the Rodeway Inn as hotels/motels industry, with an employer size class of 20-49 employees. The TWC database lists the Valero as other gasoline stations industry, with an employer size class of 5-9 employees. **Table 4.2-5 - Employment by Industry** within the surrounding area (2000 Census) is 8.3 percent of arts, entertainment, recreation, accommodation and food services (census tract level).

www.tracer2.com/cgi/databrowsing/employerQSSelection.asp?menuChoice=emp. It is anticipated that only the Valero would be potentially displaced as a result of the proposed project. The Roadway Inn would not be affected.

- The property located at 5561 US Highway 77 Kingsville, Texas in Kleberg County is a remote facility of CapRock Communications Corp http://www.caprock.com/index.htm. This property is a remote satellite communication equipment (outdoor/indoor) site; therefore, no employees are located at this site location. The address for this site was obtained through goggle map and would need to be confirmed during ROW acquisition. The remote site equipment is used to connect the CapRock client's local area and telephone networks to other networks over satellite (e.g. corporate Internet). The outdoor equipment including the antenna and the transmission gear is referred to as the VSAT terminal. CapRock deploys different antenna types based on whether customers' operations are on land or at sea or require fixed or transportable configurations. The indoor equipment includes the network gateway (i.e. satellite, modem, Ethernet switch and router) that provides the interface for the connection of phones, fax machines and computers. This property is designated by the Nueces County Appraisal District as commercial and is located on parcel number 29873. The site is surrounded by metal fencing and consists of two structures. According to **Table 4.2-5 - Employment by Industry** within the surrounding area (2000 Census) is 5.8 percent for other services (census tract level). www.tracer2.com/cgi/databrowsing/employerQSSelection.asp?menuChoice=emp. Displacement of these structures would need to be confirmed during ROW acquisition.

- Property located on parcel number 18007 (Highway 77, Riviera, Texas in Kleberg County) designated by the Nueces County Appraisal District as ranch/commercial ranch. Based on visual investigation, the property consists of a single-story structure in the vicinity of the project area. Displacement of this structure would need to be confirmed during ROW acquisition.

- Property located on parcel number 11976 (FM RD 771 Riviera, Texas in Kleberg County) designated by the Nueces County Appraisal District as vacant/commercial. Based on visual investigation, the property consists of a single-story structure in the vicinity of the project area. Displacement of this structure would need to be confirmed during ROW acquisition.

Multiple Listing Services (MLS)

To assess availability of replacement properties within the project area, a search of the MLS at the following websites (December 2009) was conducted:

- http://www.homes.com/Content/ListingUSMap.cfm
- http://www.homes.com/Real_Estate/TX/County/NUECES
- http://www.homes.com/Real_Estate/TX/County/KLEBERG
- http://www.homes.com/For-Rent
- http://www.homes.com/Real_Estate/TX/CountyType
- http://www.loopnet.com/Texas/

The MLS housing availability search was conducted using the zip codes located within the project area for available housing that is comparable and suitable to the houses (single-family homes) potentially being displaced. As shown in **Table 4.1-3** in **Appendix C**, prices of single-family homes to potentially be displaced ranged from a minimum of $8,240 to a maximum of

$142,475. The square footage of these homes ranges from 864 square feet to 4,536 square feet. The number of single-family homes within the $10,000 to $149,000 price range that are available for sale within the identified zip code locations for the project area are presented in **Table 4.1-6** below.

Table 4.1-6 MLS Housing Availability by City Zip Codes for the Project Area

Price Range	City Zip Codes				Total
	78380 (Robstown)	78343 (Bishop)	78363 (Kingsville)	78379 (Riviera)	
$1,000 - $9,999	3	2	4	0	9
$10,000 - $49,999	62	1	44	6	113
$50,000 - $99,999	33	12	31	2	78
$100,000 - $149,999	22	2	27	7	58
Total	**120**	**17**	**106**	**15**	**258**

Source: http://www.homes.com/, December 2009

Because information regarding the numbers of rooms, baths, or bedrooms was not provided in the appraisal district records for residential properties potentially being displaced, the available housing listed in **Table 4.1-6** includes, at a minimum, two bedrooms and one full bathroom, and at a maximum, six bedrooms and three baths. Based on the number of available housing units identified and the number of displaced single-family homes anticipated for this project, it is expected that comparable and suitable relocation of the residences identified for displacement and relocation could be accomplished. As the project progresses, a more refined relocation analysis would be necessary to ensure that proposed relocation sites are adequate in size and location. It is likely that a sufficient amount of space, appropriately zoned for residential types described in **Table 4.1-6,** would be available to absorb the relocation of the displaced residences. No apartments, condominiums or other multi-family structures would be displaced as a result of the Build Alternative.

The MLS availability search was conducted using the zip codes located within the project area for available commercial, industrial, and agricultural (farmland and ranch) properties that are comparable and suitable to the properties potentially being displaced.

The number of properties for lease or sale within the identified zip code locations of the project area is presented in **Table 4.1-7** below.

Table 4.1-7 MLS Availability by City Zip Codes for the Project Area

Price Range	City Zip Codes				Total
	78380 (Robstown)	78343 (Bishop)	78363 (Kingsville)	78379 (Riviera)	
Commercial for Lease	4	0	25	1	30
Commercial for Sale	28	5	7	1	41
Industrial for Lease	1	0	0	0	1
Industrial for Sale	9	0	0	0	9
Agricultural for Lease	0	0	0	0	0
Agricultural for Sale	19	5	48	10	82
Total	**61**	**10**	**80**	**12**	**163**

Source: http://www.loopnet.com/Texas/, December 2009

The square footage of commercial and industrial facilities to be displaced ranges from 160

square feet to 12,994 square feet. A MLS search of available commercial and industrial properties ranging from 100 square feet to 15,000 square feet was conducted by city zip code location. The acreage of agricultural properties to be displaced ranges from 0.13 acre to 50 acre. A MLS search of available agricultural (farmland and ranch) properties ranging from 0.27 acre to 109 acres was conducted by city zip code location. The estimated appraised values of business (commercial, industrial, and agricultural) displacements ranged from $5,000 to $390,000. Based on the number of available commercial, industrial, and agricultural properties identified, it is expected that comparable and suitable relocation would be accomplished. As with the residential locations, as the project progresses, a more refined relocation analysis would be necessary to ensure that proposed relocation sites are adequate in size and location for the displaced commercial, industrial, and agricultural properties. It is likely that a sufficient amount of space, appropriately zoned for the property types identified in **Table 4.1-3,** would be available to absorb the relocation of the displaced businesses.

Estimates were developed to determine if there are adequate replacement properties, facilities, and housing within the project area and are for planning purposes only. As the project progresses, a more refined relocation analysis would be necessary to ensure that proposed relocation sites are adequate in size and location for the displaced residences and businesses. It is likely that a sufficient amount of space, appropriately zoned for residential, agricultural, commercial, and industrial types described in **Table 4.1-3,** would be available to absorb the relocation of the displaced businesses.

Although improvements for the proposed project would require additional ROW, no “at risk” early ROW acquisitions have been identified for this project. “Early acquisition” is defined in 23 CFR 710.105(b) as acquisition in advance of any FHWA authorization or agreement. The term “at risk” is used to explain that the states bear the risk associated with acquiring parcels that may not be required for the project if not within the approved alignment following the environmental process. ROW acquisition would be performed in accordance with the *Uniform Act*, as amended.

The *Uniform Act*, as amended (49 CFR Part 24) ensures relocation of displaced persons to a replacement that is comparable in size, features, and location; is decent, safe, and sanitary; and within the financial means of the displaced person(s) (49 CFR Part 24.204). This assistance applies to tenants as well as owners occupying the real property needed for the project. TxDOT would also provide assistance to displaced businesses and non-profit organizations to aid in their satisfactory relocation with a minimum of delay. All acquisitions and relocations required for the proposed US 77 Upgrade Project would be conducted in accordance with the *Uniform Act*.

Implementation of the Build Alternative would have short-term, direct benefits from the creation of jobs and purchases of materials and equipment for construction. These benefits would most likely be on a regional basis, because it is expected that only a small number of the employees required to fill the construction jobs would likely come from within the study area. Likewise, few, if any, of the purchases of equipment and materials would be made from businesses within the study area.

Short-term negative impacts may result from the removal of 11 properties from the tax rolls for a brief period and only if the businesses are relocated within the study area. Potential relocation of these businesses to areas along the project area has been assessed based on current real estate data. Vacant industrial building space is currently on the market for lease or for sale

within the surrounding area alone would be more than enough to meet the minimum/maximum ranging from 100 square feet to 15,000 square feet required by all the displaced businesses. As the project design progresses, a more refined relocation analysis will be necessary to ensure that proposed relocation sites are adequate in size and location for the displaced businesses. It is likely that a sufficient amount of space, appropriately zoned for industrial types described would be available to absorb the relocation of the displaced businesses.

Relocation assistance would be available to all individuals, families, businesses, farmers, and nonprofit organizations displaced as a result of a state highway or other transportation project. This assistance applies to tenants as well as owners occupying the real property needed for the project. Replacement structures must be located in the same type of neighborhood and be equally accessible to public services and places of employment. TxDOT would also provide assistance to displaced businesses and non-profit organizations to aid in their satisfactory relocation with a minimum of delay and loss in earnings. The proposed project would proceed to construction only when all displaced families and businesses have been provided the opportunity to be relocated to adequate replacement sites. The available structures must also be open to persons regardless of race, color, religion or nationality and be within the financial means of those individuals affected.

Consistent with US DOT policy as mandated by the *Uniform Act*, as amended, TxDOT provides relocation resources to all displaced persons without discrimination. All property owners from whom property is needed are entitled to receive just compensation for their land and property. Just compensation is based upon the fair market value of the property. TxDOT also provides, through its Relocation Assistance Program, payment and services to aid in movement to a new location.

Utilities such as water lines, sewer lines, gas lines, telephone cables, electrical lines, and other subterranean and aerial utilities may require adjustments and are discussed in **Section 4.14 – Utility Relocation Impacts**. Aerial and/or underground utilities would be adjusted and the required utilities would be handled so that no significant disruption of service would take place while the adjustments are being made. Utility adjustments would occur according to standard TxDOT procedures.

4.2 SOCIOECONOMIC DATA

The socioeconomic environment is a composite of various correlative elements. This section presents the various socioeconomic elements and their associated potential impacts to the communities along the US 77 project corridor.

4.2.1 Demographics

The methodology used to develop the demographic section consisted of gathering and analyzing data from the 2000 US Census. The proposed project traverses the five counties of Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties, and the proposed project area includes 21 census tracts, 34 block groups, and 463 blocks.

As illustrated in **Table 4.2-1**, the total population of the five counties combined is 700,917, whereas the total population within the census tracts is 99,681, within the block groups is 54,467, and within the blocks located adjacent to the proposed project is 10,578. **Table 4.3-1 located in the Appendix C** provides the detailed ethnicity data for the counties, tracts, and

block groups included in the proposed project area. The data presented in **Table 4.2-1** are based on averages for the census tracts, block groups and blocks within the project area; however, for the environmental justice determinations are based on specific census data for geographies particularly where displacements/relocations may take place.

For median income reported in **Table 4.2-1**, percent distributions were adjusted to the next highest level, $24,999, in order to include all households below the poverty level. Although the 2011 poverty level for a family of four is $22,350, available income data does not report household income percent distribution at this level. **Table 4.2-1** illustrates the median household income for the project area block groups are $27,877, higher than the $27,708 of the five counties, and the census tract area of $27,188. 41.7 percent of the households in the project area are under the property level for the five counties. Approximately 45.8 percent of the total population census tracts are classified as low-income as well as 43.3 percent of the block group total population within the project area.

The range of census tract average median household income is from $17,602 in census tract 56.02 to $39,844 in census tract 205. The average median household income within the project area block groups ranges from $13,380 in block group 6 of census tract 56.02 to $51,005 in block group 3 of census tract 58.02. This data is illustrated in detail in **Table 4.3-3**.

Table 4.2-1 also includes information regarding Limited English Proficiency (LEP) populations. Census tract data for the "Ability to speak English for the Population Five Years and Over" indicates an average of 71.9 percent and 68.9 percent for block groups of the residents in the project area that speaks English "Not Well" or "Not At ALL." The average for the five counties is 62.4 percent. Of those who did not speak English well, Spanish was the preferred language. **Table 4.2-2** provides the detailed LEP data for the counties, tracts, and block groups included in the proposed project area.

Section 4.3 – Environmental Justice provides a detailed discussion of the proposed project population and household income.

Table 4.2-1 2000 Demographics

	Five Counties	Census Tracts	Block Groups	Blocks
Total Population	700,917	99,681	54,467	10,578
Household Income <$24,999	93,498 (41.7%)	14,046 (45.8%)	7,275 (43.3%)	*
Median Household Income	$29,745	$27,188	$27,877	*
LEP/Speak English "Not Well" or "Not at All"	142,893 (20.4%)	22,095 (22.2%)	11,575 (21.3%)	*

Source: 2000 Census Report, US Census Bureau, accessed in January 2010 *Data not available in Blocks.
Note: LEP/Speak English "Not Well" or "Not at All" is for all languages.

4.2.2 LEP Populations

Executive Order (E.O.) 13166, "Improving Access to Services for Persons with Limited English Proficiency (LEP)," requires federal agencies to examine the services they provide and identify any need for services to those with LEP. The E.O. requires federal agencies to work to ensure that recipients of federal financial assistance provide meaningful access to their LEP applicants and beneficiaries. Failure to ensure that LEP persons can effectively participate in or benefit

from federal assisted programs and activities may violate the prohibition under *Title VI of the Civil Rights Act of 1964*, 42 U.S.C. 2000d and Title VI regulations against national origin discrimination. The US Census Bureau documents Spanish as the primary language for those persons in the subject census tracts who do not speak English well. **Table 4.2-2** provides the LEP data for the counties, tracts, and block groups included in the proposed project area. The 2000 US Census summary file 3 (SF3) was used to determine the LEP for the area because it is the most comprehensive, complete, and detailed data source readily available.

The 2000 Census data indicate 71.9 and 68.9 percent of the populations within the project area census tracts and block groups, respectively, are LEP populations. The US Census Bureau identifies Spanish (67.1%) and Indo-European Language languages (1.2%) as the primary and secondary preferred languages, respectively, of persons who do not speak English well within the subject block groups. Therefore, the 68.9 percent LEP population living within the project area block groups, approximately 67.1 percent speaks Spanish. The numbers illustrated in **Table 4.2-2** represent a person's primary language, but do not necessarily preclude them from speaking English. No displacements were identified located within census blocks groups classified as LEP population based on the US Census Bureau adjusted percent distribution (50 percent and greater of the population).

Table 4.2-2 LEP for Population Five Years and Older

Area	Total Population	Speak Only English	Speak English "Not Well" or "Not at All"			
			Speak Spanish	Speak Indo-European Language	Speak Asian/Pacific Island Languages	Speak Other Language
Census Tract						
Tract 102.01	539 (100.0%)	108 (20.0%)	429 (79.6%)	0 (0.0%)	2 (0.4%)	0 (0.0%)
Tract 102.02	2,025 (100.0%)	719 (35.5%)	1,256 (62.0%)	28 (1.4%)	22 (1.1%)	0 (0.0%)
Tract 103	2949 (100.0%)	724 (24.6%)	2,199 (74.6%)	16 (0.5%)	10 (0.3%)	0 (0.0%)
Tract 104.01	1,319 (100.0%)	341 (25.9%)	966 (73.2%)	8 (0.6%)	4 (0.3%)	0 (0.0%)
Tract 104.02	2,016 (100.0%)	1,131 (56.1%)	838 (41.6%)	33 (1.6%)	9 (0.4%)	5 (0.2%)
Tract 105	834 (100.0%)	51 (6.1%)	783 (93.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Tract 106.01	2,376 (100.0%)	500 (21.0%)	1,859 (78.2%)	17 (0.7%)	0 (0.0%)	0 (0.0%)
Tract 110	1,065 (100.0%)	54 (5.1%)	1,011 (94.9%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Tract 9501	138 (100.0%)	19 (13.8%)	119 (86.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Tract 201	1,754 (100.0%)	775 (44.2%)	948 (54.0%)	11 (0.6%)	12 (0.7%)	8 (0.5%)
Tract 202	245 (100.0%)	233 (11.4%)	1,794 (87.7%)	18 (0.9%)	0 (0.0%)	0 (0.0%)
Tract 204	2,630 (100.0%)	1,200 (45.6%)	1,333 (50.7%)	30 (1.1%)	67 (2.5%)	0 (0.0%)
Tract 205	2,029 (100.0%)	848 (41.8%)	1,097 (54.1%)	21 (1.0%)	63 (3.1%)	63 (3.1%)
Tract 56.02	2,025 (100.0%)	195 (9.6%)	1,824 (90.1%)	6 (0.3%)	0 (0.0%)	0 (0.0%)
Tract 59	826 (100.0%)	188 (22.8%)	627 (75.9%)	11 (1.3%)	0 (0.0%)	0 (0.0%)
Tract 60	835 (100.0%)	248 (29.7%)	553 (66.2%)	30 (3.6%)	4 (0.5%)	0 (0.0%)

Table 4.2-2 LEP for Population Five Years and Older

Area	Total Population	Speak Only English	Speak English "Not Well" or "Not at All"			
			Speak Spanish	Speak Indo-European Language	Speak Asian/Pacific Island Languages	Speak Other Language
Tract 61	1,239 (100.0%)	553 (44.6%)	656 (52.9%)	30 (2.4%)	0 (0.0%)	0 (0.0%)
Tract 9504	1,481 (100.0%)	282 (19.0%)	1,199 (81.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Tract 9505	966 (100.0%)	119 (12.3%)	842 (87.2%)	5 (0.5%)	0 (0.0%)	0 (0.0%)
Tract 9506	683 (100.0%)	107 (15.7%)	576 (84.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Tract 9507	855 (100.0%)	202 (23.6%)	639 (74.7%)	9 (1.1%)	5 (0.6%)	0 (0.0%)
Total	30,629 (100%)	8,597 (28.1%)	21,548 (70.3%)	273 (0.8%)	198 (0.6%)	76 (0.2%)
Block Group						
T 102.01 Block Group 1	539 (100.0%)	108 (20.0%)	429 (79.6%)	0 (0.0%)	2 (0.4%)	0 (0.0%)
T 102.02 Block Group 1	882 (100.0%)	426 (48.3%)	450 (51.0%)	3 (0.3%)	3 (0.3%)	0 (0.0%)
T 103 Block Group 1	615 (100.0%)	74 (12.0%)	541 (88.0%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 104.01 Block Group 1	478 (100.0%)	56 (11.7%)	416 (87.0%)	6 (1.3%)	0 (0.0%)	0 (0.0%)
T 104.02 Block Group 3	665 (100.0%)	312 (46.9%)	328 (49.3%)	25 (3.8%)	0 (0.0%)	0 (0.0%)
T 105 Block Group 2	237 (100.0%)	14 (5.9%)	223 (94.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 105 Block Group 3	286 (100.0%)	15 (5.2%)	271 (94.8%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 9501 Block Group 1	138 (100.0%)	19 (13.8%)	119 (86.2%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 201 Block Group 1	1,754 (100.0%)	775 (44.2%)	948 (54.0%)	11 (0.6%)	12 (0.7%)	8 (0.5%)
T 202 Block Group 3	455 (100.0%)	33 (7.3%)	422 (92.7%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 202 Block Group 4	439 (100.0%)	47 (10.7%)	392 (89.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 202 Block Group 5	342 (100.0%)	84 (24.6%)	246 (71.9%)	12 (3.5%)	0 (0.0%)	0 (0.0%)
T 204 Block Group 5	1,164 (100.0%)	584 (50.2%)	525 (45.1%)	25 (2.1%)	30 (2.6%)	0 (0.0%)
T 205 Block Group 1	614 (100.0%)	190 (30.9%)	396 (64.5%)	6 (1.0%)	22 (3.6%)	0 (0.0%)
T 205 Block Group 4	671 (100.0%)	393 (58.6%)	236 (35.2%)	15 (2.2%)	27 (4.0%)	0 (0.0%)
T 56.01 Block Group 5	427 (100.0%)	81 (19.0%)	340 (79.6%)	6 (1.4%)	0 (0.0%)	0 (0.0%)
T 56.02 Block Group 5	498 (100.0%)	53 (10.6%)	445 (89.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 56.02 Block Group 6	399 (100.0%)	41 (10.3%)	352 (88.2%)	6 (1.5%)	0 (0.0%)	0 (0.0%)
T 56.02 Block Group 7	226 (100.0%)	58 (25.7%)	168 (74.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 58.02 Block Group 3	603 (100.0%)	325 (53.9%)	271 (44.9%)	7 (1.2%)	0 (0.0%)	0 (0.0%)
T 59 Block Group 1	519 (100.0%)	128 (24.7%)	383 (73.8%)	8 (1.5%)	0 (0.0%)	0 (0.0%)
T 60	242	57	170	13	2	0

Table 4.2-2 LEP for Population Five Years and Older

Area	Total Population	Speak Only English	Speak English "Not Well" or "Not at All"			
			Speak Spanish	Speak Indo-European Language	Speak Asian/Pacific Island Languages	Speak Other Language
Block Group 1	(100.0%)	(23.6%)	(70.2%)	(5.4%)	(0.8%)	(0.0%)
T 60 Block Group 2	593 (100.0%)	191 (32.2%)	383 (64.6%)	17 (2.9%)	2 (0.3%)	0 (0.0%)
T 61 Block Group 2	431 (100.0%)	187 (43.4%)	232 (53.8%)	12 (2.8%)	0 (0.0%)	0 (0.0%)
T 61 Block Group 3	444 (100.0%)	320 (72.1%)	106 (23.9%)	18 (4.1%)	0 (0.0%)	0 (0.0%)
T 9504 Block Group 1	359 (100.0%)	135 (37.6%)	224 (62.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 9504 Block Group 2	310 (100.0%)	8 (2.6%)	302 (97.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 9504 Block Group 3	281 (100.0%)	30 (10.7%)	251 (89.3%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 9504 Block Group 4	304 (100.0%)	33 (10.9%)	271 (89.1%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 9504 Block Group 5	227 (100.0%)	76 (33.5%)	151 (66.5%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 9505 Block Group 2	469 (100.0%)	76 (16.2%)	388 (82.7%)	5 (1.1%)	0 (0.0%)	0 (0.0%)
T 9506 Block Group 1	306 (100.0%)	66 (21.6%)	240 (78.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
T 9507 Block Group 1	462 (100.0%)	172 (37.2%)	276 (59.7%)	9 (1.9%)	5 (1.1%)	0 (0.0%)
T 9507 Block Group 2	393 (100.0%)	30 (7.6%)	363 (92.4%)	0 (0.0%)	0 (0.0%)	0 (0.0%)
Total	16,772 (100%)	5,197 (30.9%)	11,258 (67.1%)	204 (1.2%)	105 (0.6%)	8 (0.001%)

Source: 2000 US Census and FHWA Order 6640.23, accessed in January 2010
Notes: Census tracts/block groups within and/or adjacent to the project area were used to represent the population potentially affected by the proposed project. Only includes population older than five years old per the US Census Bureau.

4.2.3 Economics

The methodology used to identify major employers began with using inventories from various websites (sources identified in **Table 4.2-3**) for the five identified counties within the project area. The major employers for each of the counties were identified as employment establishments with a minimum of 100 full-time and part-time workers, and were based on location by county rather than company-wide totals. An employment establishment for this project may consist of a single building or a collection of adjacent buildings occupied by one employer, such as a college campus or business park. Employment by Industry for the surrounding area was also obtained at the census tract level (2000 Census).

Table 4.2-3 lists the major employers in Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties. As stated above, Major Employers for this area include any company that has 100 or more employees.

Table 4.2-3 Major Employers

Employer	Location (County)	Industry	Employees
Naval Air Station – Corpus Christi	Nueces	Military	5,525
Christus Spohn Health System	Nueces	Medical	5,400
Corpus Christi ISD	Nueces	Education	5,178
HEB	Nueces	Retail	5,000
Corpus Christi Army Depot	Nueces	Government	3,541
City of Corpus Christi	Nueces	Government	3,171
Bay, Ltd	Nueces	Industrial	2,100
Del Mar College	Nueces	Education	1,542
Corpus Christi Medical Center	Nueces	Medical	1,300
First Data Corporation	Nueces	Service	1,200
Whataburger – Corporate Office	Nueces	Service	1,115
Nueces County	Nueces	Government	1,034
Texas A&M University – Corpus Christi	Nueces	Education	991
Flint Hills Resources	Nueces	Basic	920
Kiewit Offshore Services	Nueces	Basic	900
Corpus Christi State School	Nueces	Education	850
Valero Refining	Nueces	Industrial	824
Sherwin Alumina	Nueces	Industrial	800
Sam Kane Beef Processors	Nueces	Industrial	800
Flour Bluff ISD	Nueces	Education	750
APAC Teleservices	Nueces	Basic	736
Calallen ISD	Nueces	Education	700
Gulf Marine Fabricators	Nueces	Basic	700
H & S Constructors	Nueces	Basic	650
CITGO Petroleum & Refining	Nueces	Industrial	530
Repcon	Nueces	Basic	500
Tuloso-Midway ISD	Nueces	Education	402
Celanese Bishop Plant	Nueces	Industrial	350
West Oso ISD	Nueces	Education	305
AT&T	Nueces	Basic	300
Nueces County Community Action Agency	Nueces	Basic	300
Naval Air Station – Kingsville	Kleberg	Military	1,705
Texas A&M University – Kingsville	Kleberg	Education	1,201
Kingsville ISD	Kleberg	Education	694
Wal-Mart	Kleberg	Retail	362
Celanese	Kleberg	Industrial	342
King Ranch	Kleberg/Kenedy/Willacy	Farm/Ranch	313
Christus Spohn Hospital Kleberg	Kleberg	Medical	301
Kleberg County	Kleberg	Government	300
City of Kingsville	Kleberg	Government	252
Mundy Corporation	Kleberg	Basic	205
HEB	Kleberg	Retail	198
Global Contact Services	Kleberg	Basic	148
Kingsville Nursing and Rehabilitation	Kleberg	Medical	123
Kleberg First National Bank	Kleberg	Basic	120
Canterbury Villa	Kleberg	Medical	115
Border Patrol	Kleberg	Government	114
Lowe's	Kleberg	Retail	104
Raymondville ISD	Willacy	Education	468
Wackenhut Corrections Corp.	Willacy	Government	258
Willacy Apparel	Willacy	Retail	135

Table 4.2-3 Major Employers

Employer	Location (County)	Industry	Employees
HEB	Willacy	Retail	120
Harlingen Consolidated ISD	Cameron	Education	2,550
Valley Baptist Medical Center	Cameron	Medical	2,376
Fruit of the Loom	Cameron	Basic	962
City of Harlingen	Cameron	Government	780
Wal-Mart Superstore	Cameron	Retail	487
Texas State Technical College	Cameron	Education	480
HEB	Cameron	Retail	370
Rio Grande State College	Cameron	Education	356
Advanced Call Center Technologies	Cameron	Basic	333
US Border Patrol	Cameron	Government	270
Su Clinica Familiar	Cameron	Medical	265
Q. C. Onics	Cameron	Industrial	236
Southwestern Bell Telephone (AT&T)	Cameron	Service	222
Acetylene Oxygen Company	Cameron	Industrial	210
Gorges Quick to Fix	Cameron	Industrial	175
Marine Military Academy	Cameron	Education	175
Dillard's Department Store	Cameron	Retail	156
Valley Morning Star	Cameron	Basic	156
Retama Manor	Cameron	Medical	150
Anderson, Greenwood & Co.	Cameron	Industrial	150
Immigration & Naturalization Services	Cameron	Government	150
Tex-Steel	Cameron	Industrial	148
Varmicon Industries	Cameron	Industrial	144
South Texas Hospital	Cameron	Medical	140
Valley Diagnostic Clinic	Cameron	Medical	136
Luby's	Cameron	Retail	130
Time Warner Communications	Cameron	Basic	127
Boggus Ford – Harlingen	Cameron	Retail	125
Texas State Bank	Cameron	Basic	122
Earthgrain Baking Company	Cameron	Retail	121
Valley International Cold Storage	Cameron	Basic	120
Industrial Fab of the Valley, Inc.	Cameron	Industrial	104
L & F Distributors	Cameron	Basic	100
Tadim, Inc.	Cameron	Industrial	100

Sources: Cameron County - http://www.myharlingen.us/, Kenedy County - http://keeptexasmoving.com/var/files/File/TTCPrjctsTTC35/EnvStdyMaps/Tier1DEIS_FEIS/Tier_1_DEIS/document/appendix_c-10_economic_data.pdf, Kleberg County - http://kingsvillechamber.blogspot.com/, Nueces County - http://www.ccredc.com/Selected_Major_Employers_Leading_Primary_Employers_Location_Decision_Database.cfm, Willacy County - http://www.rio-grande-valley.com/raymondville/employers.php, accessed in January 2010

Table 4.2-4 illustrates the projected employment growth in the study area by county with a base year of 1998 and a horizon year of 2030.

Table 4.2-4 Forecasted 2030 Employment

Area	Employment			
	1998	2030	Increase	Percent Change
Nueces County	131,608	187,907	56,299	43
Kleberg County	8,225	10,733	2,508	30
Kenedy County	259	234	-25	-10
Willacy County	4,060	5,804	1,744	43
Cameron County	103,923	253,104	149,181	144

Source: *Master Development Plan: TTC-35 High Priority Trans-Texas Corridor*, January 2010

Table 4.2-5 summarizes the 2000 Census employment by industry within the 21 census tracts that span the project corridor. The 2000 Census data revealed that for persons 16 years of age or older within the project corridor, the top four industries in terms of employment were:

1) educational, health, and social services
2) retail trade
3) manufacturing, arts, entertainment, recreation, etc.
4) construction.

The fewest number of jobs were in an industry referred to as other services (except public administration).

Table 4.2-5 Employment By Industry Within The Surrounding Area

Census Tracts/ Location	Agriculture, Forestry, Fishing, and Hunting and Mining	Construction	Manufacturing	Wholesale Trade	Retail Trade	Transportation and Warehousing, and Utilities	Information	Finance, Insurance, Real Estate and Rental and Leasing	Professional, Scientific, Management, Administrative, and Waste Management Services	Educational, Health, and Social Services	Arts, Entertainment, Recreation, Accommodation, and Food Services	Other Services (Except Public Administration)	Public Administration	Total
101	138 (6.5%)	211 (10.0%)	151 (7.1%)	42 (2.0%)	233 (11.0%)	76 (3.6%)	20 (0.9%)	56 (2.6%)	53 (2.5%)	705 (33.3%)	170 (8.0%)	112 (5.3%)	149 (7.0%)	2,116
102.01	10 (1.5%)	44 (6.7%)	84 (12.8%)	17 (2.6%)	79 (12.1%)	61 (9.3%)	7 (1.1%)	39 (6.0%)	27 (4.1%)	158 (24.1%)	47 (7.2%)	42 (6.4%)	40 (6.1%)	655
102.02	10 (0.5%)	132 (6.6%)	174 (8.7%)	66 (3.3%)	212 (10.6%)	100 (5.0%)	63 (3.2%)	87 (4.4%)	88 (4.4%)	706 (35.4%)	74 (3.7%)	84 (4.2%)	198 (9.9%)	1,994
103	136 (6.4%)	234 (11.1%)	342 (16.2%)	140 (6.6%)	447 (21.1%)	314 (14.8%)	87 (4.1%)	176 (8.3%)	158 (7.5%)	765 (36.2%)	163 (7.7%)	220 (10.4%)	144 (6.8%)	3,326
104.01	30 (2.0%)	158 (10.6%)	156 (10.5%)	62 (4.2%)	202 (13.5%)	87 (5.8%)	36 (2.4%)	53 (3.6%)	94 (6.3%)	296 (19.9%)	130 (8.7%)	114 (7.6%)	73 (4.9%)	1,491
104.02	32 (1.8%)	144 (8.2%)	164 (9.3%)	90 (5.1%)	212 (12.0%)	102 (5.8%)	27 (1.5%)	113 (6.4%)	122 (6.9%)	465 (26.4%)	114 (6.5%)	105 (6.0%)	74 (4.2%)	1,764
105	13 (1.5%)	92 (10.7%)	77 (8.9%)	46 (5.3%)	118 (13.7%)	46 (5.3%)	10 (1.2%)	16 (1.9%)	35 (4.1%)	240 (27.8%)	72 (8.3%)	79 (9.2%)	19 (2.2%)	863
110	6 (0.6%)	128 (12.3%)	86 (8.3%)	39 (3.8%)	102 (9.8%)	53 (5.1%)	20 (1.9%)	29 (2.8%)	39 (3.8%)	256 (24.7%)	133 (12.8%)	91 (8.8%)	56 (5.4%)	1,038
9501	91 (48.7%)	2 (1.1%)	2 (1.1%)	1 (0.5%)	7 (3.7%)	5 (2.7%)	0 (0.0%)	0 (0.0%)	10 (5.3%)	25 (13.4%)	14 (7.5%)	9 (4.8%)	21 (11.2%)	187
201	306 (14.2%)	150 (7.0%)	224 (10.4%)	31 (1.4%)	205 (9.5%)	107 (5.0%)	28 (1.3%)	117 (5.4%)	84 (3.9%)	486 (22.6%)	151 (7.0%)	125 (5.8%)	137 (6.4%)	2,151
202	81 (4.2%)	231 (11.8%)	144 (7.4%)	43 (2.2%)	270 (13.8%)	101 (5.2%)	25 (1.3%)	41 (2.1%)	46 (2.4%)	444 (22.8%)	260 (13.3%)	128 (6.6%)	137 (7.0%)	1,951
204	217 (7.1%)	232 (7.6%)	169 (5.5%)	46 (1.5%)	291 (9.5%)	161 (5.3%)	46 (1.5%)	166 (5.4%)	114 (3.7%)	1,007 (33.0%)	258 (8.5%)	131 (4.3%)	213 (7.0%)	3,051
205	180 (7.1%)	134 (5.3%)	171 (6.8%)	13 (0.5%)	211 (8.4%)	196 (7.8%)	29 (1.2%)	154 (6.1%)	135 (5.4%)	760 (30.2%)	209 (8.3%)	81 (3.2%)	247 (9.8%)	2,520
56.02	34 (1.7%)	309 (15.7%)	130 (6.6%)	58 (3.0%)	191 (9.7%)	72 (3.7%)	30 (1.5%)	44 (2.2%)	178 (9.1%)	463 (23.6%)	270 (13.8%)	130 (6.6%)	54 (2.8%)	1,963
59	118 (11.1%)	106 (10.0%)	82 (7.7%)	41 (3.9%)	178 (16.8%)	63 (5.9%)	8 (0.8%)	23 (2.2%)	22 (2.1%)	246 (23.2%)	78 (7.3%)	47 (4.4%)	50 (4.7%)	1,062
60	105 (9.8%)	114 (10.7%)	72 (6.7%)	50 (4.7%)	87 (8.1%)	61 (5.7%)	22 (2.1%)	36 (3.4%)	93 (8.7%)	190 (17.8%)	89 (8.3%)	85 (8.0%)	65 (6.1%)	1,069
61	93 (6.8%)	142 (10.3%)	162 (11.8%)	24 (1.7%)	157 (11.4%)	71 (5.2%)	0 (0.0%)	42 (3.1%)	70 (5.1%)	343 (24.9%)	104 (7.6%)	81 (5.9%)	86 (6.3%)	1,375
9504	127 (8.3%)	39 (2.6%)	85 (5.6%)	65 (4.3%)	234 (15.4%)	50 (3.3%)	23 (1.5%)	42 (2.8%)	30 (2.0%)	434 (28.5%)	145 (9.5%)	73 (4.8%)	176 (11.6%)	1,523
9505	135 (11.8%)	105 (9.2%)	68 (5.9%)	31 (2.7%)	128 (11.2%)	45 (3.9%)	11 (1.0%)	32 (2.8%)	37 (3.2%)	373 (32.5%)	67 (5.8%)	57 (5.0%)	57 (5.0%)	1,146
9506	69 (9.5%)	48 (6.6%)	73 (10.0%)	18 (2.5%)	154 (21.2%)	55 (7.6%)	11 (1.5%)	0 (0.0%)	20 (2.8%)	152 (20.9%)	48 (6.6%)	23 (3.2%)	56 (7.7%)	727
9507	177 (19.5%)	60 (6.6%)	45 (4.9%)	28 (3.1%)	106 (11.6%)	36 (4.0%)	12 (1.3%)	26 (2.9%)	43 (4.7%)	218 (24.0%)	58 (6.4%)	25 (2.7%)	76 (8.4%)	910
Tract Total	2,108 (6.4%)	2,815 (8.6%)	2,661 (8.1%)	951 (2.9%)	3,824 (11.6%)	1,862 (5.7%)	515 (1.6%)	1,292 (3.9%)	1,498 (4.6%)	8,732 (26.6%)	2,654 (8.1%)	1,842 (5.6%)	2,128 (6.5%)	32,882
Nueces County	2,792 (2.1%)	11,076 (8.4%)	9,617 (7.3%)	4,353 (3.3%)	16,009 (12.2%)	6,209 (4.7%)	3,174 (2.4%)	7,870 (6.0%)	11,736 (8.9%)	30,280 (23.0%)	13,047 (9.9%)	7,087 (5.4%)	8,468 (6.4%)	131,718
Kleberg County	917 (7.4%)	877 (7.1%)	885 (7.2%)	169 (1.4%)	1,321 (10.7%)	709 (5.7%)	138 (1.1%)	584 (4.7%)	575 (4.7%)	3,522 (28.5%)	1,128 (9.1%)	659 (5.3%)	877 (7.1%)	12,361
Kenedy	91	2	2	1	7	5	0	0	10	25	14	9	21	187

Table 4.2-5 Employment By Industry Within The Surrounding Area

Census Tracts/ Location	Agriculture, Forestry, Fishing, and Hunting and Mining	Construction	Manufacturing	Wholesale Trade	Retail Trade	Transportation and Warehousing, and Utilities	Information	Finance, Insurance, Real Estate and Rental and Leasing	Professional, Scientific, Management, Administrative, and Waste Management Services	Educational, Health, and Social Services	Arts, Entertainment, Recreation, Accommodation, and Food Services	Other Services (Except Public Administration)	Public Administration	Total
County	(48.7%)	(1.1%)	(1.1%)	(0.5%)	(3.7%)	(2.7%)	(0.0%)	(0.0%)	(5.3%)	(13.4%)	(7.5%)	(4.8%)	(11.2%)	
Willacy County	656 (10.9%)	351 (5.8%)	354 (5.9%)	164 (2.7%)	838 (13.9%)	301 (5.0%)	80 (1.3%)	174 (2.9%)	187 (3.1%)	1,685 (28.0%)	407 (6.8%)	300 (5.0%)	521 (8.7%)	6,018
Cameron County	2,317 (2.1%)	7,923 (7.3%)	11,298 (10.4%)	4,013 (3.7%)	13,487 (12.4%)	6,023 (5.5%)	1,659 (1.5%)	5,321 (4.9%)	6,511 (6.0%)	29,176 (26.8%)	9,128 (8.4%)	6,299 (5.8%)	5,749 (5.3%)	108,904
County Total	6,773 (2.6%)	20,229 (7.8%)	22,156 (8.5%)	8,700 (3.4%)	31,662 (12.2%)	13,247 (5.1%)	5,051 (1.9%)	13,949 (5.4%)	19,019 (7.3%)	64,688 (25.0%)	23,724 (9.2%)	14,354 (5.5%)	15,636 (6.0%)	259,188
Bishop City	86 (6.8%)	128 (10.2%)	148 (11.7%)	24 (1.9%)	142 (11.3%)	71 (5.6%)	0 (0.0%)	42 (3.3%)	56 (4.4%)	304 (24.1%)	98 (7.8%)	81 (6.4%)	80 (6.3%)	1,260
Combes Town	15 (1.7%)	103 (11.4%)	99 (11.0%)	45 (5.0%)	122 (13.6%)	61 (6.8%)	34 (3.8%)	26 (2.9%)	24 (2.7%)	236 (26.2%)	29 (3.2%)	58 (6.4%)	48 (5.3%)	900
Driscoll City	11 (3.7%)	39 (13.1%)	22 (7.4%)	10 (3.4%)	47 (15.8%)	16 (5.4%)	5 (1.7%)	6 (2.0%)	22 (7.4%)	58 (19.5%)	17 (5.7%)	18 (6.0%)	27 (9.1%)	298
Harlingen City	159 (0.8%)	1,203 (6.1%)	1,503 (7.6%)	766 (3.9%)	2,267 (11.5%)	758 (3.8%)	504 (2.5%)	1,049 (5.3%)	1,308 (6.6%)	5,837 (29.5%)	1,548 (7.8%)	1,328 (6.7%)	1,553 (7.9%)	19,783
Kingsville City	546 (5.5%)	723 (7.3%)	667 (6.7%)	132 (1.3%)	1,117 (11.2%)	591 (5.9%)	110 (1.1%)	458 (4.6%)	475 (4.8%)	2,982 (29.9%)	966 (9.7%)	522 (5.2%)	681 (6.8%)	9,970
Lyford City	77 (11.8%)	39 (6.0%)	40 (6.1%)	11 (1.7%)	68 (10.4%)	15 (2.3%)	5 (0.8%)	13 (2.0%)	25 (3.8%)	244 (37.3%)	37 (5.6%)	40 (6.1%)	41 (6.3%)	655
Raymondville City	183 (6.8%)	126 (4.7%)	142 (5.3%)	66 (2.5%)	382 (14.3%)	121 (4.5%)	46 (1.7%)	94 (3.5%)	65 (2.4%)	775 (28.9%)	195 (7.3%)	175 (6.5%)	308 (11.5%)	2,678
Robstown City	83 (2.1%)	468 (11.8%)	223 (5.6%)	79 (2.0%)	461 (11.6%)	239 (6.0%)	87 (2.2%)	115 (2.9%)	289 (7.3%)	949 (23.9%)	456 (11.5%)	284 (7.1%)	245 (6.2%)	3,978
Ricardo	NO DATA AVAILABLE													
Riviera	NO DATA AVAILABLE													
Sarita	NO DATA AVAILABLE													
City Total	1,160 (2.9%)	2,829 (7.2%)	2,844 (7.2%)	1,133 (2.9%)	4,606 (11.7%)	1,872 (4.7%)	791 (2.0%)	1,803 (4.6%)	2,264 (5.7%)	11,385 (28.8%)	3,346 (8.5%)	2,506 (6.3%)	2,983 (7.5%)	39,522
Overall Total	10,041 (3.0%)	25,873 (7.8%)	27,661 (8.3%)	10,784 (3.3%)	40,092 (12.1%)	16,981 (5.1%)	6,357 (1.9%)	17,044 (5.1%)	22,781 (6.9%)	84,805 (25.6%)	29,724 (9.0%)	18,702 (5.6%)	20,747 (6.3%)	331,592

Source: 2000 Census Report, US Census Bureau, accessed in January 2010
Notes: Manufacturing includes non-durable and durable goods. Trade includes wholesale and retail.
Service includes business, personal, entertainment, health, educational, and other services.

As discussed in **Section 4.1 – ROW Displacements/Relocations**, the construction of the proposed project would directly displace 11 businesses. **Table 4.2-6** shows businesses by industry type that would be potentially displaced. As discussed in **Section 4.1 – ROW Displacement/Relocations**, adequate building space is available in the surrounding area to relocate the businesses identified. The proposed project is not expected to influence long-term employment or income levels and is also not anticipated to increase the tax base for the area.

Table 4.2-6 Potential Displacements within Census Blocks Classified as Minority

Figure ID	Tax ID	Type	Site Street	# of Employees	Impacted Acreage	Structures
5	743700000040	Wholesale trade	Hanson Pipe & Precast 1610 S Highway 77, Robstown, Texas 78380	20-49	0.145151	1 office building and 1 Maintenance building
6	743700000052	Industrial supplies merchant wholesalers	Black Angus Containers 1620 S. Highway 77, Robstown, Texas 78380	5-9	0.120372	1 office/warehouse building
9	450200010015	Metal merchant wholesaler	Atlas Tubular LP 1710 S. Highway 77, Robstown, Texas 78380	50-99	2.957891	1 warehouse, 1 storage, 1 office building
10	450200010025	Metal merchant wholesaler	Atlas Tubular LP 1710 S. Highway 77, Robstown, Texas 78380	50-99	2.977395	1 office
37	70601040309	government	Veterans Land Board State of Texas 1514 U.S. HWY 77 S Bishop, TX 78343		1.020605	1 office building
40	70601040300	Supermarkets and other grocery store	Pops Jerky Store 663 US 77 South Bypass, Bishop Texas 78343	5-9	1.570309	1 commercial building
41	758000010010	unknown	1442 US Highway South Bypass, Bishop, Texas 78343	not known	1.960145	1 business, 1 house
49	12480	Hotels/motels industry; other Gasoline stations industry	Rodeway Inn/Valero 3430 US Highway 77 S Bypass, Bishop, Texas	20-49/5-9	0.22252	1 service station
91	29873	communications	Caprock Communications Corp. 5561 US Highway 77 Kingsville, Texas		0.137294	2 electronic equipment buildings
118	18007	unknown	Highway 77 Riviera, Texas	N/A	5.609505	1 single-story house
142	11976	unknown	Highway 77 Riviera, Texas	N/A	1.224285	1 single-story house

Source: Jacobs Engineering Group, Inc. (GIS), January 2010

Implementation of the Build Alternative would have short-term, direct benefits from the creation of jobs and purchases of materials and equipment for construction. These benefits would most likely be on a regional basis, because it is expected that only a small number of the employees required to fill the construction jobs would likely come from within the study area. Likewise, few, if any, of the purchases of equipment and materials would be made from businesses within the study area. Short-term negative impacts may result from the removal of 11 properties from the tax rolls for a brief period and only if the businesses are relocated within the study area.

Potential relocation of these businesses to areas along the project area has been assessed based on current real estate data. Vacant industrial building space is currently on the market for lease or for sale within the surrounding area alone would be more than enough to meet the minimum/maximum ranging from 100 square feet to 15,000 square feet required by all the displaced businesses. As the project design progresses, a more refined relocation analysis will be necessary to ensure that proposed relocation sites are adequate in size and location for the displaced businesses. It is likely that a sufficient amount of space, appropriately zoned for industrial types described in **Table 4.2-6** would be available to absorb the relocation of the displaced businesses.

4.2.4 Community Cohesion

This section contains a brief discussion of the existing neighborhoods, ranchlands, sensitive social and community facilities (schools, places of worship, health care facilities and resources, cemeteries, public resource facilities), and parks within 0.25 mile of the proposed project boundaries. **Figures A.4.2-1** through **A.4.2-4** illustrate existing attributes of community cohesion.

The methodology used to develop this section consisted of preparing a baseline inventory of existing community features located within 0.25 mile of the proposed project boundaries using GIS data.

4.2.4.1 Existing Conditions

Neighborhoods – Colonia

There are five colonias located within 0.25 mile of the proposed project boundaries. Colonia in Spanish means a community or neighborhood. The Office of the Secretary of State defines a "colonia" as a residential area along the US/Mexico border that may lack some of the most basic living necessities such as potable water and sewer systems, electricity, paved roads, and safe and sanitary housing. Most residents living in South Texas colonias live below the national poverty level with an estimated median annual household income of $7,000 to $11,000 and an average family size of five to six persons (Center for Housing and Urban Development, undated). The proposed project is located adjacent to designated colonia areas in Willacy and Cameron Counties; however, the proposed project does not require the displacement of any residents living in the colonias. **Table 4.2-7** lists neighborhood-colonias within 0.25 mile of the proposed project boundaries (http://www.twdb.state.tx.us/colonias/index.asp).

Table 4.2-7 Neighborhoods-Colonias Within 0.25 Mile of the Proposed Project Boundaries

Texas Colonia Number	Colonia Name	County
031A026	Stardust	Cameron
031A040	Combes	Cameron
2450004	Bausell and Ellis	Willacy
2450003	Benitez	Willacy
2450006	Hugh Terry	Willacy

Source: http://www.twdb.state.tx.us/colonias/index.asp, January 2010

Ranchland

One of the most unique features of the US 77 Upgrade Project is how US 77 is bordered on both the west and east sides by some of the largest ranches in the US. Just south of Kingsville, existing US 77 travels through Kenedy County, which is predominantly ranchland owned by the King, Kenedy, Armstrong, and Yturria ranches. Each of the ranches contains more than 40,000 acres.

The Kenedy Ranch is a privately owned ranch in South Texas that has been managed for wildlife and grazing for its entire history (http://www.kenedymuseum.org/). The ranch was founded in the 1860's by riverboat captain Mifflin Kenedy and is adjacent to the famous King Ranch (founded by Kenedy's partner, Capt. Richard King). The expansive Kenedy Ranch hosts a rich diversity of habitats typical of South Texas and is the northern limit for many subtropical

species of birds. A museum in the nearby town of Sarita displays a history of the ranch and the area.

The 825,000-acre King Ranch spans parts of Nueces, Kleberg, Kenedy, and Willacy Counties and had its beginning in 1852, when Richard King and Gideon K. Lewis set up a cattle camp on Santa Gertrudis Creek in South Texas (http://www.king-ranch.com/). Formal purchase began in 1853, when they bought a Spanish land grant, Rincón de Santa Gertrudis, of 15,500 acres on Santa Gertrudis Creek in Nueces County. The ranch was ranked 175th out of the top 500 businesses in Texas by the Texas 500: Hoover's Guide to the Top Texas Companies (Austin: Reference Press, 1994) (http://www.tshaonline.org/handbook/online/articles/KK/apk1.html). The King Ranch has long held significant banking and mercantile interests in Kingsville, a town located in the heart of the ranch. The ranch has long supported the agricultural educational programs of Texas A&M University, both at College Station and Kingsville. Cattle operations of the King Ranch have become known worldwide. Several Texas historical markers commemorate the King Ranch and its operations. For more details on the King Ranch, see **Section 4.8.1.1**.

Schools

There are 14 schools within 0.25 mile of the proposed project boundaries including six public elementary schools, three public middle schools, three public high schools, one youth city school, and one private school as listed in **Table 4.2-8.**

Table 4.2-8 Schools Within 0.25 Mile of the Proposed Project Boundaries

Name	Address	City	County
Coastal Bend Youth City	2547 North US Highway 77	Robstown	Nueces
Bishop Elementary School	200 North Fir Avenue	Bishop	Nueces
St Paul Lutheran School	801 East Main Street	Bishop	Nueces
Bishop High School	717 East 6th Street	Bishop	Nueces
Presbyterian Pan American School	223 North FM 772	Kingsville	Kleberg
Ricardo Middle School	138 West CR 2160	Kingsville	Kleberg
Nanny Elementary School	203 Seahawk Drive	Riviera	Kleberg
De La Paz Middle School	203 Seahawk Drive	Riviera	Kleberg
Kaufer High School	203 Seahawk Drive	Riviera	Kleberg
Sarita Elementary School	150 East La Parra Street	Sarita	Kenedy
Myra Green Middle School	1 Bearkat Boulevard	Raymondville	Willacy
Raymondville High School	1 Bearkat Boulevard	Raymondville	Willacy
Dishman Elementary School	309 Madeley Avenue	Combes	Cameron
Harlingen Adventist Elementary School	2081 Montezuma Avenue	Harlingen	Cameron

Source: Jacobs Engineering Group, Inc. (GIS), January 2010

Places of Worship

There are eight places of worship within 0.25 mile of the proposed project boundaries as listed in **Table 4.2-9.**

Table 4.2-9 Places of Worship Within 0.25 Mile of the Proposed Project Boundaries

Name	Address	City	County
St Paul Lutheran Church	801 East Main Street	Bishop	Nueces
First United Methodist Church	804 East 6th Street	Bishop	Nueces
Praise Victory Worship Center	1800 East Corral Avenue	Kingsville	Kleberg
St Joseph's Church	1430 Brookshire Street	Kingsville	Kleberg
Emanuel Christian Church	1624 East Santa Gertrudis	Kingsville	Kleberg
El Redentor Baptist Church	1624 East Santa Gertrudis Street	Kingsville	Kleberg
Ricardo Baptist Church	221 School Road	Kingsville	Kleberg
Our Lady of Guadalupe Church	103 Main Street	Sarita	Kenedy

Source: Jacobs Engineering Group, Inc. (GIS), January 2010

Health Care Facilities

There are three health care facilities and two adult day care facilities within 0.25 mile of the proposed project boundaries as shown in **Table 4.2-10**. These facilities house vital services for residents within the project area and beyond.

Table 4.2-10 Health Care/Adult Day Care Facilities Within 0.25 Mile of the Proposed Project Boundaries

Name	Address	City	County
Hubert Veterinary Hospital	1908 East Kenedy Avenue	Kingsville	Kleberg
Christus Spohn Hospital-Kleberg	1311 East General Cavazos Boulevard	Kingsville	Kleberg
Willacy County Hospital District	1623 South 15th Street	Raymondville	Willacy
La Paloma Adult Day Care	100 N Expressway 77	Raymondville	Willacy
Sunshine Day Care	268 South 15th Street	Raymondville	Willacy

Source: Jacobs Engineering Group, Inc. (GIS), January 2010

Cemeteries

There are three cemeteries within 0.25 mile of the proposed project boundaries as listed in **Table 4.2-11**.

Table 4.2-11 Cemeteries Within 0.25 Mile of the Proposed Project Boundaries

Name	Address	City	County
Restland Memory Park	CR 6 at CR 79A, PO Box 142	Bishop	Nueces
La Piedad Cemeterio Numero Dos	unknown	Raymondville	Willacy
Harlingen Combes Memorial Cemetery	US 77 Business & Sid Jones Road	Combes	Cameron

Source: Jacobs Engineering Group, Inc. (GIS), January 2010

Public Resource Facilities – US Post Offices

US post offices are important to rural areas, not only to facilitate communication, but also to establish the identity of an unincorporated community as listed in **Table 4.2-12**.

Table 4.2-12 Public Facilities/US Post Offices Within 0.25 Mile of the Proposed Project Boundaries

Name	Address	City	County
US Post Office	US 77	Driscoll	Nueces
US Post Office	201 South Ash Avenue	Bishop	Nueces
US Post Office	120 North 7th Street	Riviera	Kleberg
US Post Office	103 Mallory Street	Sarita	Kenedy
US Post Office	2167 US 77	Armstrong	Kenedy
US Post Office	705 East Hidalgo Avenue	Raymondville	Willacy
US Post Office	233 East Broadway Street	Lyford	Willacy
US Post Office	US 77 Frontage Road	Sebastian	Willacy
US Post Office	302 S Expressway 77	Combes	Cameron

Source: Jacobs Engineering Group, Inc. (GIS), January 2010

Public Facilities – Prisons and Correctional Facilities

Willacy County Adult Correctional Facility is the only multi-custody prison facility located within 0.25 mile of the proposed project area as shown in **Table 4.2-13**. This facility houses 540 inmates (rated capacity) and is contracted by the US Marshals Service.

Table 4.2-13 Public Facilities/Prisons Within 0.25 Mile of the Proposed Project Boundaries

Name	Address	City	County
Willacy County Adult Correctional Facility	1601 Buffalo Drive	Raymondville	Willacy

Source: Jacobs Engineering Group, Inc. (GIS), January 2010

Parks and Publicly-Owned Recreational Facilities

It is federal policy to preserve and, where possible, enhance the quality of the environment. Public parks, recreation areas, wildlife and waterfowl refuges, and historic sites (and potential historic sites), contribute greatly to the quality of Texas' environment and are considered significant. In accordance with federal policy, these sites receive special consideration under the law as specified in Section 4(f) of the Department of Transportation Act of 1966 (U.S.C. 1966b; 23 CFR, Part 774; and 49 CFR, Part 622). For compliance, an evaluation must be conducted for sites identified as being affected by all proposed alternatives. The evaluation must show that there is no prudent and feasible alternative to the proposed action.

Dick Kleberg Park is the only identified park within 0.25 mile of the project area (http://www.klebergpark.org/parks/dkleberg.html accessed in January 2010. It is located on US 77 at Escondido Road. On April 25 1958, Robert J. Kleberg, Jr. and Richard M. Kleberg, Jr. trustees of the Alice G.K. Kleberg Foundation, donated 184.5 acres of land to Kleberg County. The park was named after Dick Kleberg, Sr., who was a US congressman and who served as chairman of the King Ranch Board from 1950 to 1955. The park offers several facilities, including an exposition center where rodeos, concerts, circuses, and other events are held. Adjacent to the exposition center, there is an outdoor arena and horse stalls, little league fields, and an adult and youth softball complex.

4.2.4.2 No Build Alternative – Community Cohesion Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The

No Build Alternative would not separate or isolate any distinct neighborhoods, ethnic groups, or other specific groups. Therefore, no mitigation regarding community cohesion would be required.

4.2.4.3 Build Alternative – Community Cohesion Consequences

US 77 traverses the proposed project area and travels south between Corpus Christi and Harlingen, serving as one of the two primary links to the Rio Grande Valley. The northern end of the US 77 within the project area overlaps the improvements of US 77 in Robstown to IH 37. South of Kingsville, the road travels through Kenedy County, which is predominantly ranchland owned by the King, Kenedy, Armstrong, and Yturria ranches. The southern end overlaps US Highway 83 and is a newly completed expressway through the cities of Harlingen, San Benito and Brownsville, with a continuous of its southern terminus to the US/Mexico border.

Existing land use for the project area consists mostly of rural agricultural uses (ranching and farming), and includes commercial and industrial (mostly oil and gas/petroleum) uses scattered throughout the vicinity, with small urbanized areas concentrated within the city limits located along the proposed US 77 alignment. The US 77 alignment traverses five counties and 13 cities and small towns. The counties include Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties. Cities and towns located along the US 77 alignment include Corpus Christi, Robstown, Driscoll, Bishop, Kingsville, Ricardo, Riviera, Sarita, Raymondville, Lyford, Sebastian, Combes, and Harlingen. Land use adjacent to the existing US 77 ROW includes farmland, ranch, vacant land, commercial, residential, industrial, hospitals, parks, and public facilities.

A total of approximately 689.74 acres (440.43 acres in Nueces County and 249.31 acres in Kleberg County) of additional ROW would be required for the proposed construction of the Build Alternative. Displacements/relocations for the project area would be dispersed throughout only two counties for the project corridor and not concentrated in any one or two communities. The proposed project would result in the potential displacements and relocations of 43 structures consisting of: 19 residential (all single-family homes and mobile homes), 15 industrial, three commercial, four farmland, one ranch, and one public. However, the displacements anticipated for the project area would occur outside of any established communities for the project area.

There are four major ranches, five residential (colonias), 14 schools, one park, five hospitals (health care/adult day care facilities), one prison, eight places of worship, three cemeteries, nine US post offices located adjacent to the proposed US 77 project alignment.

The US 77 Upgrade Project would not restrict access to any existing public or community services, businesses, or commercial areas. In the long-term, the community would benefit from the proposed project through improved mobility and reduction in traffic congestion for the area. The proposed project would ultimately enhance safety and the operational efficiency of the existing facilities throughout the project area and would provide improved access to and from adjacent properties. Criteria, methods, or practices used in the preparation of this document are not directly or indirectly discriminatory on the basis of race, color, or national origin.

The proposed project would not affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups. The proposed project would not discourage or provide disincentives to commercial, industrial, or residential development. None of the schools, places of worship, health care facilities and resources, cemeteries, public resource facilities), and

parks discussed in this section would be displaced as a result of the proposed project. Relief routes are being proposed as part of the Build Alternative for Driscoll and Riviera to avoid displacing residences, businesses, and places of community gathering. The proposed project would not divide, separate, or isolate any neighborhood or community; therefore, community cohesion would likely remain intact. The Build Alternative would not bisect any communities that are not already bisected by the existing corridor and would not sever or alter the social interaction of the communities along the corridor.

Increased mobility due to the relief routes proposed for Driscoll and Riviera would be an incentive to future development along the proposed project alignment. **Section 4.16 – Traffic Operation Impacts** discusses the traffic-related impacts resulting from the Build Alternative.

The US 77 Upgrade Project would not alter travel patterns of police, fire protection, or emergency medical services within the project area, but instead would enhance travel pattern conditions so as to not impede emergency vehicles traveling in the area. Appropriate measures for traffic control would ensure that potential conflicts between vehicles responding to emergencies would not be affected. Additionally, the ISDs in the communities along US 77 were contacted to coordinate bus routes to minimize the impacts to local communities. Input from the ISDs was considered and utilized during project design to the maximum extent reasonably possible so as to not impede travel patterns of existing bus routes for the area.

4.2.5 Visual Quality and Aesthetics

This section addresses the visual and aesthetic impacts that may result from the construction of the Build Alternative. The assessment determines if the improvements and additions would be compatible with the visual character of the setting into which they would be introduced.

Visual and aesthetic resources within the project area were identified through review of aerial photographs and internet searches (Google Earth), and field survey. Generally, visual and aesthetic resources within the area include historic structures, parklands, and undeveloped open space/natural areas. In addition, potential sensitive visual receptors (i.e., areas or users affected by changes in the visual and aesthetic character of the study area) have been identified. **Table 4.2-14** provides definitions used in evaluating visual quality and aesthetics. Sensitive receptors of primary concern are:

- Residential areas facing the Build Alternative
- Residential areas immediately adjacent to the Build Alternative
- Users of adjacent parks.

Table 4.2-14 Visual Assessment Evaluation Criteria

Primary Viewers	Visual Quality	Visual Sensitivity
A = Motorists B = Single/Multi-Family Residents C = Commercial/Office Tenants D = Recreational Users E = School/Hospital/Government F = Industrial Tenants G = Pedestrians H = Agricultural	High = Assessment unit, or portions thereof, is of substantial visual and/or aesthetic quality to the primary viewers. Moderate = Assessment unit, or portions thereof, is of average visual and/or aesthetic quality to the primary viewers.	High = Introduction of new elements into the assessment unit could substantially impact the quality of the visual aesthetic resources observed by the primary viewers. Moderate = Introduction of new elements into the assessment unit may have an impact on the quality of the visual/aesthetic resource as observed by the primary viewers, or a portion

Table 4.2-14 Visual Assessment Evaluation Criteria

Primary Viewers	Visual Quality	Visual Sensitivity
Ranching/Farming	Low = Assessment unit is of little or no visual and/or aesthetic quality to the primary viewers.	thereof. Low = Introduction of new elements into the assessment unit is not likely to have an impact on any visual/aesthetic resource as observed by primary viewers.

Source: Bureau of Land Management: Visual Resource Management System, March 2010

Visual quality and visual sensitivity evaluation criteria are based on a qualitative assessment as follows:

- Substantial/High, meaning that the Build Alternative has unacceptable effects on measures compared to the No Build Alternative
- Possibly Substantial/Moderate, meaning that the Build Alternative has possible negative effects on measures compared to the No Build Alternative
- Generally Not Substantial/Low, meaning that the Build Alternative has no adverse affects upon the measure as compared to the No Build Alternative.

The impact assessment also takes into consideration that a portion of the ROW required for this project is currently used as a transportation corridor, including existing highways and streets. Visual impacts are discussed in terms of the effect the new physical elements associated with the project would have on the following:

- Landform Quality – The existing natural or man-made landform
- Visual Resources – The physical resources, including native vegetation, introduced landscaping, and the built environment, that make up the character of the area
- Visual Intrusion/Privacy – The creation of direct views from the construction of the relief routes and interchanges.

Federal and state regulations require visual impacts to be addressed per NEPA regulation. There are no specific federal or state visual regulatory requirements that apply to properties that are not designated historic and/or eligible for listing in the NRHP, or parkland. However, TxDOT would review the development plans to ensure compliance with development code requirements. These requirements relate to open storage, landscaping, lighting, screening, neighborhood protection, and signage. Public input regarding visual intrusion and privacy impacts are also considered in the assessment of impacts.

To assess visual and aesthetic impacts, the project area was divided into eight visual assessment segments (see **Figures A.4.2-5** through **A.4.2-12**). Assessment segments consist of an area that exhibits a visual and aesthetic cohesiveness. Each sensitive receptor/asset was assessed to determine which characteristics of the project could have a visual/aesthetic impact on the receptor, particularly in the vicinity of the proposed relief routes and interchanges. Visual intrusion or privacy impacts of the improvements and additions on adjacent properties were assessed using several criteria: horizontal distance, existing screening, and vertical distance. Visual screening and/or architectural treatments could be used to mitigate the visual/aesthetic impact, if needed.

4.2.5.1 Existing Conditions

The project area is surrounded by a primarily rural environment that features numerous ranches and farmlands, interspersed with low density residential, commercial, and industrial areas located particularly around cities and towns along US 77. For the purpose of this discussion, the US 77 project area was separated into segments as identified in **Table 4.2-15**. The assessment segments consist of an area that exhibits a visual and aesthetic cohesiveness. **Table 4.2-15** provides a general evaluation of the primary viewer, visual quality, and visual sensitivity of receptors and/or assets within each segment.

Table 4.2-15 Visual Assessment Segments

Segment	Name	Primary Viewers	Visual Quality	Visual Sensitivity
I	IH 37 to CR 36 in Nueces County	A, B, C, E, F, G, H	Low	Low
II	South of CR 36 to just south of the Proposed Driscoll Relief Route in Nueces County	A, B, C, F, G, H	High	High
III	Just south of the Proposed Driscoll Relief Route in Nueces County to Nueces/Kleberg County Line	A, B, C, F, G, H	Moderate	Moderate
IV	Nueces/Kleberg County Line to FM 772/just south of the existing Kingsville Relief Route in Kleberg County	A, B, C, D, E, F, G, H	Moderate	Moderate
V	FM 772/just south of the existing Kingsville Relief Route in Kleberg County to Los Olmos Creek/Kleberg/Kenedy County Line	A, B, C, E, F, G, H	High	High
VI	Los Olmos Creek/Kleberg/Kenedy County Line to Kenedy/Willacy County Line	A, B, C, D, E, F, G, H	Low	Low
VII	Kenedy/Willacy County Line to the Willacy/Cameron County Line	A, B, C, D, F, G, H	Low	Low
VIII	Willacy/Cameron County Line to US 83 in Harlingen, Cameron County	A, B, C, E, F, G, H	Low	Low

Primary Viewers:
A=Motorists B=Single/Multi-Family Residents C=Commercial/Office Tenants D=Recreational Users
E=Schools/Hospitals/Government F=Industrial Tenants G=Pedestrians H=Agricultural Ranchers/Farmers

Source: Jacobs Engineering Group, Inc., January 2010

4.2.5.2 No Build Alternative – Visual Quality and Aesthetics Consequences

If the No Build Alternative was implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. Primary viewers of the proposed project would include motorists, single/multi-family residents, recreational users, commercial/office tenants, schools/hospitals/government (public), industrial tenants, pedestrians, and agricultural ranchers/farmers. The No Build Alternative would have no effect on the visual and aesthetic quality of the area. Therefore, no mitigation regarding visual and aesthetics quality would be required.

4.2.5.3 Build Alternative – Visual Quality and Aesthetics Consequences

The potential impact of each of the project characteristics was rated according to the visual assessment evaluation criteria described in **Table 4.2-14** and the visual assessment segments identified in **Table 4.2-15** and shown in **Figure A.4.2-5** through **Figure A.4.2-12**. It was assumed that the design and construction of the Build Alternative would be consistent with

TxDOT design standards. The Build Alternative would affect the aesthetics in the project area as follows:

- **Segment I: IH 37 to CR 36 in Nueces County (Figure A.4.2-5)** – There would be no changes from IH 37 to CR 36 in Nueces County since construction improvements have been completed or would be completed under separate projects. A new interchange is proposed at CR 36. This segment is located within a mostly rural area of Nueces County consisting of mostly farmland, with some areas of residential, commercial, and industrial properties. For this segment, the Build Alternative would introduce new main lanes, access roads, ramps, as well as the interchange mentioned. Visual impacts would not be substantial for adjacent housing, businesses, and pedestrians in this segment because essentially all of the construction improvements are complete for this segment.

- **Segment II: South of CR 36 to just south of the Proposed Driscoll Relief Route in Nueces County (Figure A.4.2-6)** – Improvements for this segment include a relief route east of Driscoll. New interchanges are also proposed for CR 24, FM 665, and CR 18. This segment is located within a rural area of Nueces County, consisting of mostly farmland, with some areas of residential, commercial, and industrial properties. The visual impacts would possibly be substantial in the vicinity of the proposed relief route due to construction on new ROW.

- **Segment III: Just south of the Proposed Driscoll Relief Route in Nueces County to Nueces/Kleberg County Line (Figure A.4.2-7)** – Improvements for this segment, from just south of the proposed Driscoll relief route to the Nueces/Kleberg County Line, would include various combinations of new US 77 interchanges at FM 3354, CR 10, 6th Street, 4th Street, and CR 4. This segment is located within a rural area of Nueces County, consisting of mostly farmland, with some areas of residential, commercial, and industrial properties. Visual impacts would possibly be moderately substantial for adjacent housing, businesses, and pedestrians in this segment. This is due to the acquisition of new ROW for roadway widening resulting in homes and businesses along existing US 77 being located closer to a busy roadway.

- **Segment IV: Nueces/Kleberg County Line to FM 772/just south of the existing Kingsville Relief Route in Kleberg County (Figure A.4.2-8)** – This segment, from the Nueces/Kleberg County line to FM 772, just south of the existing Kingsville US 77 relief route, includes various combinations of new interchanges and proposed construction/widening of the main lanes and access roads. The proposed improvements would include the acquisition of additional ROW. The proposed new interchanges with US 77 are at East Caesar Avenue, FM 1717, CR 2120, CR 2160, and FM 772. Improvements are also proposed at an interchange location just north of Sage Road. The structures within this segment are located within a mostly rural area of Kleberg County, consisting of residential, commercial, industrial properties, to include the NAS Kingsville. Visual impacts would possibly be moderately substantial for adjacent housing, businesses, and pedestrians in this segment due to the acquisition of new ROW for roadway widening resulting in homes and businesses along existing US 77 being located closer to a busy roadway.

- **Segment V: FM 772/just south of the existing Kingsville Relief Route in Kleberg County to Los Olmos Creek/Kleberg/Kenedy County Line (Figure A.4.2-9)** – This

segment begins at FM 772 and ends at Los Olmos Creek (Kleberg/Kenedy County Line). From the south end of the existing Kingsville US 77 relief route, to north of Riviera, generally 30 feet of proposed ROW would be needed in some areas to construct new main lanes, access roads, ramps, and interchanges. New interchanges with US 77 would be constructed at RM 628, CR 2280, CR 2290, FM 771, and CR 2340. Improvements for this segment also include a relief route in Riviera. This segment is located within a rural area of Kleberg County, consisting of mostly ranch and farmland with some areas of residential, commercial, and industrial properties. The visual impacts would possibly be substantial in the vicinity of the proposed relief route due to construction on new ROW. In addition, visual impacts would possibly be moderately substantial for adjacent housing, businesses, and pedestrians in this segment due to the acquisition of new ROW for roadway widening resulting in homes and businesses along existing US 77 being located closer to a busy roadway.

- **Segment VI: Los Olmos Creek/Kleberg/Kenedy County Line to Kenedy/Willacy County Line (Figure A.4.2-10)** – This segment begins at Los Olmos Creek (Kleberg/Kenedy County Line) and ends at the Kenedy/Willacy County Line. Properties for this segment are mostly ranch and farmland. Proposed improvements for this segment include a number of full interchanges and half interchanges (one-directional ramps only). New US 77 interchanges would be constructed at Armstrong Avenue and La Parra/Mallory Road. Interchanges at ranch gates include full and half interchanges at specific gates. No ROW would be required for the proposed improvements within this segment. Visual impacts would not be substantial within this segment.

- **Segment VII: Kenedy/Willacy County Line to the Willacy/Cameron County Line (Figure A.4.2-11)** – A portion of this segment has been completed by the TxDOT Pharr District from the north end of the existing Raymondville US 77 relief route to just south of SH 490; therefore, no additional ROW or construction is anticipated in this portion of this segment. As such, the visual impacts for this portion (from the north end of the existing Raymondville US 77 relief route to just south of SH 490) would not be substantial. From south of SH 490 to the Willacy/Cameron County line, various combinations of new main lanes, access roads, ramps, and interchanges are proposed; however, where access roads already exist, only main lanes would be constructed. A new interchange would be constructed at Spur 56/CR 2400. No ROW is required for the proposed improvements within this segment. Visual impacts would not be substantial within this segment.

- **Segment VIII: Willacy/Cameron County Line to US 83 in Harlingen, Cameron County (Figure A.4.2-12)** – This segment begins at the Willacy/Cameron County Line and extends to US 83 in Harlingen, Cameron County. The segment portion from CR 2629 to SH 107 is located within the rural area of Cameron County, which consists of mostly ranch and farmland, with some areas of residential properties. Existing two-way access roads would be converted to one-way access roads from FM 2629 to SH 107 in the town of Combes. Visual impacts would not be substantial in this segment. No new construction is anticipated in this section of Cameron County; therefore, no additional ROW would be required. Visual impacts would not be substantial for adjacent housing, businesses, or pedestrians in this segment because construction improvements are complete for this segment.

Changes in the visual character of the surrounding environment from short-term construction related activities can generally be described in terms of vehicle and equipment activity,

construction staging, stockpiling of excavated material, temporary signage, and traffic congestion. Developed and naturally vegetated areas adjacent to the proposed project would be cleared for the construction of the roadway lanes, and topography would be modified to fill slope and cut slopes for retaining walls. These activities would increase impervious surface areas.

Construction activities would lead to increased levels of dust, indirect transfer of dirt between locations, and localized glare from lighting sources assembled to ensure the safety of construction crews and vehicle drivers. The construction of the proposed project would permanently change views and the visual quality of the corridor due to an expanded roadway width, topography, and grade changes. Vegetation removal in the form of scattered trees and hedges along the new ROW would result in a reduction of vegetative screening, leading to increased impacts from reflective glare from the roadway surface for property owners adjacent to the proposed project. Light impacts would also come from the removal of fences and from illumination, particularly at signalized intersections.

Construction of the roadway in new ROW would possibly result in homes and businesses being located closer to the roadway. Staging areas would be located away from visually sensitive areas where practicable and where land is available. Construction activities would be primarily limited to daylight hours to eliminate the need to use high-wattage lighting sources to operate during nighttime hours. Revegetation would take place in areas disturbed during construction.

4.2.6 No Build Alternative – Socioeconomic Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would leave the existing businesses intact and unchanged. Therefore, no mitigation regarding socioeconomics would be required.

4.2.7 Build Alternative – Socioeconomic Consequences

Implementation of the Build Alternative would have short-term, direct benefits from the creation of jobs and purchases of materials and equipment for construction. These benefits would most likely be on a regional basis because it is expected that only a small number of the employees required to fill the construction jobs would likely come from within the project area. During construction, the proposed project would temporarily increase employment and incomes in the local economy as construction-related expenditures are increased. Short-term negative impacts may result from the removal/relocation of businesses from the tax rolls for a brief period and only if the businesses are relocated within the project area. If the businesses choose not to relocate within the project area, impacts would be permanent, thereby resulting in a potential increase in unemployment in the project area. Temporary access use through a construction easement may be required for the duration of construction only. The proposed project would not restrict access to any existing businesses but would assure that access would be maintained during and after construction is complete. Changes or effects to these properties would be minimal and would have no permanent adverse impacts resulting from the temporary use.

Increased mobility due to the addition of grade-separated interchanges, direct connectors, and relief routes would be a limited incentive to future development along the roadway facility by enhancing safety and the operational efficiency of the existing roadway facilities. Where relief

routes are proposed, the proposed project would provide a time-saving option for drivers willing to pay tolls to use the relief routes. This may result in the removal of some traffic from existing businesses along existing US 77. However, other factors such as the closest fueling facilities being approximately 50 miles from Riviera, SH 285 traffic coming into the center of Riviera, and the new location of the DPS weigh station may affect the amount of traffic remaining on the existing facility.

Induced property developments for the proposed project along the proposed improvements, such as the relief routes, could result in some commercial activities relocating from their existing location to new locations along these areas of proposed improvements. This would be expected to be concentrated at new points of access. Access to the proposed project would only be provided at limited locations. Induced development along the Build Alternative is anticipated to be most likely at access points and less likely where no access is provided.

As discussed in **Section 3.2.2**, direct connectors proposed for Driscoll and Riviera would provide direct access to and from those towns without adding obstacles (such as through-traffic mixing with local traffic, limited access, stop-and-go traffic) that would affect traffic flow. However, this potential economic effect is thought to be off-set by the increased accessibility and improved travel time reliability in the area in general due to the increase in options available to the driver. In addition, businesses located beyond the entrance and exit ramps for the direct connectors could see a change in business volumes and possibly a change in property values.

For some businesses located adjacent to the project boundaries, there may be a potential for reduction in property value due to more circuitous access. These access changes may also result in a loss of business volume for businesses located within sections of the project area. In Kingsville, the project would provide additional access roads for the existing relief route. Traffic on Sage Road in Kingsville would be redirected to FM 1898, and one business, an automobile dealership (Dodge/Jeep/Chrysler Dealership, 2151 US 77, Kingsville, Texas), located at the north end of Kingsville would be affected. Currently, northbound traffic can make a left turn into the dealership from a crossover. With the addition of the access road, northbound traffic from the dealership would travel south on the access road, approximately 0.25 mile and make a U-turn to go north. As in the case with the direct connectors, there could be some diversion of traffic and potential customers from the dealership; however, drivers wishing to use the business would continue to patronize this business by entering the dealership from the south traveling northward, past the dealership approximately 0.6 mile and make a U-turn at an interchange onto the southbound access road. This would be considered a permanent impact. The proposed project would provide a potentially longer route but safer option for the driver than the current at-grade high-speed crossover. It should be noted, however, that access is just one of the elements that affects the value of a business and that the improved accessibility and mobility overall may counteract these access limitations.

The proposed project is not expected to influence long-term employment or income levels. However, it is anticipated to potentially increase the tax base for the project area. Implementation of the Build Alternative would have short-term, direct benefits from the creation of jobs and purchases of materials and equipment for construction. These benefits would most likely be on a regional basis, because it is expected that only a small number of the employees required to fill the construction jobs would likely come from within the study area. Likewise, few, if any, of the purchases of equipment and materials would be made from businesses within the study area.

As discussed in **Section 4.1 – ROW Displacements/Relocations**, the construction of the project may directly displace 11 businesses with 1 to 99 employees. **Table 4.2-6** shows businesses by industry type that may be potentially displaced. As discussed in **Section 4.1 – ROW Displacements/Relocations**, adequate building space is available in the surrounding area to relocate the identified businesses. Short-term negative impacts may result from the removal of 11 properties from the tax rolls for a brief period and only if the businesses are relocated within the study area. Potential relocation of these businesses to areas along the project area has been assessed based on current real estate data. Vacant industrial building space is currently on the market for lease or for sale within the surrounding area alone would be more than enough to meet the minimum/maximum ranging from 100 square feet to 15,000 square feet required by all the displaced businesses. As the project progresses, a more refined relocation analysis would be necessary to ensure that proposed relocation sites are adequate in size and location for the displaced businesses. It is likely that a sufficient amount of space, appropriately zoned for industrial types described would be available to absorb the relocation of the displaced businesses.

Business visibility could be affected by the proposed project where interchanges are constructed. Services signage would be added to direct connectors, interchanges, and relief routes. At ranches, half interchanges limit access. However, coordination with ranch owners resulted in design changes that maximize access where ranch operations take place.

Reasonable measures would be taken to minimize the inconvenience to businesses during construction. Excluding displacement, some businesses would be adversely affected by this project because current access would be changed. However, access to all businesses would be maintained or improved during and after construction, and visibility to businesses would also be maintained.

4.3 ENVIRONMENTAL JUSTICE

For this environmental justice analysis, the primary source of demographic data was the US Census 2000 as it is the most comprehensive, complete, and detailed data source currently available. The results of the analysis of minority conditions within the affected census tracts/block groups/blocks and reference areas are shown in **Table 4.3-1** located in **Appendix C**.

Each census tract extends beyond the defined boundaries of the study area; therefore, block group and/or block data were used in this analysis.

The FHWA implements the requirements of E.O. 12898 through FHWA Order 6640.23, FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations. Guidance on how to implement E.O. 12898 and conduct an environmental justice analysis has also been issued by the Council on Environmental Quality (CEQ). FHWA Order 6640.23 applies the following definitions for minority and low-income populations, which are consistent with the definitions in E.O. 12898 issued by the CEQ and Environmental Protection Agency (EPA).

- Low-income means a household income at or below the US Department of Health and Human Services (HHS) poverty guidelines (2011 HHS poverty guideline for a family of four persons is $22,350).

- Minority means a person who is: Black/African American, Hispanic, Asian-American, American Indian and Alaskan Native and/or Native Hawaiian and other Pacific Islander, Two or More Races and Some Other Race.
- Minority Population means any readily identifiable group of minority persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed FHWA program, policy, or activity. Minority populations were identified based on the CEQ guidance document *Environmental Justice: Guidance Under the National Environmental Policy Act*. Based on this guidance, "Minority populations should be identified if 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 unit of geographic analysis..."
- Low-Income Population means any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons (such as migrant workers or Native Americans) who would be similarly affected by a proposed FHWA program, policy, or activity.

E.O. 13045, entitled "Protection of Children from Environmental Health Risks and Safety Risks," mandates that federal agencies identify and assess environmental health and safety risks that may disproportionately affect children as a result of the implementation of federal policies, programs, activities, and standards (62 Federal Register 19883-19888, April 23, 1997). No elementary/middle/high schools or day-care facilities for children are located in or adjacent to the proposed project.

E.O. 13166, "Improving Access to Services for Persons with Limited English Proficiency," requires federal agencies to examine the services they provide and identify any need for services to those with LEP. The E.O. requires federal agencies to work to ensure that recipients of federal financial assistance provide meaningful access to their LEP applicants and beneficiaries. Failure to ensure that LEP persons can effectively participate in or benefit from federally assisted programs and activities may violate the prohibition under *Title VI of the Civil Rights Act of 1964*, 42 U.S.C. 2000d, and Title VI regulations against national origin discrimination.

4.3.1 Population, Race, and Ethnicity

Race can be defined as a self-identification data item based on an individual's perception of his or her racial identity. Respondents on the year 2000 Census Bureau form chose the race(s) with which they most closely identified.

Ethnicity can be defined as the classification of a population sharing common characteristics such as religion, traditions, culture, language, tribal, or national origin. It can be viewed as ancestry, nationality, or country of birth. Hispanics/Latinos can be of any race.

In the year 2000 Census Bureau population by race/ethnicity data, the Hispanic/Latino population is separated from the following seven race categories (Census Table P8): White alone, Black or African American alone, American Indian and Alaska Native alone, Asian alone, Native Hawaiian and Other Pacific Islander alone, Some Other Race alone or Two or More Races.

In order to accurately identify the population, race, and ethnicity for the proposed project area, the data from the above-referenced categories, including Hispanic/Latino, for the subject census blocks within the proposed project area, are identified on **Table 4.3-2** located in **Appendix C**.

As shown in **Table 4.3-1** located in **Appendix C**, racial and ethnic minorities comprise approximately 78.5 percent of the entire population within the study area subject census tracts. The total racial and ethnic composition of the subject census tracts contained within the study area is approximately 1.4 percent Black/African American alone, 0.2 percent American Indian/Alaska Native alone, 0.4 percent Asian alone, 0.03 percent Native Hawaiian/Other Pacific Islander alone, 0.04 percent Some Other Race, 0.4 percent Two or More Races, and 76 percent Hispanic or Latino (of any race).

By comparison (and as shown in **Table 4.3-1** located in **Appendix C**), racial and ethnic minorities comprise approximately 76.4 percent of the entire population within the study area subject block groups. The total racial and ethnic composition of the subject block groups contained within the study area is approximately 2.0 percent Black/African American alone, 0.2 percent American Indian/Alaska Native alone, 0.5 percent Asian alone, 0.05 percent Native Hawaiian/Other Pacific Islander alone, 0.5 percent Some Other Race, 0.5 percent Two or More Races, and 73.1 percent Hispanic or Latino (of any race).

As shown in **Table 4.3-2** located in **Appendix C**, racial and ethnic minorities comprise approximately 72.4 percent of the entire population within the study area subject blocks. The total racial and ethnic composition of the subject blocks contained within the study area is approximately 3.7 percent Black/African American alone, 0.1 percent American Indian/Alaska Native alone, 0.6 percent Asian alone, 0.1 percent Native Hawaiian/Other Pacific Islander alone, 0.05 percent Some Other Race, 0.5 percent Two or More Races, and 67.3 percent Hispanic or Latino (of any race).

As illustrated in **Table 4.3-1** and **Table 4.3-2** located in **Appendix C**, 34 percent of all blocks identified for the project area are comprised of more than 50 percent racial and ethnic minorities. Therefore, any adverse impacts could be considered to be disproportionate using the 50 percent threshold. Environmental justice determinations are not based on averages but rather on specified census data for geographies where displacements/relocations would occur.

According to the 2000 Census, the total number of census blocks identified within the study area is 463. Of the 463 census blocks identified, 158 census blocks were identified as containing a minority population based on the CEQ designation of minority populations (i.e., blocks containing over 50 percent minority or those that have meaningful greater amount of minority populations), which is approximately 34 percent of all the census block located in the study area. **Table 4.3-3** illustrates potential displacements of three residences and nine businesses located within seven census blocks classified as minority based on the US Census Bureau adjusted percent distribution (50 percent and greater of the population).

Table 4.3-3 Potential Displacements within Census Blocks Classified as Minority

Nueces County						
Tract 56.02, Block Group 6, Block 6022						
Figure ID	Tax ID	Type	Site Street	# of Employees	Impacted Acreage	Structures
5	743700000040	Business	Hanson Pipe & Precast 1610 S Highway 77, Robstown, Texas 78380	20-49	0.145151	1 office building and 1 Maintenance building
6	743700000052	Business	Black Angus Containers 1620 S. Highway 77, Robstown, Texas 78380	5-9	0.120372	1 office/warehouse building
Tract 60, Block Group 2, Block 2004						
9	450200010015	Business	Atlas Tubular LP 1710 S. Highway 77, Robstown, Texas 78380	50-99	2.957891	1 warehouse, 1 storage, 1 office building
10	450200010025	Business	Atlas Tubular LP 1710 S. Highway 77, Robstown, Texas 78380	50-99	2.977395	1 office
Tract 60, Block Group 1, Block 1051						
Figure ID	Tax ID	Type	Site Street	# of Employees	Impacted Acreage	Structures
39	070601040400	Residential	1474 US Highway 77 Bishop, TX 78343	N/A	1.717314	1 house
Track 60, Block Group 2, Block 2140						
37	70601040309	Business	Veterans Land Board State of Texas 1514 U.S. HWY 77 S Bishop, TX 78343		1.020605	1 office building
40	70601040300	Business	Pops Jerky Store 663 US 77 South Bypass, Bishop Texas 78343	5-9	1.570309	1 commercial building
41	758000010010	Business	1442 US Highway South Bypass, Bishop, Texas 78343	not known	1.960145	1 business, 1 house
Kleberg County						
Tract 56.01, Block Group 4,						
Figure ID	Tax ID	Type	Site Street	# of Employees	Impacted Acreage	Structures
49	12480	Business	Rodeway Inn/Valero 3430 US Highway 77 S Bypass, Bishop, Texas	20-49/5-9	0.22252	1 service station
Track 201, Block Group 1, Block 1613						
Figure ID	Tax ID	Type	Site Street	# of Employees	Impacted Acreage	Structures
91	29873	Business	Caprock Communications Corp. 5561 US Highway 77 Kingsville, Texas		0.137294	2 electronic equipment buildings
Tract 201, Block Group 1, Block 1695						
Figure ID	Tax ID	Type	Site Street	# of Employees	Impacted Acreage	Structures
112A	24452	Residential	5794 US Highway 77 Riviera, Texas 78379	N/A	0.274313	1 mobile home
109	12948	Residential	301 County Road 2280 Riviera, Texas 78379	N/A	0.346684	1 house and garage

Source: (http://www.tracer2.com/cgi/databrowsing/employerQSSelection.asp?menuChoice=emp), accessed in January 2010

4.3.2 Income

The US Bureau of the Census defines a low-income population as a group of people and/or a community that, as a whole, lives below the national poverty level. Per the HHS, the 2011 average poverty level threshold for a family of four people living in the 48 contiguous states and D.C. is a total annual income of $22,350. A low-income population is also defined by FHWA Order 6640.23 as any readily identifiable group of low-income persons who live in geographic proximity and, if circumstances warrant, geographically dispersed/transient persons who would be similarly affected by a proposed FHWA program, policy, or activity. Household income data

for the State of Texas, the counties, census tracts, and block groups are shown in **Table 4.3-4**.

Although the 2011 poverty level for a family of four is $22,350, available income data does not report household income percent distribution at this level; therefore, percent distributions were adjusted to the next highest level, $24,999, in order to include all households below the 2011 poverty level. As shown in **Table 4.3-4,** approximately 43.3 percent of the total population within the project area census tracts is classified as low-income below the 2011 poverty level. The census tract range of average median household income is from $17,602 in census tract 56.02 to $39,844 in census tract 205. The average median household income within the project area block groups ranges from $13,380 in block group 6 of census tract 56.02 to $51,005 in block group 3 of census tract 58.02.

Based on the US Census Bureau adjusted percent distribution, 50 percent and greater of the population for the following census tracts/block groups would be potentially classified as low-income:

- Census Tract 105, Block Group 2 – 50.2%; Median Income $22,431
- Census Tract 105, Block Group 3 – 63.3%; Median Income $15,800
- Census Tract 202, Block Group 3 – 51.0%; Median Income $23,750
- Census Tract 202, Block Group 4 – 58.1%; Median Income $20,528
- Census Tract 56.02, Block Group 5 – 64.9%; Median Income $15,568
- Census Tract 56.02, Block Group 6 – 68.9%; Median Income $13,380
- Census Tract 56.02, Block Group 7 – 68.9%; Median Income $24,545
- Census Tract 9504, Block Group 1 – 51.8%; Median Income $22,326
- Census Tract 9504, Block Group 2 – 67.1%; Median Income $14,231
- Census Tract 9504, Block Group 3 – 61.6%; Median Income $20,625
- Census Tract 9506, Block Group 1 – 70.3%; Median Income $20,543
- Census Tract 9507, Block Group 2 – 56.0%; Median Income $20,750

Potential displacement of one business was identified for the proposed project in only one census block group classified as low-income: census tract 56.02; block group 6. Summaries of household incomes for the counties, census tracts, and block groups within the proposed project limits can be seen in **Table 4.3-4**. Household income data were not available at the block level.

Table 4.3-4 Household Income Percent Distribution

2000 Census Tract	Total number of Households	Household Income <$24,999	Household Income $25,000 to $49,999	Household Income >$50,000	Median Household Income
Cameron County	97,193 (100.0%)	46,652 (48.0%)	28,120 (28.9%)	22,421 (23.1%)	$26,155
Kenedy County	138 (100.0%)	69 (50.0%)	48 (34.8%)	21 (15.2%)	$25,000
Kleberg County	10,918 (100.0%)	4,808 (44.0%)	3,152 (28.9%)	2,958 (27.1%)	$29,313
Nueces County	110,316 (100.0%)	38,859 (35.2%)	33,407 (30.3%)	38,050 (34.5%)	$35,959
Willacy County	5,603 (100.0%)	3,110 (55.5%)	1,651 (29.5%)	842 (15.0%)	$22,114

Table 4.3-4 Household Income Percent Distribution

2000 Census Tract	Total number of Households	Household Income <$24,999	Household Income $25,000 to $49,999	Household Income >$50,000	Median Household Income
Total	**224,168 (100%)**	**93,498 (41.7%)**	**66,378 (29.6%)**	**64,292 (28.6%)**	
Census Tract					
Tract 102.01	539 (100.0%)	278 (51.6%)	125 (23.2%)	136 (25.2%)	$24,375
Tract 102.02	2,025 (100.0%)	813 (40.1%)	643 (31.8%)	569 (28.1%)	$30,701
Tract 103	2,949 (100.0%)	1,308 (44.4%)	937 (31.8%)	704 (23.9%)	$27,238
Tract 104.01	1,319 (100.0%)	541 (41.0%)	521 (39.5%)	257 (19.5%)	$29,057
Tract 104.02	2,016 (100.0%)	689 (34.2%)	625 (31.0%)	702 (34.8%)	$39,324
Tract 105	834 (100.0%)	479 (57.4%)	263 (31.5%)	92 (11.0%)	$20,000
Tract 106.01	2,376 (100.0%)	1,228 (51.7%)	644 (27.1%)	504 (21.2%)	$23,980
Tract 110	1,065 (100.0%)	683 (64.1%)	292 (27.4%)	90 (8.5%)	$18,603
Tract 9501	138 (100.0%)	69 (50.0%)	48 (34.8%)	21 (15.2%)	$25,000
Tract 201	1,754 (100.0%)	641 (36.5%)	424 (24.2%)	689 (39.3%)	$35,662
Tract 202	2,045 (100.0%)	1,161 (56.8%)	604 (29.5%)	280 (13.7%)	$20,503
Tract 204	2,630 (100.0%)	1,110 (42.2%)	843 (32.1%)	677 (25.7%)	$30,126
Tract 205	2,029 (100.0%)	571 (28.1%)	679 (33.5%)	779 (38.4%)	$39,844
Tract 56.02	2,025 (100.0%)	1,281 (63.3%)	525 (25.9%)	219 (10.8%)	$17,602
Tract 59	826 (100.0%)	366 (44.3%)	235 (28.5%)	225 (27.2%)	$27,304
Tract 60	835 (100.0%)	273 (32.7%)	306 (36.6%)	256 (30.7%)	$32,309
Tract 61	1,239 (100.0%)	449 (36.2%)	368 (29.7%)	422 (34.1%)	$35,026
Tract 9504	1,481 (100.0%)	794 (53.6%)	487 (32.9%)	200 (13.5%)	$22,162
Tract 9505	966 (100.0%)	459 (47.5%)	320 (33.1%)	187 (19.4%)	$26,667
Tract 9506	683 (100.0%)	408 (59.7%)	176 (25.8%)	99 (14.5%)	$21,642
Tract 9507	855 (100.0%)	445 (52.0%)	287 (33.6%)	123 (14.4%)	$23,818
Total	**30,629 (100%)**	**14,046 (45.8%)**	**9,352 (30.5%)**	**7,231 (23.6%)**	
Block Group					

Table 4.3-4 Household Income Percent Distribution

2000 Census Tract	Total number of Households	Household Income <$24,999	Household Income $25,000 to $49,999	Household Income >$50,000	Median Household Income
T 102.01 Block Group 1	539 (100.0%)	278 (51.6%)	125 (23.2%)	136 (25.2%)	$24,375
T 102.02 Block Group 1	882 (100.0%)	348 (39.5%)	353 (40.0%)	181 (20.5%)	$29,636
T 103 Block Group 1	615 (100.0%)	300 (48.8%)	209 (34.0%)	106 (17.2%)	$25,938
T 104.01 Block Group 1	478 (100.0%)	222 (46.4%)	206 (43.1%)	50 (10.5%)	$25,904
T 104.02 Block Group 3	665 (100.0%)	273 (41.1%)	271 (40.8%)	121 (18.2%)	$29,018
T 105 Block Group 2	237 (100.0%)	119 (50.2%)	89 (37.6%)	29 (12.2%)	$22,431
T 105 Block Group 3	286 (100.0%)	181 (63.3%)	86 (30.1%)	19 (6.6%)	$15,800
T 9501 Block Group 1	138 (100.0%)	69 (50.0%)	48 (34.8%)	21 (15.2%)	$25,000
T 201 Block Group 1	1,754 (100.0%)	641 (36.5%)	424 (24.2%)	689 (39.3%)	$35,662
T 202 Block Group 3	455 (100.0%)	232 (51.0%)	142 (31.2%)	81 (17.8%)	$23,750
T 202 Block Group 4	439 (100.0%)	255 (58.1%)	160 (36.4%)	24 (5.5%)	$20,528
T 202 Block Group 5	342 (100.0%)	142 (41.5%)	143 (41.8%)	57 (16.7%)	$27,500
T 204 Block Group 5	1,164 (100.0%)	510 (43.8%)	286 (24.6%)	368 (31.6%)	$29,200
T 205 Block Group 1	614 (100.0%)	173 (28.2%)	170 (27.7%)	271 (44.1%)	$40,200
T 205 Block Group 4	671 (100.0%)	89 (13.3%)	266 (39.6%)	316 (47.1%)	$48,682
T 56.01 Block Group 5	427 (100.0%)	174 (40.7%)	84 (19.7%)	169 (39.6%)	$31,250
T 56.02 Block Group 5	498 (100.0%)	323 (64.9%)	121 (24.3%)	54 (10.8%)	$15,568
T 56.02 Block Group 6	399 (100.0%)	275 (68.9%)	96 (24.1%)	28 (7.0%)	$13,380
T 56.02 Block Group 7	226 (100.0%)	117 (51.8%)	45 (19.9%)	64 (28.3%)	$24,545
T 58.02 Block Group 3	603 (100.0%)	126 (20.9%)	155 (25.7%)	322 (53.4%)	$51,005
T 59 Block Group 1	519 (100.0%)	255 (49.1%)	139 (26.8%)	125 (24.1%)	$25,321
T 60 Block Group 1	242 (100.0%)	75 (31.0%)	87 (36.0%)	80 (33.1%)	$35,417
T 60 Block Group 2	593 (100.0%)	198 (33.4%)	219 (36.9%)	176 (29.7%)	$31,821

Table 4.3-4 Household Income Percent Distribution

2000 Census Tract	Total number of Households	Household Income <$24,999	Household Income $25,000 to $49,999	Household Income >$50,000	Median Household Income
T 61 Block Group 2	431 (100.0%)	142 (32.9%)	151 (35.0%)	138 (32.0%)	$35,292
T 61 Block Group 3	444 (100.0%)	100 (22.5%)	119 (26.8%)	225 (50.7%)	$50,469
T 9504 Block Group 1	359 (100.0%)	186 (51.8%)	121 (33.7%)	52 (14.5%)	$22,326
T 9504 Block Group 2	310 (100.0%)	208 (67.1%)	88 (28.4%)	14 (4.5%)	$14,231
T 9504 Block Group 3	281 (100.0%)	173 (61.6%)	61 (21.7%)	47 (16.7%)	$20,625
T 9504 Block Group 4	304 (100.0%)	151 (49.7%)	105 (34.5%)	48 (15.8%)	$25,179
T 9504 Block Group 5	227 (100.0%)	76 (33.5%)	112 (49.3%)	39 (17.2%)	$31,544
T 9505 Block Group 2	469 (100.0%)	204 (43.5%)	166 (35.4%)	99 (21.1%)	$28,990
T 9506 Block Group 1	306 (100.0%)	215 (70.3%)	50 (16.3%)	41 (13.4%)	$20,543
T 9507 Block Group 1	462 (100.0%)	225 (48.7%)	156 (33.8%)	81 (17.5%)	$25,938
T 9507 Block Group 2	393 (100.0%)	220 (56.0%)	131 (33.3%)	42 (10.7%)	$20,750
Total	**16,772 (100%)**	**7,275 (43.3%)**	**5,184 (30.9%)**	**4,313 (25.7%)**	†

Source: US Bureau of the Census Income Distribution in 1999 of Households and Families: 2000, accessed in January 2010

4.3.3 Household Occupancy

Summaries of housing and vacancy data for the counties, census tracts, and block groups are shown in **Table 4.3-5**. Housing and vacancy data were not available at the block level. **Table 4.3-5** shows approximately 81.1 percent occupation of the total housing units within the study area block groups, leaving 18.9 percent of the total housing units vacant and available for potential residential displacements and relocation for the project area.

Table 4.3-5 Housing Occupancy

2000 Census Tract	Total Housing Units	Occupied Housing Unit	Vacant Housing Unit
Cameron County	119,654 (100.0%)	97,267 (81.3%)	22,387 (18.7%)
Kenedy County	281 (100.0%)	138 (49.1%)	143 (50.9%)
Kleberg County	12,743 (100.0%)	10,896 (85.5%)	1,847 (14.5%)
Nueces County	123,041 (100.0%)	110,365 (89.7%)	12,676 (10.3%)

Table 4.3-5 Housing Occupancy

2000 Census Tract	Total Housing Units	Occupied Housing Unit	Vacant Housing Unit
Willacy County	6,727 (100.0%)	5,584 (83.0%)	1,143 (17.0%)
Total	**262,446 (100%)**	**224,250 (85.4%)**	**38,196 (14.6%)**
Census Tract			
Tract 102.01	604 (100.0%)	541 (89.6%)	63 (10.4%)
Tract 102.02	3,146 (100.0%)	2,038 (64.8%)	1,108 (35.2%)
Tract 103	3,631 (100.0%)	2,938 (80.9%)	693 (19.1%)
Tract 104.01	1,520 (100.0%)	1,315 (86.5%)	205 (13.5%)
Tract 104.02	2,693 (100.0%)	2,023 (75.1%)	670 (24.9%)
Tract 105	904 (100.0%)	834 (92.3%)	70 (7.7%)
Tract 106.01	2,668 (100.0%)	2,389 (89.5%)	279 (10.5%)
Tract 110	1,152 (100.0%)	1,071 (93.0%)	81 (7.0%)
Tract 9501	281 (100.0%)	138 (49.1%)	143 (50.9%)
Tract 201	2,079 (100.0%)	1,754 (84.4%)	325 (15.6%)
Tract 202	2,461 (100.0%)	2,041 (82.9%)	420 (17.1%)
Tract 204	3,021 (100.0%)	2,622 (86.8%)	399 (13.2%)
Tract 205	2,411 (100.0%)	2,037 (84.5%)	374 (15.5%)
Tract 56.02	2,232 (100.0%)	2,014 (90.2%)	218 (9.8%)
Tract 59	956 (100.0%)	826 (86.4%)	130 (13.6%)
Tract 60	983 (100.0%)	846 (86.1%)	137 (13.9%)
Tract 61	1,397 (100.0%)	1,238 (88.6%)	159 (11.4%)
Tract 9504	1,714 (100.0%)	1,480 (86.3%)	234 (13.7%)
Tract 9505	1,051 (100.0%)	955 (90.9%)	96 (9.1%)
Tract 9506	863 (100.0%)	722 (83.7%)	141 (16.3%)

Table 4.3-5 Housing Occupancy

2000 Census Tract	Total Housing Units	Occupied Housing Unit	Vacant Housing Unit
Tract 9507	1,305 (100.0%)	845 (64.8%)	460 (35.2%)
Total	37,072 (100%)	30,667 (82.7%)	6,405 (17.3%)
Block Group			
T 102.01 Block Group 1	604 (100.0%)	541 (89.6%)	63 (10.4%)
T 102.02 Block Group 1	1,881 (100.0%)	892 (47.4%)	989 (52.6%)
T 103 Block Group 1	671 (100.0%)	611 (91.1%)	60 (8.9%)
T 104.01 Block Group 1	504 (100.0%)	476 (94.4%)	28 (5.6%)
T 104.02 Block Group 3	971 (100.0%)	657 (67.7%)	314 (32.3%)
T 105 Block Group 2	227 (100.0%)	212 (93.4%)	15 (6.6%)
T 105 Block Group 3	293 (100.0%)	283 (96.6%)	10 (3.4%)
T 9501 Block Group 1	281 (100.0%)	138 (49.1%)	143 (50.9%)
T 201 Block Group 1	2,079 (100.0%)	1,754 (84.4%)	325 (15.6%)
T 202 Block Group 3	537 (100.0%)	457 (85.1%)	80 (14.9%)
T 202 Block Group 4	599 (100.0%)	462 (77.1%)	137 (22.9%)
T 202 Block Group 5	373 (100.0%)	355 (95.2%)	18 (4.8%)
T 204 Block Group 5	1,217 (100.0%)	1,147 (94.2%)	70 (5.8%)
T 205 Block Group 1	635 (100.0%)	602 (94.8%)	33 (5.2%)
T 205 Block Group 4	899 (100.0%)	678 (75.4%)	221 (24.6%)
T 56.01 Block Group 5	479 (100.0%)	436 (91.0%)	43 (9.0%)
T 56.02 Block Group 5	591 (100.0%)	510 (86.3%)	81 (13.7%)
T 56.02 Block Group 6	396 (100.0%)	393 (99.2%)	3 (0.8%)
T 56.02 Block Group 7	230 (100.0%)	202 (87.8%)	28 (12.2%)
T 58.02	717	621	96

Table 4.3-5 Housing Occupancy

2000 Census Tract	Total Housing Units	Occupied Housing Unit	Vacant Housing Unit
Block Group 3	(100.0%)	(86.6%)	(13.4%)
T 59 Block Group 1	640 (100.0%)	539 (84.2%)	101 (15.8%)
T 60 Block Group 1	301 (100.0%)	253 (84.1%)	48 (15.9%)
T 60 Block Group 2	682 (100.0%)	593 (87.0%)	89 (13.0%)
T 61 Block Group 2	498 (100.0%)	439 (88.2%)	59 (11.8%)
T 61 Block Group 3	474 (100.0%)	447 (94.3%)	27 (5.7%)
T 9504 Block Group 1	444 (100.0%)	368 (82.9%)	76 (17.1%)
T 9504 Block Group 2	328 (100.0%)	280 (85.4%)	48 (14.6%)
T 9504 Block Group 3	329 (100.0%)	280 (85.1%)	49 (14.9%)
T 9504 Block Group 4	341 (100.0%)	306 (89.7%)	35 (10.3%)
T 9504 Block Group 5	272 (100.0%)	246 (90.4%)	26 (9.6%)
T 9505 Block Group 2	514 (100.0%)	464 (90.3%)	50 (9.7%)
T 9506 Block Group 1	398 (100.0%)	299 (75.1%)	99 (24.9%)
T 9507 Block Group 1	862 (100.0%)	455 (52.8%)	407 (47.2%)
T 9507 Block Group 2	443 (100.0%)	390 (88.0%)	53 (12.0%)
Total	**20,710 (100%)**	**16,786 (81.1%)**	**3,924 (18.9%)**

Source: 2000 Census Report, US Census Bureau, accessed in January 2010

4.3.4 Tolling and Environmental Justice - Overview

The E.O. 12898 term “disproportionately high and adverse effect” considers the totality of significant individual or cumulative human health or environmental impacts on minority populations and low-income populations. In general, the economic impact of tolling is higher for low-income users because the cost of paying tolls would represent a substantially higher percentage of household income than for non-low-income users. In addition, toll collection methods can also serve to restrict access to a facility or disproportionately burden low-income populations because of a lack of credit or the inability to maintain a prepaid account.

It is not anticipated that there would be disproportionate impacts to low-income or minority populations due to the implementation of the proposed project provision in the Build Alternative

to construct non-tolled direct connections to the existing facility through each community. The proposed tolled relief routes as part of the Build Alternative would benefit users and adjacent populations as a result of the improved system linkage and mobility within the study area and region.

The primary component of the US 77 Upgrade Project which is to upgrade the existing facility to Interstate highway standards would not be eligible for tolling, as there is no added capacity. However, the secondary component of the US 77 Upgrade Project, which could be considered eligible for tolling, includes the relief routes around Driscoll and Riviera (as discussed in **Section 3.2.2**), as the relief routes would provide new added capacity. System users would continue to have the non-tolled option of US 77 existing main lanes (not including the relief routes around Driscoll and Riviera) by using the future Business US 77 lanes through Driscoll and Riviera.

The Build Alternative includes the completion of upgrading US 77 to Interstate highway standards, including two highway relocations around Driscoll and Riviera. US 77 would remain a four-lane divided highway for the entire project length with additional capacity isolated to only the two relief routes. In select locations throughout the corridor, the four main lanes would be supplemented by access roads, overpasses, and interchanges to facilitate local access. Although the total project length is 122 miles, the proposed construction area is approximately 88 miles in length along or near US 77 in Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties. There are sections of US 77 that have been upgraded, are under construction, or are being advanced under separate environmental documents to bring US 77 up to Interstate standards **(Table 1.1-1 Figure A.1.1-1)**. They include:

- Sections A, B, C, D, E, F, and G from US 83 in Harlingen to the Business 77 relief route merge north of Raymondville, Texas.
- Section M at La Parra Avenue in Sarita, Texas.
- Section R from FM 1356 to FM 425 in Kingsville, Texas.
- Section S from FM 425 to SH 141 in Kingsville, Texas.
- Section T from SH 141 to FM 1898 in Kingsville, Texas.
- Section Z from FM 892 to SH 44 in Robstown, Texas.
- Section AA from SH 44 to IH 37 in Nueces County, Texas.

The upgrade of US 77 would be accomplished by undertaking improvements within the existing ROW where possible, with additional adjacent ROW when necessary (Build Alternative) and the addition of relief routes proposed in the vicinity of Driscoll and Riviera. The actual construction limits would be from FM 892 in Robstown to SH 107 in Combes.

The relief routes have been designed for regional trips providing the most reliable, time-saving commute and additional capacity in Driscoll and Riviera. Drivers using this facility can anticipate traffic to flow at a minimum of 70 mph with no interruption from the traffic intersections and turning movements that are currently present in these areas. Drivers could expect to pay a toll for this time-saving commute and additional capacity provided by the relief route toll facility. The established toll rate would be evaluated and adjusted during the procurement stage of the project, as the actual toll rates for the US 77 Upgrade Project relief routes have not yet been established.

The relief routes would be the only potential tolled portions of the project. The project is not within the boundaries of any existing tolling entity. The facility would be tolled by TxDOT. Therefore, the only applicable tolling policy is what is used for tolling facilities owned by TxDOT,

such as those in Austin. The project would adhere to the policy as set forth in: http://www.statutes.legis.state.tx.us/Docs/TN/htm/TN.228.htm and tolls will be set as outlined in I 43 TAC Part 1 Chapter 27.

The toll would be strictly limited to the relief routes and would not be applicable to the upgraded portions of existing US 77. Motorists would not have to pay a toll to drive on US 77 with the exception of a motorist choosing to use the US 77 relief routes at Driscoll and Riviera. In these areas, they may choose between the existing non-tolled main lanes or the tolled relief routes. At its widest point, the US 77 Upgrade Project would include four non-tolled main lanes plus four tolled main lanes in each direction.

In regards to transit or HOV lanes within the project area: there is no transit service in these communities. Also, no HOV lanes are planned for the relief routes. However, motorcycles which would use the proposed facility would be considered as 2-axle automobiles.

The east options for Driscoll and Riviera relief routes would construct a new facility on new location. These relief routes would provide US 77 general purpose main lanes with limited access roads. Although the relief routes would be tolled, no tollbooths would be necessary as the facility would employ electronic toll collection with the use of toll gantries. The relief route toll facility would provide added capacity in Driscoll and Riviera.

The 4.0 mile section of US 77 designated as the Driscoll relief route would be constructed around the east side of Driscoll, while maintaining the existing US 77 configuration through the center of Driscoll. New interchanges would be provided at CR 24, FM 665, and CR 18. This relief route is shown as the Driscoll East Option in **Figure A.3.1-8**. This relief route would be tolled. Toll gantries would be placed in north and south locations along the relief route. This relief route would require a ROW width of approximately 400 feet on new location. Direct access to Driscoll for both northbound and southbound travelers has been provided through direct connectors.

The 5.6 mile section from just north of RM 628 to the Kleberg/Kenedy County line at Los Olmos Creek would include the construction of a new Riviera relief route around the east side of Riviera on approximately 400 feet of new ROW, while maintaining the existing US 77 configuration through Riviera. Interchanges would be provided at CR 2280, CR 2290, FM 771, and CR 2340. The east relief route would require the acquisition of approximately 400 additional feet of ROW on new location to the east. See **Figure A.3.1-12** for the Riviera Build Alternative. This relief route could be tolled. Toll gantries would be placed near the north and south locations along the relief route. Direct access to Riviera for both northbound and southbound travelers has been provided through direct connectors.

Land use within a geographical area (local and regional) typically establishes trip purposes for that area, and contributes to traffic patterns for that area. For example, areas of commerce and residences can define when and where trips are taken. Typically, the first trip people make everyday starts from home, and the last trip they make at night ends at home. This pattern contributes to traffic characteristics, such as trip peaks occurring in the mornings and evenings on particular routes, which is true for the project area. Trip designations are based on the project's geographical makeup to include academic (school) commute; health; shopping; recreation; and eating out.

The trip destinations along the US 77 corridor are displayed in **Table 4.3-6** these attractors and

generators contribute to the daily trip purpose commutes for the project area. US 77 traverses the proposed project area and travels south between Corpus Christi and Harlingen, serving as one of the two primary links to the Rio Grande Valley. The northern end of the US 77 within the project area overlaps the improvements of US 77 in Robstown to IH 37. South of Kingsville, the road travels through Kenedy County, which is predominantly ranchland owned by the King, Kenedy, Armstrong, and Yturria ranches. The southern end overlaps US Highway 83 and is a newly completed expressway through the cities of Harlingen, San Benito and Brownsville, with a continuous of its southern terminus to the US/Mexico border.

Existing land use for the project area consists mostly of rural agricultural uses (ranching and farming), and includes commercial and industrial (mostly oil and gas/petroleum) uses scattered throughout the vicinity, with small urbanized areas concentrated within the city limits located along the proposed US 77 alignment. The US 77 alignment traverses five counties and 13 cities and small towns including Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties. Cities and towns located along the US 77 alignment include Corpus Christi, Robstown, Driscoll, Bishop, Kingsville, Ricardo, Riviera, Sarita, Raymondville, Lyford, Sebastian, Combes, and Harlingen. Land use adjacent to the existing US 77 ROW includes farmland, ranch, vacant land, commercial, residential, industrial, hospitals, parks, and public facilities. Attractors and generators identified within a half-mile radius of the project corridor are included in **Table 4.3-6**.

Table 4.3-6 Attractors and Generators

Community	Academic
Driscoll	Driscoll School District complex has gym and baseball field
Bishop	Bishop Consolidated School District complex (football field & tennis courts)
Kingsville	Texas A&M University Kingsville
Kingsville	HM King High School (football, baseball, softball field, & tennis courts)
Kingsville	Ricardo Independent School District Office (football field)
Riviera	Kaufer High School (baseball, softball, football field, & tennis courts)
Sarita	Sarita Elementary School
Raymondville	Raymondville High School (football, baseball, softball field, & tennis courts)
Lyford	Lyford High School (football, baseball, softball field, & tennis courts)
Community	Recreation
Bishop	Bishop City Office and City Park same location (baseball and auxiliary building)
Kingsville	Kleberg County Parks & Recreation
Community	Government
Kingsville	Naval Air Station Kingsville
Community	Entertainment / Shopping
Kingsville	Shops and restaurants along North and South 14th St.
Kingsville	Shops and restaurants along East King Ave.
Kingsville	Shops and restaurants along North and South 6th St.
Kingsville	Shops and restaurants along East Kleberg Ave.
Kingsville	Shops and restaurants along South Brahma Blvd.
Kingsville	Shops and restaurants along East General Cavazos Blvd.
Kingsville	Shops and restaurants along FM 1356
Kingsville	Southgate Mall (shopping center)
Kingsville	Walmart Supercenter
Raymondville	Walmart Supercenter
Raymondville	Shops and restaurants along East Hidalgo Ave.

Table 4.3-6 Attractors and Generators

Raymondville	Shops and restaurants along North and South 7th St.
Community	Medical
Kingsville	Christus Spohn Hospital-Kleberg

Source: Jacobs Engineering Group, Inc., March 2010

Proactive public involvement, including public meetings and surveys, and coordination with local planning officials can help avoid disproportionate impacts by allowing these populations to voice their concerns and be a part of the planning process. However, individual low-income persons may choose to utilize adjacent non-toll alternatives specifically for cost-saving measures. Low-income individuals may be affected as a result of difference in travel time associated with utilizing non-toll alternatives. The economic impact of the relief routes would be higher for low-income individuals because the cost of paying tolls would represent a higher percentage of household income than for non-low-income households. The toll rates for the relief route toll facilities would be consistent with other toll rates in the region.

Environmental justice populations would be indirectly impacted by tolling of the relief routes in Driscoll and Riviera. The level of indirect impact would be directly linked to the level of use. A driver's decision to use a toll or non-tolled facility is dependent upon a variety of factors including:

- level of congestion
- time of day
- trip length
- affordability of the toll for the individual.

With regards to the effects of tolling on environmental justice populations, low-income populations would pay a higher percentage of their income in tolls when compared to the general population, assuming the same level of use. If the toll is beyond the affordability of certain low-income travelers, they would have the non-tolled alternative of utilizing the existing US 77 facility/future Business US 77 through Driscoll and Riviera. As a result, those who are unable to afford the toll could be denied the travel benefit associated with using the tolled facility. However, because the project would enhance the overall functionality and mobility of the existing non-tolled highway, it is anticipated that low-income travelers would not experience a disproportionately high and adverse human health and environmental effect as defined in E.O. 12898.

The initial set of five public meetings (March 2008) discussed the issue of tolling the relief routes for both Driscoll and Riviera with a request for input on ideas for relief route options. It was explained that the TTC has required that any new highway on new location be considered for tolling. The second set of five public meetings (September 2008 and October 2008) summarized the relief route options received from the first set in more detail and again emphasized that they would be tolled.

Two basic tolling scenarios were used to develop the estimate for Driscoll and Riviera:

1. The cost that may be incurred by a regional driver opting to use either of the toll facilities.
2. The cost that may be incurred by a local driver opting to use either the Driscoll or Rivera relief toll facility.

Below is a list of the assumptions used to develop the tolling cost estimate:

- The number of trips a regional traveler would make was estimated at approximately 60 round trips per year (5 trips per month). This trip would start either in the Rio Grande Valley in Cameron, Willacy, or Kenedy Counties and end in Corpus Christi and then the reverse. Typical travelers for this corridor include: sales persons, hunters, ranch operators, and oil field services providers.
- Local usage and the traffic split between the traffic using the tolled relief route and the traffic using the un-tolled existing facility were conservatively estimated using engineering judgment.
- The toll rate was estimated to be 14.5 cents per mile (cpm). This was based on real toll rates for similar type facilities including: proposed SH 114 and SH 121 in Tarrant and Dallas Counties, 14.5 cpm; Dallas North Tollway and President George Bush Turnpike in Dallas County, 14.5 cpm; and SH 130 in Travis County, 12.5 cpm.
- Except for the extreme ends of the facility, the entire length of the facility is located outside any MPO boundaries. Consequently, the anticipated construction limits for the US 77 Upgrade Project are not located within MPO boundaries. Therefore, typical tools such as traffic models, traffic assignments (to determine the percentage of minority and low-income populations), and a Regional Toll Analysis (RTA) were not available. No TAZ data is available as the project is outside the limits of any MPO.
- The toll collection system for the US 77 relief routes in Driscoll and Riviera would operate under a fully electronic format. Vehicles would not have to stop to pay a toll; rather, vehicles would pass through electronic readers and be assessed a toll charge. Recent advances have allowed another possible electronic toll collection (ETC) method that would accommodate vehicles without a toll tag. This video tolling program allows motorists to travel the tolled lanes without needing a transponder and without needing to stop and pay. However, it should be noted the video tolling method would be more expensive for users of the facility because of the additional fee associated with billing and handling of the periodic billing statements.
- For Texas Turnpike Authority (TTA TxTags, a $1 fee is currently (in 2008) applied to each monthly invoice for non-tag customers. For North Texas Toll Authority (NTTA) TollTags, a $1 fee is currently (in 2008) applied to each monthly invoice for non-tag customers.
- With the NTTA TollTag, for example, a prepaid credit card toll account user would pay a minimum amount of $40 as an initial deposit to receive a tag. The account would be reduced each time the user opts to pass through an operating TollTag lane. Currently, when the user's account reaches $10 or less, the user's credit or debit card would be charged $40 to automatically increase the available balance.
- Cash toll accounts would be available. With a cash toll account, in addition to the initial $40 minimum payment and replenishing the account when the balance reaches $10 or less, cash users must pay a deposit of $25 per tag. The cash user deposit would be refunded without interest if the user returns the tag to a TollTag Store or Customer Service Center in Austin (by mail or in person) in good condition, or if the user converts the cash account to a credit card account.
- There are no plans for building a Customer Service Center in the area. For cash only customers, paying by mail would be the only option. Money orders would be required for pay by mail customers.
- There are no continuous parallel side streets that could be utilized to avoid the proposed relief routes as the relief routes effectively bypass the central business districts in the

communities of Driscoll and Riviera.

Contributing factors and assumptions for each of the proposed relief routes are as follows:

Riviera Background and Assumptions

- The regional traffic that originates in the Rio Grande Valley and is destined for Corpus Christi would have to travel over 50 miles without fueling facilities before reaching Riviera. The majority of Kenedy County consists of large ranches with no areas to stop, and Riviera is the first place for services for the traveling public. It is estimated that approximately 60 percent of travelers would want to have a refueling/rest stop in Riviera.
- Public comments through additional meetings in Riviera addressing access to Riviera from a relief route were received after the second round of public meetings. The concern voiced by business owners was that most of the traveling public would bypass businesses because of the difficult access to Riviera by way of the originally proposed diamond configuration interchanges. A diamond configuration could be perceived as a deterrent for travelers to access Business US 77 in Riviera, as it would require exiting, stopping at a signalized intersection, a turning movement, stopping again at the Business US 77, and another turning movement to US 77. In response to these comments, the design was revised in order to maintain the same number of lanes from the freeway to the existing lanes through Riviera by the use of direct connection configuration at both the north and south end of Riviera.
- SH 285 intersects the existing US 77 facility from the west in Riviera. SH 285 traffic is forced to turn north or south on US 77. To access the relief route in Riviera, trucks from SH 285 would have to travel through residential areas to the east of Riviera, which would result in no time-savings. Therefore, SH 285 traffic would most likely continue to use the future Business US 77. This would most likely result in a continuation of the supply of travelers to the local businesses along future Business US 77 in Riviera.
- The existing DPS truck weigh station in Kleberg County would require relocation with the US 77 Upgrade Project. The current facility is located on the east side of US 77, just south of Riviera. It has been cited by DPS operators as one of the most unsafe weigh stations in Texas due to the following factors: high-speed traffic, the inadequate queuing space for trucks to wait to be inspected, and northbound trucks from SH 285 and all southbound trucks from US 77 are required to travel south of Riviera and make an unprotected turning movement across US 77 to access the weigh station. Three meetings were held with local community leaders, Kleberg County officials, and DPS to discuss options for relocation of the weigh station. DPS discussed how the current location is operationally deficient and requested that the station be relocated. A location to the north of Riviera was agreed upon by all attending parties. It is a logical assumption that some of the northbound truck traffic would utilize future Business US 77 into Riviera, where drivers would stop and make preparations before the required stop at the future weigh station. This would continue to route these same travelers to the local businesses along future Business US 77 in Riviera.
- The majority of Riviera residents work in the general area of Riviera, with a minority commuting to work in Corpus Christi or the Rio Grande Valley.
- Approximately 10 percent of the regional traffic is estimated to take the tolled relief route around Riviera.

Driscoll Background and Assumptions

- Additional meetings throughout the project corridor including a meeting with the Driscoll Mayor Pro Tem were held after the second of public meetings. The concern voiced in Driscoll was that most of the traveling public would bypass businesses because of difficult access to Driscoll by way of the originally proposed diamond configuration interchanges. A diamond configuration could be perceived as a deterrent for travelers to access Business US 77 in Driscoll, as it would require exiting, stopping at a signalized intersection, a turning movement, stopping again at the Business US 77, and another turning movement to US 77. In response to these comments, the design was revised in order to maintain the same number of lanes from the freeway to the existing lanes through Driscoll by the use of direct connection configuration at both the north and south end of Driscoll.
- Depending on the location of employment within Corpus Christi, most residents of Driscoll who commute for work to Corpus Christi would either use the existing US 77 lanes to access the freeway north and then use IH 37 or access Corpus Christi by use of FM 665. Very minor use of the tolled relief route by the residents of Driscoll would be expected.
- Approximately 50 percent of the regional traffic is estimated to take the tolled relief route around Driscoll.

The following example is an estimate of the total cost that might be incurred by a regional traveler opting to take the toll relief routes on a trip from the Rio Grande Valley to Corpus Christi. The traveler would pay tolls on both relief routes in Riviera and Driscoll. Each relief route is approximately 4.0 miles in length. If a toll rate of 14.5 cpm is used, the resulting potential cost for a regional traveler would be $1.16 per trip. Using the estimated 60 round trips per year, the regional traveler would spend $139 per year. A regional traveler who opted to utilize the Riviera and Driscoll tolled relief routes with an annual household income equal to the median household income of Cameron County ($26,155) would spend about 0.5 percent of their household income on tolls. Those households living at the HHS poverty guideline level of $22,350 would spend 0.6 percent of household income on tolls.

The following example is an estimate of the cost that may be incurred by a traveler residing in Riviera and commuting to Corpus Christi on a working day basis. If a toll rate of 14.5 cpm is used, the potential cost can be illustrated by using the following scenario. For this example, it is assumed that the traveler would make 250 round-trips per year (typical work year excluding weekends, holidays, etc.) through the relief route in Driscoll. Under this scenario, the annual cost for using the 4.25 mile toll facility (8.5 miles per round trip) would be approximately $616 per year. A traveler who opted to utilize the Driscoll tolled relief route with an annual household income equal to the median household income of Kleberg County ($29,313) would spend about 2.0 percent of their household income on tolls based on the assumptions previously noted. Those households living at the HHS poverty guideline level of $22,350 would spend 2.8 percent of household income on tolls.

The intensity of any adverse economic impact on low-income populations that may result from implementing the tolled relief routes around Riviera and Driscoll is potentially mitigated by the project's design by providing direct connection interchanges at both the north and south entry points for the towns, by maintaining the same number of lanes, and providing access to the existing lanes through town and the ease of access provided by direct connection interchanges.

The additional capacity provided by the relief route around Driscoll may substantially lower the

traffic volumes and potentially reduce the number of large trucks with any associated reduction of noise and air pollution through Driscoll.

Although the US 77 corridor has relatively low traffic volumes, there is a substantially high percentage of trucks. Riviera experiences peaks of heavy truck traffic and congestion resulting from the following contributing factors: high truck volumes in the US 77 corridor, operation of the existing weigh station, the reduced speeds within Riviera including school zones, the volume of trucks entering US 77 from SH 285, the proximity of the schools in Riviera to US 77 during bus service times, and the lack of fueling facilities to the south of Riviera for 50 miles. There is a potential benefit associated with the additional capacity provided by the relief route around Riviera and with the relocation of the weigh station. This may lower the volumes of trucks sitting within the community idling or stopped in traffic. Another potential benefit would be the associated reduction of noise and air pollution through the communities.

4.3.5 No Build Alternative – Environmental Justice Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. Under the No Build Alternative, the existing community cohesion would remain intact and no disproportionate effects to low-income, minority, LEP populations, or children would occur. Therefore, no mitigation regarding environmental justice would be required.

4.3.6 Build Alternative – Environmental Justice Consequences

The Build Alternative was analyzed utilizing various elements including: distribution of minority and low-income populations; disproportionate effects test; extent of adverse effects; public involvement; LEP; Title VI of the Civil Rights Acts of 1964; toll road considerations; and mitigation and compensation options.

<u>Methodology and Approach</u>
The Build Alternative was evaluated for compliance with EO 12898 and FHWA 6640.23. The following evaluation measures were utilized:

- Identify whether minority or low-income populations exist in the project area
- Determine whether the proposed project would have disproportionate effects on minority and/or low-income groups
- Identify impacts that would potentially affect any minority and low-income communities of concern and identify mitigation strategies for any identified.

The composition of the populations within the project area provides the context to identify whether the improvements would cause disproportionately high and adverse impacts on minority or low-income populations. The proposed project area varies in composition and income levels. Population and income characteristics for the project study area were derived from the 2000 US Census and are presented in the socioeconomic data section. In accordance with E.O. 12898 and FHWA Order 6640.23, data on the presence of minority and low-income populations were analyzed at the project level to ensure the US 77 project does not subject these populations to a “disproportionately high and adverse effect.”

<u>Distribution of Minority and Low-Income Populations</u>
Disproportionately high and adverse affect on minority and low-income populations means an

adverse effect that: (1) is predominately born by a minority population and/or a low-income population, or (2) would be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that would be suffered by the non-minority population and/or non low-income population.

According to the 2000 Census, the total number of census blocks identified within the study area is 463. Of the 463 census blocks identified, 158 census blocks were identified as containing a minority population based on the CEQ designation of minority populations (i.e., blocks containing over 50 percent minority or those that have meaningful greater amount of minority populations), which is approximately 34 percent of all the census block located in the study area. **Table 4.3-3** illustrates potential displacements of three residences and nine businesses located within seven census blocks classified as minority based on the US Census Bureau adjusted percent distribution (50 percent and greater of the population).

In addition, according to the 2000 Census, the average median family income for all 34 census block groups identified within the study area is $27,877, which is above the poverty threshold of $22,350 in 2011. However, based on the US Census Bureau adjusted percent distribution (50 percent and greater of the population), nine of those census block groups are classified as low-income illustrating a median income as follow:

- Census Tract 105, Block Group 3 – 63.3%; Median Income $15,800
- Census Tract 202, Block Group 3 – 51.0%; Median Income $23,750
- Census Tract 202, Block Group 4 – 58.1%; Median Income $20,528
- Census Tract 56.02, Block Group 5 – 64.9%; Median Income $15,568
- Census Tract 56.02, Block Group 6 – 68.9%; Median Income $13,380
- Census Tract 9504, Block Group 2 – 67.1%; Median Income $14,231
- Census Tract 9504, Block Group 3 – 61.6%; Median Income $20,625
- Census Tract 9506, Block Group 1 – 70.3%; Median Income $20,543
- Census Tract 9507, Block Group 2 – 56.0%; Median Income $20,750

Potential displacement of one business was identified for the proposed project in only one census block group classified as low-income: census tract 56.02; block group 6.

<u>Mitigation Strategies</u>
A total of approximately 689.74 acres (440.43 acres in Nueces County and 249.31 acres in Kleberg County) of additional ROW would be required for the proposed construction of the Build Alternative. This would result in the potential displacements and relocations of 43 structures within the following identified land use parcels: 19 residential, 15 industrial, three commercial, four farmland, one ranch, and one public. Three residences and nine businesses identified located in areas classified as minority and/or low-income based on the US Census Bureau adjusted percent distribution (50 percent and greater of the population) may be displaced.

Based on the number of available housing units identified in **Table 4.1-6** and the number of displaced single-family homes anticipated for this project, it is expected that comparable and suitable relocation of the residences identified for displacement and relocation could be accomplished. As the project design progresses, a more refined relocation analysis would be necessary to ensure that proposed relocation sites are adequate in size and location. It is likely that a sufficient amount of space, appropriately zoned for residential types described in **Table 4.1-6,** would be available to absorb the relocation of the displaced residences. No apartments,

condominiums or other multi-family structures would be displaced as a result of the Build Alternative.

As discussed in **Section 4.1 – ROW Displacements/Relocations**, short-term negative impacts may result from the removal of 11 properties from the tax rolls for a brief period and only if the businesses are relocated within the study area. Potential relocation of these businesses to areas along the project area has been assessed based on current real estate data. Vacant industrial building space is currently on the market for lease or for sale within the surrounding area alone would be more than enough to meet the minimum/maximum ranging from 100 square feet to 15,000 square feet required by all the displaced businesses. It is likely that a sufficient amount of space, appropriately zoned for industrial types described would be available to absorb the relocation of the displaced businesses.

Also discussed in **Section 4.1 –ROW Displacements/Relocations** of this document, it has not been determined whether the properties identified for displacement and relocation are either partial or full takings; however, for the purposes of this document, all properties identified for displacement and relocation are assumed full takings until they can be further assessed during actual ROW acquisition. No “at risk” and/or early ROW acquisitions were identified for the project. The term “at risk” is used to explain that the states bear the risk associated with acquiring parcels that may not be required for the project if not within the approved alignment following the environmental process.

Mitigation for these ROW impacts would occur through the payment of fair market value for the acquired property and structures as well as relocation benefits for those that qualify. Right-of-way acquisition would be performed in accordance with the Uniform Relocation Assistance and Real Property Acquisitions Policies Act of 1970, (42 USC 4601 ET SEQ., P.L. 91-646) as amended by the Uniform Relocation Act Amendments of 1987 (P.L. 100-17), known as the Uniform Act. This act contains specific requirements that determine the manner in which a government entity acquires private property for public use when federal funds are used for any phase of a project. The purpose of this act is to provide a uniform policy for fair and equitable treatment of persons and businesses displaced as a result of federal and federally assisted program in accordance with the following objectives:

(a) To ensure that owners of real property to be acquired for federal and federally-assisted projects are treated fairly and consistently, to encourage and expedite acquisition by agreements with such owners, to minimize litigation and relieve congestion in the courts, and to promote public confidence in federal and federally-assisted land acquisition programs

(b) To ensure that persons displaced as a direct result of federal or federally-assisted projects are treated fairly, consistently, and equitably so that such persons would not suffer disproportionate injuries as a result of projects designed for the benefit of the public as a whole

(c) To ensure that agencies implement these regulations in a manner that is efficient and cost effective.

<u>Disproportionate Effect Test</u>
FHWA Order 5540.23 provides guidance on determining when a disproportionately high and adverse effect is likely and how to respond if such a finding is made. In accordance with Title

VI, EO 12898, and FHWA 6640.23, data on the presence of and effects to minority and low-income populations were analyzed at the project level to ensure that the proposed action does not subject these populations to a "disproportionately high and adverse effect."

The *Federal Register Environmental Documents – Notice of Final Title VI Circular* defines a "predominantly minority area" as a geographic area, such as a neighborhood, census tract, or traffic analysis zone (TAZ), where the proportion of minority people residing in that area exceeds the average proportion of minority people in the recipient's service area. As shown in **Table 4.3-1** and **Table 4.3-2** in **Appendix C**, racial and ethnic minorities comprise approximately 72.4 percent, 76.4 percent, and 78.5 percent of the entire population within the blocks, block groups, and census tracts, respectively. Although **Table 4.3-1** and **Table 4.3-2** illustrate that all blocks or block groups identified for the project area are comprised of more than 50 percent racial and ethnic minorities, the tables also illustrate that the proportion of minority people residing in the project area does not exceed the proportion of minority people residing in the census tracts. Because project impacts would not be isolated to areas with concentrated environmental justice populations but would instead occur throughout the project length, the proposed project would not result in disproportionate adverse impacts to low-income or minority populations.

The *Federal Register Environmental Documents – Notice of Final Title VI Circular* also includes the definition of a predominantly low-income area as a geographic area, such as a neighborhood, census tract, or TAZ, where the proportion of low-income people residing in that area exceeds the average proportion of low-income people in the recipient's service area. **Table 4.3-3** shows approximately 43.3 percent of the total population within the project area block groups as low-income. Likewise, approximately 45.8 percent of the total population within the project area census tracts is classified as low-income. As such, **Table 4.3-3** illustrates that the proportion of low-income within the project area does not exceed the proportion of low-income within the census tracts; therefore, no environmental justice issues exist for this project.

<u>Summary of Potential Effects for Minority Populations</u>
To complete the disproportionate effects analysis, the inclusive block groups and affected blocks were used as the environmental justice units to establish the area of potential effect for the US 77 Upgrade Project. Presence of minority and low-income communities within the project study area, as well as ethnicity and poverty rate data were examined at the census tract, block group, and block levels. The demographic characteristics of potentially affected block groups were compared against the appropriate reference area (i.e., Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties, and the census tracts) thresholds and the 2011 HHS poverty guideline to determine if the US 77 project could have disproportionate effect on minority and/or low-income populations. Because the smallest unit for demographic data is the block-level, the impacts (e.g., displacements and/or right-of-way acquisition) to these affected units are assumed to be proportional to the demographic profile of the affected block. Block data from the US Census Bureau was used to help complete the disproportionate effects analysis.

During project development, the proposed roadway was shifted towards undeveloped areas where possible to reduce impacts to residential and commercial properties, including minority or low-income individuals. Three residences and nine businesses identified located in areas classified as minority based on the US Census Bureau adjusted percent distribution (50 percent and greater of the population) may be displaced. The proposed project would not discourage or provide disincentives to commercial, industrial, or residential development. Increased mobility due to the roadway relief routes in Driscoll and Riviera would be an incentive to future

development along the facility, which may result in some commercial activity being displaced from existing US 77 corridor area or other existing commercial areas to new locations along the relief routes.

The proposed project is located adjacent to an areas designated as a colonias; however the proposed project does not require the displacement of any residents living in those colonias.

Summary of Potential Effects for Low-Income Populations

Individual low income persons may choose to utilize adjacent non-toll alternatives specifically for cost saving measures. Low income individuals may also be affected as a result of difference in travel time associated with utilizing non-toll alternatives. The economic impact of the direct connectors would be higher for low-income residents because the cost of paying tolls would represent a higher percentage of household income than for non-low-income households.

There are also potential benefits associated with the proposed direct connector toll facilities that should be considered when assessing the overall impact, such as improved system linkage and mobility in the project area, and the potential use of toll revenues for other transportation projects including transit. The viable option of choosing tolled verses non-tolled has been proven to provide increased mobility, accessibility, and safer, more efficient routes of transportation (of their choosing) for those traveling to and from their homes and workplaces, as well as to other destinations (such as academics, recreation, shopping, other cities, counties) such as described in the project geographical area (local and regional).

The US Department of Transportation (Congestion Pricing: Equity – USDOT (http://www.etc.dot.gov/equity.htm) have conducted studies that have shown that lower income individuals face the greatest financial harm when they are denied adequate choices. For example, lack of choice can result in lost wages or late fees for day care that could have been avoided had they been provided a viable choice. Surveys conducted on priced lanes have concluded that a broad spectrum of income groups express approval of the priced projects because they are given a choice of choosing a tolled route, an alternative route, or a different transportation mode.

Summary of Overall Effects for Minority and Low-Income Populations

The analysis indicates that there does appear to be a larger percentage of minority and low-income population in some of the affected blocks than the average minority population in the project area; however, there does not appear to be a disproportionate impact to minority and low-income populations among all affected blocks. No displacements were identified located within census blocks groups classified as LEP population based on the US Census Bureau adjusted percent distribution (50 percent and greater of the population).

The proposed project would not restrict access to any existing public or community services, businesses, commercial areas, or employment centers. In the long-term, entire communities, colonias, residents including minority and low-income populations, would benefit from the improved mobility from the proposed project. The proposed project would include two relief routes that may ease truck traffic congestion through Driscoll and Riviera, which in turn may ultimately enhance safety and the operational efficiency of the existing facilities through these areas. Criteria, methods, or practices used in the preparation of this document are not directly or indirectly discriminatory on the basis of race, color, or national origin. The proposed project would not affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups.

There would be no disproportionately adverse impacts on minority and/or low-income populations associated with the project. The increase in traffic noise and visual change due the new roadway are not located in areas of high minority or low-income population.

Public involvement activities were conducted in accordance with E.O. 13166 on LEP communities. Notifications for public meetings, including legal notices, display advertisements, mailed notices, and bulletin notices, were written in English and Spanish. Spanish language display advertisements were also placed in the Spanish newspaper *El Nuevo Heraldo*, which is circulated in the Harlingen/Brownsville area. Spanish-speaking staff was available at the public meetings to provide assistance to LEP persons. Comment forms and sections of the informational handouts were provided in English and Spanish. Persons requiring Spanish translation of the presentation portion of the public meetings were advised in the legal notices, display ads, mailed notices, and bulletin notices to contact the project team prior to the meetings so that arrangements for translation services could be made. Spanish-speaking staff was available at public meetings and to answer phone calls on the project's toll-free telephone hotline. During the public outreach, no requests were received for interpreters at public meetings or at discussions with local officials.

The entire surrounding community, including minority and low-income individuals, were given the opportunity to comment on the project through the public involvement process as required by NEPA, as well as FHWA's and TxDOT's guidance. As a result of the alternatives analysis; design revisions; and, input from the public, regulatory agencies, and local officials, business/ residential displacements and other project impacts were avoided or minimized, to the extent practicable.

LEP populations would not be discriminated against as a result of the US 77 Upgrade Project. Reasonable steps would continue to be taken to ensure that such persons have meaningful access to programs, services, and information TxDOT provides. TxDOT provides for LEP populations by publishing meeting notices in Spanish newspapers, by providing access to interpreters for public meetings, and by producing ROW acquisition and relocation assistance manuals in Spanish.

As the relief routes would be TxDOT tolled facilities, the TxTAG.org website would remain available in Spanish and call in numbers are available for the hearing impaired, as discussed on the website. Any future meetings would follow the same procedure as noted above.

The proposed project would not divide, separate, or isolate any neighborhood or community; therefore, community cohesion would likely remain intact. The Build Alternative would not bisect any communities that are not already bisected by the existing corridor and would not sever or alter the social interaction of the communities along the corridor. Relief routes are being proposed as part of the Build Alternative for Driscoll and Riviera to avoid displacing residences, businesses, and places of community gathering.

No other adverse impacts from the proposed project including, but not limited to, air quality, noise, biological, social, or cultural resource impacts would occur (see the appropriate sections in the EA for descriptions of impacts).

In summary, no disproportionately adverse impacts to Environmental Justice populations would occur from the Build Alternative because the project does not disproportionately impact minority

or low-income populations as defined by the CEQ and FHWA Order 6640.23. Therefore, the requirements of E.O. 12898 appear to be satisfied.

4.4 LAND USE

This section describes existing land use for the proposed project area. Plans and policies that may impact future land use within the project area are also discussed. For the purposes of the land use section, the proposed project area is defined as an area approximately a 0.5 mile in width or a 0.25 mile on either side of the proposed alignment centerline.

The methodology used to develop this section consisted of drawing a 0.5 mile radius around the alignments to facilitate the analysis of potential impacts. A baseline inventory was then compiled using GIS.

4.4.1 Existing Conditions

US 77 traverses the proposed project area and travels south between Corpus Christi and Harlingen, serving as one of the two primary links to the Rio Grande Valley. South of Kingsville, the road travels through Kenedy County, which is predominantly ranchland owned by the King, Kenedy, Armstrong, and Yturria ranches.

Existing land use for the project area consists mostly of rural agricultural uses (ranching and farming), and includes commercial and industrial (mostly oil and gas/petroleum) uses scattered throughout the vicinity, with small urbanized areas concentrated within the city limits located along the proposed US 77 alignment. The US 77 alignment traverses five counties and 13 cities and small towns. The counties include Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties. Cities and towns located along the US 77 alignment include Corpus Christi, Robstown, Driscoll, Bishop, Kingsville, Ricardo, Riviera, Sarita, Raymondville, Lyford, Sebastian, Combes, and Harlingen. Land use adjacent to the existing US 77 ROW includes farmland, ranch, vacant land, commercial, residential, industrial, hospitals, parks, and public facilities (**Figures A.4.4-1** through **A.4.4-6**). **Table 4.4-1** shows the land use, acreage and percent of the project area for the US 77 corridor.

There are four major ranches, five residential (colonias), 14 schools, one park, five hospitals (health care/adult day care facilities), one prison, eight places of worship, three cemeteries, nine US post offices located adjacent to the proposed US 77 project alignment. See **Subsection 4.2.4 – Community Cohesion** for detail discussion of these sites, facilities, and resources identified for the project area.

Table 4.4-1 Existing Land Use

Land Use	Acres*	Percent of Project Corridor
Commercial	456	0.39
Farmland	21,669	18.52
Hospital	16	0.01
Industrial	384	0.33
Park	199	0.17
Prison	5	0.00
Public	39	0.03
Ranch	88,869	75.97
Residential	2,507	2.14

Table 4.4-1 Existing Land Use

Land Use	Acres*	Percent of Project Corridor
School	112	0.10
Utilities	49	0.04
Pastureland	2,678	2.29

Source: Jacobs Engineering Group, Inc., November 2008 *Estimated existing land use was compiled from field investigations then transposed into GIS mapping software

The development along US 77 occurred after the railroad, now known as UPRR, was built and then usage was intensified after the construction of US 77. Originally known as the St. Louis, Brownsville and Mexico railroad, the railroad was incorporated on June 5, 1903, for a period of 50 years under Title Ninety-four of the Revised Statutes of the State of Texas. The purpose for which the St. Louis, Brownsville and Mexico railroad was incorporated was to construct, equip, maintain, and operate a standard-gage railway from Sinton to Brownsville, with a branch line extending westerly to the southeast corner of Starr County, a total distance of about 200 miles. The principal place of business was Kingsville; the company had temporary offices in Corpus Christi at the time of the charter. Members of the first board of directors were Robert J. Kleberg and Arthur E. Spohn, both of Corpus Christi; Robert Driscoll, Jr., Uriah Lott, and Richard King, all of Nueces County; and John G. Kenedy, James B. Wells, Francisco Yturria, and Thomas Carson, all of Cameron County (http://www.tshaonline.org/handbook/online/).

The following paragraphs describe the land use by county along the project corridor:

Nueces County
Land use in Nueces County primarily consists of vacant farmland. In and around the communities of Robstown, Driscoll, and Bishop, the land use consists of the typical commercial and residential developments that occur along highway corridors. Within the city of Driscoll the proposed alignment would be on new location to the east, impacting farmland. Driscoll's existing development along US 77 would not be affected by the proposed roadway. **Table 4.4-2** lists the land uses along the US 77 corridor within Nueces County.

Table 4.4-2 US 77 Corridor Land Use – Nueces County

Land Use	Acres*	Percent of Project Corridor
Commercial	54	0.49
Farmland	10,039	91.27
Industrial	184	1.67
Public	10	0.09
Residential	371	3.37
School	34	0.31
Utilities	24	0.22
Pastureland	284	2.58

Source: Jacobs Engineering Group, Inc., November 2008 *Estimated existing land use was compiled from field investigations then transposed into GIS mapping software.

Kleberg County
Within Kleberg County, existing US 77 bypasses the city of Kingsville to the east of the central business district of Kingsville. It joins Business US 77 at the southern side of Kingsville, north of the unincorporated areas of Ricardo and Riviera. Between Kingsville and Riviera, land use consists primarily of farm and ranchland. Commercial and residential developments make up the majority of land uses within Kingsville, Ricardo, and Riviera. In Kingsville, US 77 provides access to Texas A&M University Kingsville (TAMUK), and the NAS Kingsville. **Table 4.4-3** lists

the land uses along the US 77 corridor within Kleberg County.

Table 4.4-3 US 77 Corridor Land Use – Kleberg County

Land Use	Acres*	Percent of Project Corridor
Commercial	196	1.04
Farmland	5,645	29.96
Hospital	16	0.09
Industrial	62	0.33
Park	199	1.06
Ranch	9,523	50.54
Residential	1,377	7.31
School	28	0.15
Utilities	16	0.09
Pastureland	1,779	9.44

Source: Jacobs Engineering Group, Inc., November 2008 *Estimated existing land use was compiled from field investigations then transposed into GIS mapping software.

Kenedy County

The majority of land use in Kenedy County is ranchland. There are four ranches with greater than 40,000 acres that make up the majority of the county. The small town of Sarita includes the only developed areas along US 77 within the county. The land uses in Sarita consist of commercial, residential, and the Sarita Elementary School that is adjacent to US 77. **Table 4.4-4** lists the land uses along the US 77 corridor within Kenedy County.

Table 4.4-4 US 77 Corridor Land Use – Kenedy County

Land Use	Acres*	Percent of Project Corridor
Commercial	11	0.02
Farmland	68	0.10
Public	8	0.01
Ranch	69,597	99.81
Residential	35	0.05
School	5	0.01
Utilities	6	0.01

Source: Jacobs Engineering Group, Inc., November 2008 *Estimated existing land use was compiled from field investigations then transposed into GIS mapping software.

Willacy County

The northern part of Willacy County consists of ranchland, but to the south along US 77 in the communities of Raymondville and Lyford, land use patterns change to include residential, commercial, and farm land. **Table 4.4-5** lists the land uses along the US 77 corridor within Willacy County.

Table 4.4-5 US 77 Corridor Land Use – Willacy County

Land Use	Acres*	Percent of Project Corridor
Commercial	92	0.69
Farmland	2,834	21.29
Industrial	5	0.03
Prison	5	0.03
Public	21	0.16
Ranch	9,749	73.23

Table 4.4-5 US 77 Corridor Land Use – Willacy County

Land Use	Acres*	Percent of Project Corridor
Residential	364	2.74
School	45	0.34
Utilities	1	0.01
Pastureland	195	1.47

Source: Jacobs Engineering Group, Inc., November 2008 *Estimated existing land use was compiled from field investigations then transposed into GIS mapping software.

Cameron County

Northern Cameron County consists of farmland with scattered areas of residential and industrial developments. As one travels south along US 77 into the communities of Combes and Harlingen, land uses change to include residential, commercial, and industrial uses. **Table 4.4-6** lists the land uses along the US 77 corridor within Cameron County.

Table 4.4-6 US 77 Corridor Land Use – Cameron County

Land Use	Acres*	Percent of Project Corridor
Commercial	102	2.49
Farmland	3,083	75.15
Industrial	134	3.27
Residential	361	8.81
Utilities	2	0.04
Pastureland	420	10.24

Source: Jacobs Engineering Group, Inc., November 2008 *Estimated existing land use was compiled from field investigations then transposed into GIS mapping software.

4.4.2 Local Land Use Plans/Policies

Growth in the project study area is being increasingly influenced by the amount of development occurring in the surrounding counties and cities of the study area, which must be considered and addressed through the formulation of land use plans and policies. Since the passage of NAFTA, there has been a concern with the increase in traffic for the cities located along the US 77 route, particularly in Driscoll and Riviera, as well as the concern regarding the decrease in mobility, safety, and accessibility for the local roadways in the area. NAFTA has precipitated economic growth of commercial and industrial development within the counties and cities along US 77 and in the border cities of Harlingen, San Benito and Brownsville, (which is a positive impact) but also stimulating an increase in traffic congestion between these cities and throughout the region.

US 77 traverses the proposed project area and travels south between Corpus Christi and Harlingen, serving as one of the two primary links to the Rio Grande Valley. The northern end of the US 77 within the project area overlaps the improvements of US 77 in Robstown to IH 37. South of Kingsville, the road travels through Kenedy County, which is predominantly ranchland owned by the King, Kenedy, Armstrong, and Yturria ranches. The southern end overlaps US Highway 83 and is a newly completed freeway through the cities of Harlingen, San Benito and Brownsville, with a continuous of its southern terminus to the US/Mexico border.

As a result of the border crossing, the transportation system is of heightened importance to the local economy. The ability to facilitate efficient truck movement across the border and through the various communities alson the project area has an immediate influence on economic development. Equally important, is free flowing traffic along the major arteries connected to US

77, which must be realized through effective access management controls. The existing street system must be integrated to ensure improved local mobility once the proposed project construction is completed and the relief routes are opened to the public for use. As such plans and policies must be implemented to successfully govern and guide this growth in infrastructure.

The following discussion identifies the plans and policies related to land use and growth in the proposed US 77 Upgrade Project area. Unlike counties in other states, counties in Texas have little regulatory authority. For example, counties do not have the power to regulate zoning on land in the county, or the use or appearance of property. They are also not legally bound to develop comprehensive plans like a municipality.

Corpus Christi Metropolitan Transportation Plan Fiscal Year 2010-2035

Financially constrained projects were incorporated into the approved 2006 network to define the 2035 forecast network. Projects included improvements to existing links, the staged improvement of existing roadways to full freeway standards, and the construction of new roadways on new ROW. Significant 2035 network projects coded into the model include:

- Completion of the Joe Fulton corridor with an enhanced connection at IH 37
- Replacement of the Harbor Bridge on a new alignment, with an interchange at SH 286
- Upgrade of US 77 to full freeway standards as far north as IH 37
- Relief routes around Driscoll.

The Kingsville Joint Land Use Study (JLUS)

The Kingsville Joint Land Use Study is the result of a collaborative planning process between the City of Kingsville, Kleberg County, NAS Kingsville, and representatives for local organizations and agencies. Sponsored by the US Department of Defense (DOD) and the Office of Economic Adjustment (OEA), the primary goal of the study is the development of strategies designed to safeguard the quality of life for residents, the growth of the city, and the mission of the installation. When originally built, most major military installations, including NAS Kingsville, were outside of urban areas. However, the spin-off economic effects of operations and the general trend toward growth in rural areas have led to compatibility challenges as installations and communities grow closer together. Coupled with the consolidation of military assets and the subsequent closing of active installations, increased pressure is being placed on remaining installations to preserve mission capabilities. In light of these issues, the importance of collaborative land use planning becomes critical.

Kingsville Air Installations Compatible Use Zones (AICUZ) Study

The Noise Control Act of 1972 found that noise not adequately controlled has the potential of endangering the health and welfare of people. It states that all Americans are entitled to an environment free from noise that can jeopardize their general health and quality of life. Along with state and local governments, actions from the federal government were needed to ensure that the objectives of the Act were met. Concurrently, military installations were experiencing the impacts related to urban development moving closer to the installations and commenting on noise from flight operations. In 1973, the DOD responded by establishing the AICUZ program. The AICUZ program seeks to develop a cooperative relationship between communities and military installations and provides land use compatibility guidelines designed to protect public health and safety, as well as maintain military readiness. As designed, the AICUZ study evaluates three components: noise, vertical obstructions, and accident potential zones. The 1998 NAS Kingsville AICUZ study served to update and revise the noise and accident potential

information from 1992. This study utilized noise contour data based on the operational use of T-45 aircraft.

City of Kingsville Master Plan (March 2008)
While the State of Texas does not mandate that municipalities maintain a master or comprehensive general plan, the City of Kingsville maintains such a plan to help guide future development and community facilities. A master plan is designed to serve as the jurisdiction's "construction" or "blueprint" for future decisions concerning land use, infrastructure, public services, and resource conservation. All specific plans, subdivisions, and zoning decisions made by the city must be consistent with the master plan. Typically, there are three defining features to a master plan:

1. **General**. As the name implies, a master plan provides general guidance that will be used to direct future land use and resource decisions.
2. **Comprehensive**. A master plan covers a wide range of social, economic, infrastructure, and natural resource factors. These include topics such as land use, housing, circulation, utilities, public services, recreation, agriculture, biological resources, and many other topics.
3. **Long-range.** Master plans provide guidance on reaching a future envisioned 20 or more years in the future.

The purpose of a master plan is to:

- Identify the jurisdiction's land use, circulation, environmental, economic, and social goals and policies as they relate to future development in the jurisdiction
- Provide a basis for local government decision-making, including decisions on development approvals
- Provide citizens with opportunities to participate in the planning and decision-making processes of their communities

- Inform citizens, developers, decision-makers, other cities and counties, and other organizations (such as NAS Kingsville) of the policies that guide development within a particular community.

Kleberg County Air Installation Zoning Regulation
Through the Texas legislation, Chapter 241, Municipal and County Zoning Authority around Airports, Kleberg County was given the responsibility of safeguarding air operations of NAS Kingsville by adopting regulations that would curtail incompatible land use and other airport hazards. In December of 1993, Kleberg County adopted the Kleberg County Air Installation Zoning Regulation, as recommended by the 1992 Kingsville AICUZ. Although adopted by the county, little has been done to implement the provisions of this ordinance.

The Kenedy Groundwater Conservation District Management Plan
The Kenedy Groundwater Conservation District Management Plan was formed by the Kenedy County Groundwater Conservation District, and the plan was adopted on July 6, 2007. In September of 2007, the plan was approved by the Texas Water Development Board (TWDB). Groundwater conservation districts have the difficult task of protecting and conserving groundwater for the entire public, as well as upholding Texas private property rights. Rather than setting strict rules and regulations on a landowner, the Kenedy Groundwater Conservation District Management Plan has outlined strategies and objectives to monitor and educate the

public. Both the City of Kingsville and NAS Kingsville extract groundwater from the same aquifer as the Kenedy Groundwater Conservation District. However, because the city and the installation are not a part of the district, their groundwater extraction rate is unmonitored. Any dramatic increase in volume of groundwater extracted would negatively affect the conservation district.

Harlingen's Vision 2020 Comprehensive Plan
Harlingen's Vision 2020 Comprehensive Plan is the general plan for land use and development for the City of Harlingen, Texas. The comprehensive plan is the city's guide for government officials and citizens in making decisions about land use and development. The Vision 2020 Plan:

- Addresses most aspects of community and urban lifestyle
- Identifies issues that affect quality of life for residents
- Defines goals and objectives for seizing opportunities and meeting existing and future needs
- Recommends specific proposals for programs and actions that should be implemented by the city.

Vision 2020 is a comprehensive plan, as it identifies the myriad of factors related to future community growth, analyzes the relationships between these factors, proposes what needs to be done about them, and recommends goals, objectives, policies, and actions for using the city's resources in the most efficient and effective ways.

4.4.3 Legislation and Other Regulations

The following is an overview of existing state and federal legislation and policy that impact compatibility planning.

4.4.3.1 State Legislation

Texas Local Government Code Chapter 241, Municipal and County Zoning Authority Around Airports
Chapter 241 of the Texas State Local Government Code gives a municipality or county authority to regulate land use within a designated airport hazard area. This is done through the creation of a Joint Airport Zoning Board that is appointed by a primary jurisdiction in partnership with another agency or jurisdiction to work jointly. The code details the board as having the authority to adopt, administer, and, when necessary, enforce land use to ensure public safety and compatibility. Although the board is intended to solely develop and adopt an Airport Compatible Land Use Zoning Ordinance or Hazard Zoning Ordinance, it is possible for the board to continue after adoption. In order for this to occur, the municipality must name the board as the administrative body for this function. This would then grant the board authority to review and approve building permits and have zoning authority over the designated area. The City of Kingsville currently does not have a Joint Airport Zoning Board with NAS Kingsville or Kleberg County.

Texas Local Government Code Chapter 42, Extraterritorial Jurisdictions (ETJs) of Municipalities
Chapter 42 of the Texas State Local Government Code, ETJs of Municipalities, designates a municipality a certain amount of land surrounding the city for future growth. The municipality has no zoning authority since the designated area does not actually belong to the city. However, Section 242 of the code does give the city the right to regulate subdivision development within

the ETJ. The designated ETJ is based on the population of the municipality and has the ability to grow in accordance with population. The ETJ also increases as land is annexed to the city. For the City of Kingsville, the ETJ is defined as the area within 2.0 miles of the current city limits. The majority of NAS Kingsville is located within the Kingsville ETJ. Although only a small segment of the installation abuts the city limits of Kingsville, land to the south, northwest and north of the installation just outside of the city limits, within the ETJ, is more susceptible to development due to its proximity to the major transportation corridors and to the City of Kingsville.

4.4.3.2 Federal Legislation

House Bill No. 1852
House Bill No. 1852 was passed to preserve the dark sky environment for military operations. The bill grants the county authority to regulate the use of lighting to mitigate interference with training activities, operations, or research within 5.0 miles of a military installation. Under this legislation, the county is provided with the authority to dictate the type of lighting allowed to control glare and to set shielding requirements and time of usage.

Environmental Compliance NEPA
NEPA of 1969 requires federal agencies to file an EA and sometimes an EIS for major federal actions that have an environmental impact. NEPA is applicable to all federal agencies, including the military. NEPA mandates that the military analyze the impact of its actions and operations on the environment, including that of the surrounding communities. Inherent in this analysis is an exploration of methods to lessen any adverse environmental impact. The EIS is a public process that allows participation by the community. For local planning officials, an EIS or EA is a valuable planning document in determining the extent of impacts of changing military actions or operations on their policies, plans, and programs, if any, and on the surrounding community. Public hearings are required for all EIS and EA documents released by the military under NEPA. A Findings of No Significant Impact (FONSI) under an EA or a full EIS that considers alternatives to the proposed military actions or operations also is required and is subject to public scrutiny. The information obtain by the EIS/EA is valuable in planning coordination and policy formulation at the local government level.

Federal Initiatives Department of Defense Conservation Partnering Initiative
In 2003, Congress amended Title 10 U.S.C. §2684a and §2692a (P.L. 107-314), the *National Defense Authorization Act*, to add authority to the DOD to partner with other federal agencies, states, local governments, and conservation based Non Governmental Organizations (NGO) to set aside lands near military bases for conservation purposes and to prevent incompatible development from encroaching on, and interfering with, military missions. This law provides an additional tool to support smart planning, conservation, and environmental stewardship on and off military installations. In response to the authority created by the *2003 National Defense Authorization Act*, the Navy created the Encroachment Partnering (EP) program. The purpose of the EP program is to acquire real property interests, such as conservation easements or development rights, to address current and potential encroachment or compatibility threats to an installation's mission.

Federal Aviation Act
The *Federal Aviation Act* requires the Secretary of Transportation to make long-range plans to formulate policy for the orderly development and use of "navigable air space" to serve the needs of civilian aeronautics and national defense except for the specific needs of military agencies.

Military planning strives to work alongside local, state, and federal aviation law and policies but sometimes must supersede other levels of government due to national security interests. The ”500 feet rule” is discussed in the *Federal Aviation Act*. It states that flights 500 feet or more above ground level (AGL) do not represent a compensable taking because flights 500 feet AGL enjoy a right of free passage without liability to the owners below. This is important to NAS Kingsville and the surrounding communities when considering land acquisition and development rights.

4.4.4 No Build Alternative – Land Use Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would result in essentially the same land use patterns, while travel delays would increase and vehicle access would deteriorate. The effect of not building the proposed improvements may in the long-term diminish the ability of the corridor to successfully compete for future regional growth as vehicle access becomes increasingly congested.

4.4.5 Build Alternative – Land Use Consequences

It is not anticipated that the Build Alternative would substantially change the land usage as it is now or as planned for future development. The proposed project would improve access throughout the corridor and is consistent with the planning efforts of the cities and counties within the corridor. The proposed improvements would provide increased accessibility to various religious, educational, medical, and recreational facilities along the corridor. Emergency public services would have a safer and more efficient facility to use, by separating through and cross-traffic at the major intersections and ranch gates, and by separating through-traffic from local traffic turning onto side streets.

Information collected on reasonably foreseeable property developments within the project area came from requests (mostly through public involvement activities) from local officials (city and county planning) and adjacent landowners that would be directly impacted by the project (and who would be most likely to have an opportunity or desire to develop their property). This investigation has discovered that few property owners are developing plans for any currently undeveloped properties along or in the vicinity of the project area, especially within the rural areas. Local MPO planners with the five counties were also asked if they had in place a long-term or comprehensive plan prepared for the area, and in particular, for the surrounding area of the proposed US 77 Upgrade Project. For the most part, the counties do not have a comprehensive plan but follow the state and federal regulations and ordinances for land use zoning. Nueces County responded that they have no control over land use in the rural areas except for development in floodplains and when platting subdivisions. The counties rely on the surrounding cities to institute their own comprehensive plans.

The proposed project is consistent with local planning efforts since the project is not a new location project and the potential relief routes were suggested and supported by Driscoll and Riviera.

4.5 PRIME FARMLANDS INCLUDING SOILS

This section describes the existing conditions concerning Prime Farmlands in the project area and discusses the potential consequences to Prime Farmlands resulting from the Build and No Build Alternatives.

The data and conclusions presented in this section were developed by:

1. Reviewing the NRCS lists of Prime Farmland soils for the project counties
2. Mapping and calculating the amount of Prime Farmland soils present in the project area using GIS software
3. Initially scoring the proposed ROW using Form AD-1006: Farmland Conversion Impact Rating (Corridor Projects)
4. Submitting the partially completed Form AD-1006 to the NRCS to review and complete the Prime Farmlands rating.

4.5.1 Existing Conditions

The project area construction limits between FM 892 in Robstown and SH 107 in Combes traverses 112 miles of the Gulf Coastal Plain, which is described as an area of nearly level to slightly undulating terrain along the Gulf of Mexico (Spearing 1991:35). In South Texas, this area is termed the South Texas Plains and has been divided into five biogeographical zones – the Rio Grande Plain, the Rio Grande Delta, the Nueces-Guadalupe Plain, the Sand Sheet, and the Coastal Bend. The project area traverses parts of the Coastal Bend from Nueces County to southern Kenedy County. From southern Kenedy County southward through Willacy County and to the project's terminus in Cameron County, the project traverses the Rio Grande Delta (Black 1989:40).

Soil conditions in the Coastal Bend and Rio Grande Delta range from dense clay to deep sand to shallow loam and are characterized by upland plains and prairies inland from shallow bays and tidal flats on the coast (littoral). The Coastal Bend area in Nueces and Kleberg Counties contains primarily of clayey and loamy soils, as do most of Willacy and Cameron Counties in the Delta area. However, most of Kenedy County consists of deep to shallow eolian sands often in northwest to southeast trending dunes.

Table 4.5-1 identifies soils found within the project area, of which 48 are considered to be hydric soils and 36 are considered to be Prime Farmland soils by the USDA NRCS (USDA 2009). **Figures A.4.5-1** through **A.4.5-21** show Prime Farmland soils in the project vicinity.

Table 4.5-1 Hydric and Prime Farmland Soils within the Project Area

Map Unit Name (Map Unit Symbol)	Hydric	Prime Farmland
Cameron County		
Hidalgo fine sandy loam, 0 to 1 percent slopes (HGA)	No	Yes[1]
Hidalgo sandy clay loam (HO)	No	Yes
Racombes sandy clay loam (RA)	Yes	Yes
Raymondville clay loam (RE)	No	Yes[1]
Rio clay loam (RO)	Yes	Yes[2]
Tiocano clay (TC)	Yes	Yes[1]
Willacy fine sandy loam, 0 to 1 percent slopes (WAA)	No	Yes
Willacy fine sandy loam, 1 to 3 percent slopes (WAB)	No	Yes

Table 4.5-1 Hydric and Prime Farmland Soils within the Project Area

Map Unit Name (Map Unit Symbol)	Hydric	Prime Farmland
Willacy County		
Hidalgo sandy clay loam, 0 to 1 percent slopes (HoA)	No	Yes[1]
Lozano fine sandy loam (Ln)	No	Yes[1]
Nueces fine sand (Nu)	Yes	No
Porfirio sandy clay loam (Po)	Yes	No
Racombes sandy clay loam (Ra)	No	Yes
Raymondville clay loam (Rd)	No	Yes
Rio fine sandy loam (Rf)	Yes	Yes[2]
Rio sandy clay loam (Rg)	Yes	Yes[2]
Rio sandy clay loam, saline (Rs)	Yes	No
Tiocano clay (Tc)	Yes	Yes[1]
Willacy fine sandy loam, 0 to 1 percent slopes (WaA)	No	Yes
Willacy fine sandy loam, 1 to 3 percent slopes (WaB)	No	Yes
Kenedy County		
Bordas loamy fine sand, 0 to 1 percent slopes (BrA)	Yes	No
Cayo fine sandy loam, 0 to 1 percent slopes (ChA)	Yes	No
Estella fine sand, 0 to 1 percent slopes (EsA)	Yes	No
Falfurrias fine sand, 1 to 5 percent slopes (FaC)	Yes	No
Falfurrias fine sand, 5 to 15 percent slopes (FaE)	Yes	No
Falfurrias-Cayo complex, 0 to 8 percent slopes (FoD)	Yes	No
Falfurrias-Topo complex, 0 to 8 percent slopes (FtD)	Yes	No
Nueces fine sand, 0 to 5 percent slopes (NfC)	Yes	No
Nueces-Sarita complex, 0 to 5 percent slopes (NsC)	Yes	No
Padrones fine sand, 0 to 3 percent slopes (PaA)	Yes	No
Palobia loamy fine sand, 1 to 3 percent slopes (PbB)	Yes	No
Potrero-Lopeno-Noria complex, 0 to 5 percent slopes (PrC)	Yes	No
Quiteria fine sand, 0 to 1 percent slopes (QuA)	Yes	No
Ramita loamy fine sand, 0 to 2 percent slopes (RaB)	Yes	No
Ramita-Bordas complex, 0 to 2 percent slopes (RbB)	Yes	No
Sarita fine sand, 0 to 5 percent slopes (SnC)	Yes	No
Sarita-Cayo complex, 0 to 5 percent slopes (SrC)	Yes	No
Sarita-Topo complex, 0 to 5 percent slopes (SsC)	Yes	No
Saucel sandy loam, 0 to 1 percent slopes (SuA)	Yes	No
Sauz loamy fine sand, 0 to 1 percent slopes (SyA)	Yes	No
Sauz-Saucel complex, 0 to 1 percent slopes, occasionally flooded (SzA)	Yes	No
Topo fine sandy loam, 0 to 1 percent slopes (ToA)	Yes	No
Yturria fine sandy loam, 1 to 5 percent slopes (YtC)	No	Yes[1]
Kleberg County		
Banquete clay, 0 to 1 percent slopes (BbA)	No	Yes[1]
Clareville clay loam, 0 to 1 percent slopes (CkA)	Yes	Yes
Colmena fine sandy loam, 0 to 1 percent slopes (CmA)	No	Yes
Colmena fine sandy loam, 1 to 3 percent slopes (CmB)	No	Yes
Cranell sandy clay loam, 0 to 1 percent slopes (CnA)	Yes	Yes
Czar fine sandy loam, 0 to 1 percent slopes (CrA)	Yes	Yes[1]
Czar sandy clay loam, 0 to 1 percent slopes (CzA)	Yes	Yes
Gertrudis fine sandy loam, 0 to 3 percent slopes (GeB)	No	Yes[1]
Orelia fine sandy loam, 0 to 1 percent slopes (OfA)	Yes	Yes
Padrones fine sand, 0 to 3 percent slopes (PaA)	Yes	No
Palobia loamy fine sand, 1 to 3 percent slopes (PbB)	Yes	No

Table 4.5-1 Hydric and Prime Farmland Soils within the Project Area

Map Unit Name (Map Unit Symbol)	Hydric	Prime Farmland
Palobia fine sandy loam, 0 to 3 percent slopes (PeB)	Yes	No
Palobia-Colmena complex, 0 to 1 percent slopes (PfA)	Yes	No
Palobia-Colmena 1 to 3 percent slopes (PfB)	Yes	No
Papagua fine sandy loam, 0 to 1 percent slopes (PgA)	Yes	No
Premont fine sandy loam, 0 to 3 percent slopes (PtB)	No	Yes[1]
Ramita-Bordas complex, 0 to 2 percent slopes (RbB)	Yes	No
Victoria clay, 0 to 1 percent slopes (VcA)	Yes	Yes
Victoria clay, 1 to 3 percent slopes (VcB)	No	Yes
Yturria fine sandy loam, 1 to 5 percent slopes (YtC)	No	Yes[1]
Nueces County		
Banquete clay (Ba)	Yes	No
Raymondville complex, 0 to 1 percent slopes (CcA)	No	Yes
Clayey alluvial land (CD)	Yes	No
Miguel fine sandy loam, 0 to 1 percent slopes (MgA)	No	Yes[1]
Miguel fine sandy loam, 1 to 3 percent slopes (MgB)	No	Yes[1]
Orelia fine sandy loam (OF)	Yes	No
Victoria clay, 0 to 1 percent slopes (VcA)	Yes	Yes
Victoria clay, 1 to 3 percent slopes (VcB)	No	Yes

[1] Prime Farmland if irrigated
[2] Prime Farmland if drained
Sources: *Soil Survey of Nueces County, Texas*; US Department of Agriculture, 1965
Soil Survey of Willacy County, Texas; US Department of Agriculture, 1979
Soil Survey Staff, US Department of Agriculture, Natural Resources Conservation Service, Web Soil Survey (Kleberg, Kenedy, and Cameron Counties). Available online at http://websoilsurvey.nrcs.usda.gov/ accessed 8/4/2009, accessed in January 2010

4.5.2 No Build Alternative – Prime Farmlands Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not impact Prime Farmlands. Therefore, the No Build Alternative would not require any coordination related to Prime Farmlands.

4.5.3 Build Alternative – Prime Farmlands Consequences

The Farmland Protection Policy Act (FPPA) minimizes the extent to which federal programs contribute to the unnecessary and irreversible conversion of farmland to non-agricultural uses. Coordination with the NRCS has been conducted to meet the requirements of the FPPA (**Appendix B**).

Proposed construction would occur within the existing ROW through Kenedy, Willacy, and Cameron Counties and within existing and proposed ROW in Nueces and Kleberg Counties. Proposed new ROW would be located primarily adjacent to the existing US 77 ROW, with the exception of two proposed relief routes around Driscoll and Riviera. New ROW would total approximately 689.74 acres, of which 442.8 acres are located on Prime Farmland soils. Additionally, the existing ROW within the project limits would total approximately 4,104.5 acres, of which 1,703.2 acres are located on Prime Farmland soils. As indicated in **Table 4.5-1**, the project area is underlain by 36 soils that are considered to be Prime Farmland soils by the NRCS (USDA 2009). Of these, 14 are Prime Farmland soils if irrigated and three are Prime Farmland soils, if drained. Out of a total of 4,794.2 acres of existing and proposed ROW, approximately 2,146.0 acres (44.8 percent) of the ROW occurs over Prime Farmland soils.

The proposed improvements have minimized impacts to Prime Farmlands by utilizing the existing ROW and roadway as much as possible, and by keeping new ROW requirements as close as possible to the existing ROW. The proposed ROW has been scored using Form AD-1006: Farmland Conversion Impact Rating (Corridor Projects). The proposed project scored 60 points under *Part VI. Corridor or Site Assessment Criteria*; therefore, the form was submitted to the NRCS for review. The NRCS evaluated the project site as required by the FPPA and concluded that the combined rating of the site is 146. The FPPA states that sites with a rating less than 160 need no further consideration. A copy of the October 23, 2009 letter and completed Form AD-1006 from the NRCS is included in **Appendix B**.

4.6 VEGETATION/WILDLIFE HABITATS

This section describes the existing conditions concerning vegetation/wildlife habitats in the project area and discusses the potential consequences to vegetation/wildlife habitats resulting from the Build and No Build Alternatives.

A regional overview of vegetation/wildlife habitats in the project area was prepared by reviewing Hatch et al. (1990), McMahan et al. (1984), and Blair (1950). Site-specific vegetation/wildlife habitats in the project area were assessed by reviewing aerial photography and topographic and soil survey maps, and by conducting field investigations. The vegetation/wildlife habitat types identified in the project area were evaluated in accordance with the *1999 Memorandum of Understanding* (MOU) and *2001 Memorandum of Agreement* (MOA) between TxDOT and the Texas Parks and Wildlife Department (TPWD). Evaluations included ocular estimates of dominant species in each vegetation stratum, range and average diameter at breast height (dbh) of trees, and general height and canopy cover of trees. The vegetation communities were mapped on aerial photography during field investigations, with the exception of aquatic/semi-aquatic habitats, which were mapped using a Global Positioning System (GPS) unit during investigations to identify wetlands.

4.6.1 Existing Conditions

This section provides a regional overview of vegetation resources followed by a site-specific description of the vegetation/wildlife habitats present in the project area. The project area includes the existing and proposed ROW within the construction limits (SH 107 in Combes to FM 892 in Robstown).

Most of the project area is located in the eastern portion of the South Texas Plains vegetation region of Texas (**Figure A.4.6-1**), which is described as a nearly level to rolling plain that is slightly to moderately dissected with watercourses (Hatch et al. 1990). The northern portion (Nueces County) lies within the Gulf Prairies and Marshes vegetation region, which includes the low, wet, marshy coastal areas as well as the bordering flat plains (Hatch et al. 1990). According to *The Vegetation Types of Texas, Including Cropland* (McMahan et al. 1984), the project area (with the exception of scattered urban areas) includes the following four general vegetation types:

- Crops (44) – mapped along the Cameron, Willacy, and Nueces portions of US 77, as well as in the northern half of Kleberg County
- Mesquite-Granjeno Parks (16) – mapped in the vast stretch of undeveloped rangeland extending through Kenedy County and the southern half of Kleberg County

- Mesquite-Granjeno Woods (17) – limited to a relatively small area on the Kenedy/Willacy County line
- Live Oak Woods/Parks (25) – limited to two relatively small areas in northern Kenedy County.

The project area lies within the Tamaulipan Biotic Province (**Figure A-4.6-1**), which extends from the Balcones fault zone in central Texas southward into Mexico (Blair 1950). This biotic province is diverse in habitats and wildlife, with thorny brush (thornshrub) being the predominant habitat. The LRGV, which includes Cameron and Willacy Counties, is considered a separate biotic district (Matamoran District) within the Tamaulipan Biotic Province due to its comparatively lush brushlands, the predominance of several subtropical plant species that decrease in abundance northward, and its overall greater diversity of wildlife and habitats. Another distinct ecoregion is the South Texas Sand Sheet, or Coastal Sand Plains, which covers more than two million acres in several counties, including the northern portion of Willacy County, all of Kenedy County, and the southern portion of Kleberg County. This region is defined by a sheet of eolian sand blown inland from the Gulf coast during Holocene times and supports a unique subtropical fauna within grassland and woodland habitats.

The Tamaulipan biotic province is known for its biodiversity and number of neotropical endemics. Blair (1950) cites occurrences of 61 species of mammals, 36 species of snakes, 19 species of lizards, two land turtles, three urodeles (salamanders) and 19 anurans (frogs and toads) within the Tamaulipan. A large number of resident and migrant bird species use the region, and many subtropical birds reach the northern extent of their range here.

A search of the TPWD's Natural Diversity Database (NDD) in December 2009 identified six records of specific plant communities within 1.5 miles of the project area (**Table 4.6-1**).

Table 4.6-1 NDD Elements of Occurrence of Plant Communities near the Project Area

Element of Occurrence ID No.	Common Name	Scientific Name	Global/State Rank	Location Description
3929	Blackbrush Series	*Acacia rigidula*	G5/S5	0.9 mile east of US 77 along Tranquitas Creek
3593	Texas Ebony-Snake-eyes Series	*Pithecellobium ebano-Phaulothamnus spinescens*	G2/S2	0.3 mile east of US 77 at Combes
6067	Glasswort-Saltwort Series	*Salicornia bigelovii/Salicornia virginiana-Batis maritima*	G4/S4	1.2 miles east of US 77 along Tranquitas Creek
6379	Texas Ebony-Snake-eyes Series	*Pithecellobium ebano-Phaulothamnus spinescens*	G2/S2	West side of US 77 at Combes
8142	Seacoast Bluestem-Gulfdune Paspalum Series	*Schizachyrium scoparium var. littorale-Paspalum monostachyum*	G4/S3	East of US 77, due south of Baffin Bay
8143	Seacoast Bluestem-Gulfdune Paspalum Series	*Schizachyrium scoparium var. littorale-Paspalum monostachyum*	G4/S3	5.0 miles east of US 77 in central and south Kenedy County

Source: TPWD NDD, December 2009

Field investigations identified that the vegetation surrounding the project area is generally consistent with *The Vegetation Types of Texas* description: croplands along the northern and southern portions of the project area and mesquite-live oak dominated areas in much of Kenedy County. Within the sand sheet in the central portion of Kenedy County, the roadway also traverses grassland habitats. Vegetation/wildlife habitats present in the project area were categorized into the following 11 types based on land use, dominant species, and structure:

- Maintained Vegetation
- Crops
- Mesquite-Baccharis Shrub/Parks/Woods
- Pasture
- Live Oak Parks/Woods
- Mesquite Parks/Woods
- Mesquite Shrub
- Huisache Shrub/Brush
- Mixed Shrub
- Cedar Elm-Hackberry Parks/Woods
- Aquatic/Semi-aquatic.

None of the plant communities listed in **Table 4.6-1** were observed in the project area, and no other rare vegetation communities were identified in the project area. Riparian vegetation identified in the project includes the Cedar Elm-Hackberry Parks/Woods along Petronila Creek (see description below) and herbaceous wetland vegetation along several of the streams and drainages in the project area. With the exception of these areas, the vegetation along the banks of streams and drainages is essentially the same as surrounding areas. A total of approximately 5.0 acres of the vegetation/wildlife habitats described below are considered riparian in nature.

Descriptions and acreages of the 11 vegetation/wildlife habitats present in the project area are provided in the following paragraphs and summarized in **Table 4.6-2**. The distribution of the vegetation/wildlife habitats in the project area is shown graphically in a set of maps titled *US 77 Vegetation/Wildlife Habitats and Project Plans, SH 107 to FM 892*, which is on file at TxDOT's TTA office.

Table 4.6-2 Summary of Vegetation/Wildlife Habitats in the Project Area

Vegetation/Wildlife Habitat	Relative Distribution	Area within Project Area (acres)	Percent of Project Area
Maintained Vegetation	Within existing ROW throughout the project length; small amount also occurs in maintained developed lots in the proposed ROW near northernmost portion of project area.	2,370.8*	49.5
Crops	Dominates the proposed ROW in Nueces County; also present in portions of the proposed ROW in Kleberg County.	442.7	9.2
Mesquite-Baccharis Shrub/Parks/Woods	Located within existing US 77 median in Kenedy County portion of the project area.	315.7*	6.6
Pasture	Areas of proposed ROW in Kleberg County.	162.9	3.4
Live Oak Parks/Woods	Scattered mottes within existing ROW in central Kenedy County.	44.5*	0.9

Table 4.6-2 Summary of Vegetation/Wildlife Habitats in the Project Area

Vegetation/Wildlife Habitat	Relative Distribution	Area within Project Area (acres)	Percent of Project Area
Mesquite Parks/Woods	Scattered patches in proposed ROW in Kleberg County.	32.0	0.7
Mesquite Shrub	Scattered patches in proposed ROW in Kleberg County.	15.5	0.3
Huisache Shrub/Brush	Disturbed areas along fencelines, utility corridors, and heavily grazed drainage swales and stock ponds, primarily within proposed ROW.	8.6	0.2
Mixed Shrub	Within proposed ROW on hilltops above Escondido and Santa Gertrudis Creeks.	2.0	<0.1
Cedar Elm-Hackberry Parks/Woods	Along Petronila Creek within the proposed Driscoll relief route alignment.	1.0	<0.1
Aquatic/Semi-aquatic	Within streams, canals, and isolated drainage swales and depressions in existing and proposed ROW.	23.9*	0.5
TOTAL VEGETATION/WILDLIFE HABITATS		***3,419.6****	***71.3%***
Other Land Cover Types			
Transportation	Existing US 77 roadway and crossroads.	1,361.5	28.4
Developed	Scattered portions of proposed ROW.	13.1	0.3
TOTAL AREA IN EXISTING/PROPOSED ROW		***4,794.2****	***100%***

* Approximately 1,361.3 acres of the vegetation/wildlife habitats in the project area are located within the sand sheet in Kenedy County. This includes approximately 984.5 acres of maintained vegetation, all of the Mesquite-Baccharis Shrub/Parks/Woods (315.7 acres), all of the Live Oak Parks/Woods (44.5 acres), and 16.6 acres of aquatic habitats.
Source: Blanton and Associates, Inc., October 2009

Maintained Vegetation
Maintained Vegetation occurs within the existing US 77 ROW and in portions of the proposed ROW along maintained developed properties (**Photos 1** through **3** located in **Appendix D**). This vegetation type is typically dominated by buffelgrass (*Pennisetum ciliare*), King Ranch bluestem (*Bothriochloa ischaemum* var. *songarica*), Angleton bluestem (*Dichanthium aristatum*), bermudagrass (*Cynodon dactylon*), and three-awns (*Aristida* spp.). Other common species observed include silver bluestem (*Bothriochloa laguroides*), red grama (*Bouteloua rigidiseta*), rescue grass (*Bromus catharticus*), Texas wintergrass (*Nassella leucotricha*), Texas thistle (*Cirsium texanum*), plains tickseed (*Coreopsis tinctoria*), false ragweed (*Parthenium* spp.), western ragweed (*Ambrosia psilostachya*), silverleaf nightshade (*Solanum elaeagnifolium*), amnastla dock (*Rumex chrysocarpus*), slender vervain (*Verbena halei*), deer pea vetch (*Vicia ludoviciana*), creeping mesquite (*Prosopis reptans*), twine-vine (*Funastrum cynanchoides*), and old-man's beard (*Clematis drummondii*). Within Cameron and Willacy Counties, the maintained ROW includes planted palm trees (American cotton palm, *Washingtonia filifera*) and oleander (*Nerium oleander*).

Within the sand sheet in Kenedy County, the vegetation composition in the maintained ROW is distinct from the portions of maintained ROW to the north and south, particularly near the middle of the county where rolling sand dunes are present (**Photo 2** located in **Appendix D**). While this area of maintained ROW is still largely dominated by introduced grasses, there are many herbaceous species that are less common or absent outside the sand sheet. Common species in this area include seacoast bluestem (*Schizachyrium scoparium* var*. littorale*), gulf cordgrass (*Spartina spartinae*), Rhodes windmillgrass (*Chloris gayana*), red lovegrass (*Eragrostis secundiflora*), Pan American balsamscale (*Elionurus tripsacoides*), cardinal's feather (*Acalypha*

radians), hoarypea (*Tephrosia lindheimeri*), American snoutbean (*Rhynchosia americana*), showy nerveray (*Tetragonotheca repanda*), broom groundsel (*Senecio riddellii*), crotons (*Croton* spp.), coastal sandbur (*Cenchrus spinifex*), silver-leaf sunflower (*Helianthus argophyllus*), coastal sands sunflower (*Helianthus praecox*), American square-bud sundrops (*Calylophus serrulatus*), coastal lazy daisy (*Aphanostephus skirrhobasis*), Texas bullnettle (*Cnidoscolus texanus*), daleas (*Dalea* spp.), prostrate fleabane (*Erigeron procumbens*), field snake-cotton (*Froelichia floridana*), and Lindheimer's globemallow (*Sphaeralcea lindheimeri*). Common shrubs in this area include Texas lantana (*Lantana urticoides*), pricklypear cactus (*Opuntia engelmannii*), and constricted yucca (*Yucca constricta*). This portion of the ROW is surrounded by grassland areas on large ranches.

Maintained Vegetation accounts for approximately 49.5 percent (2,370.8 acres) of the project area. Approximately 984.5 acres of the maintained vegetation are located within the sand sheet in Kenedy County.

Crops
Most (64 percent) of the proposed ROW required for the project consists of cropland (**Photo 4** located in **Appendix D**). Typical crops grown in the region include cotton (*Gossypium hirsutum*), sorghum (*Sorghum bicolor*), and corn (*Zea mays*). Crops accounts for approximately 9.2 percent (442.7 acres) of the total project area.

Mesquite-Baccharis Shrub/Parks/Woods
Mesquite-Baccharis Shrub/Parks/Woods vegetation occurs primarily within the existing roadway median in portions of Kenedy County (**Photo 5** located in **Appendix D**). This vegetation type consists of a matrix of high and low areas, with mesquite dominating higher areas and povertyweed (*Baccharis neglecta*) dominating lower areas, disturbed areas, and the edges of mesquite-dominated areas. Other common species in these areas include huisache (*Acacia farnesiana*), sugar hackberry (*Celtis laevigata*), granjeno (*Celtis pallida*), Engelmann's pricklypear, Texas lantana, old-man's beard, buffelgrass, and King Ranch bluestem. Trees that are located within the median range from 4 to 36 inches dbh (average 12 inches) and 10 to 35 feet tall. Canopy cover ranges from 30 to 70 percent. Adjacent properties in these areas also contain mesquite-dominated woodlands and savannah. Approximately 6.6 percent (315.7 acres) of the project area contains Mesquite-Baccharis Shrub/Parks/Woods, all of which is within the sand sheet in Kenedy County.

Pasture
Pastures are the dominant vegetation type in the proposed ROW in Kleberg County (**Photo 6** located in **Appendix D**), including the proposed Riviera relief route alignment, and are characterized as areas that have been previously cleared and planted with introduced grasses such as bermudagrass and King Ranch bluestem. Other common species include buffelgrass, Angleton bluestem, threeawns, wooly croton (*Croton capitatus*), yankeeweed (*Eupatorium compositifolium*), western ragweed, silverleaf nightshade, spreading fanpetals (*Sida abutifolia*), and American snoutbean. The pastures in the project area also contain scattered mesquite and huisache trees and shrubs that are up to 24 inches dbh (average 12 inches) and 35 feet in height. Canopy cover of trees in this vegetation type is generally less than 10 percent. Pastures account for approximately 3.4 percent (162.9 acres) of the project area.

Live Oak Parks/Woods
Live Oaks Parks/Woods vegetation occurs as scattered mottes in the existing ROW in Kenedy County (**Photo 7** located in **Appendix D**), the largest of which is located at the Sarita rest area

located approximately 6.0 miles south of Sarita. This vegetation type is dominated by live oak (*Quercus virginiana* var. *fusiformis*), with mesquite also present. Trees range from 8 to approximately 40 inches dbh (average 18 inches) and are 20 to 40 feet tall. Canopy covers ranges from 50 to 80 percent. The understory is typically sparse and contains scattered shrubs such as toothache tree (*Zanthoxylum clava-herculis*), Texas lantana, granjeno, huisache, lotebush (*Ziziphus obtusifolia*), and Texas persimmon (*Diospyros texana*). Turk's cap (*Malvaviscus drummondii*), small ballmoss (*Tillandsia recurvata*), and Bailey's ballmoss (*Tillandsia baileyi*) are common in these mottes. Live Oak Parks/Woods vegetation accounts for approximately 0.9 percent (44.5 acres) of the project area, all of which is within the sand sheet in Kenedy County.

Mesquite Parks/Woods and Mesquite Shrub
Mesquite Parks/Woods and Mesquite Shrub vegetation occurs in scattered patches within the proposed ROW in Kleberg County (**Photos 8** and **9** located in **Appendix D**). These vegetation types are both dominated by mesquite but differ in structure. Within the Mesquite Parks/Woods, mesquite trees are up to 24 inches dbh (average 12 inches) and 35 feet in height. Canopy cover within these areas ranges from 30 to 80 percent. Mesquite shrub vegetation consists of multi-stemmed shrubs up to nine feet tall. Both of these vegetation types contain other species that include huisache, granjeno, brasil (*Condalia hookeri*), pricklypear cactus, tasajillo (*Cylindropuntia leptocaulis*), and King Ranch bluestem. Mesquite Parks/Woods and Mesquite Shrub vegetation account for approximately 0.7 percent (32.0 acres) and 0.3 percent (15.5 acres) of the project area, respectively.

Huisache Shrub/Brush
Huisache Shrub/Brush occurs in disturbed areas along fencelines or utility corridors and near bridges, as well as in heavily grazed drainage swales and stock ponds (**Photo 10** located in **Appendix D**). Huisache shrubs in these areas range from scattered to relatively dense. Dominant herbaceous species include bermudagrass and King Ranch bluestem. Huisache Shrub/Brush accounts for approximately 0.2 percent (8.6 acres) of the project area.

Mixed Shrub
Mixed Shrub vegetation is restricted to the proposed ROW on hills overlooking Escondido and Santa Gertrudis creeks (**Photo 11** located in **Appendix D**). This vegetation type contains a variety of South Texas shrubs species, including blackbrush acacia (*Acacia rigidula*), lime pricklyash (*Zanthoxylum fagara*), lotebush, mesquite, huisache, granjeno, pricklypear cactus, Spanish dagger (*Yucca treculeana*), brasil, guayacan (*Guajacum angustifolium*), and althorn goatbush (*Castela erecta*). Dominant herbaceous species in these areas include King Ranch bluestem, Angleton bluestem, and broom snakeweed (*Gutierrezia sarothrae*). Mixed Shrub vegetation accounts for less than one percent (2.0 acres) of the project area.

Cedar Elm-Hackberry Parks/Woods
Cedar Elm-Hackberry Parks/Woods occurs in a narrow band along Petronila Creek in the proposed ROW associated with the Driscoll relief route (**Photo 12** located in **Appendix D**). This woodland is dominated by cedar elm (*Ulmus crassifolia*) and sugar hackberry trees that range from 4 to 12 inches dbh (average 8 inches) and up to 30 feet tall. Canopy cover ranges from 30 to 75 percent. Other common species include mesquite, granjeno, Texas persimmon, huisache, saw greenbrier (*Smilax bona-nox*), climbing twine-vine, and guineagrass (*Urochloa maxima*). Cedar Elm-Hackberry Parks/Woods vegetation accounts for less than one percent (1.0 acre) of the project area.

Aquatic/Semi-aquatic
Aquatic/semi-aquatic habitat occurs in natural streams, manmade canals, drainage ditches, and stock ponds, and natural depressions within the existing and proposed ROW. In Cameron and Willacy Counties, perennial aquatic habitat occurs in canals and drainage ditches such as the North Floodway, Willacy County Drainage Canal, and East Main Drain (**Photo 13** located in **Appendix D**). In Kenedy County, aquatic/semi-aquatic features in the project area are limited to scattered depressions or blowouts created by the scouring of sands by the wind, exposing the underlying clay (**Photo 14** located in **Appendix D**). Many of these contain fresh water, but some are more brackish or saline in nature and are rimmed with saline clays. These areas hold water and aquatic vegetation temporarily during rainy periods but are often dry and contain upland vegetation or are bare at other times of the year. Most of these areas were full of water in October 2008 but were completely dry by April 2009. In Kleberg and Nueces Counties, aquatic/semi-aquatic habitats primarily occur in various streams and manmade ditches and stock ponds (**Photo 15** located in **Appendix D**). Plant species within the aquatic/semi-aquatic habitats vary, but common species include broadleaf cattail (*Typha latifolia*), amnastla dock, coastal water hyssop (*Bacopa monnieri*), spikerushes (*Eleocharis* spp.), flatsedges (*Cyperus* spp.), rusty-seed paspalum (*Paspalum langei*), saltgrass (*Distichlis spicata*), seashore dropseed (*Sporobolus virginicus*), Carolina wolfberry (*Lycium carolinianum*), shoregrass (*Monanthochloe littoralis*), sea purselane (*Sesuvium portulacastrum*), and seaside heliotrope (*Heliotropium curassivicum*). Aquatic/semi-aquatic habitats account for approximately 0.5 percent (23.9 acres) of the project area. Approximately 16.6 acres of the aquatic habitats are located within the sand sheet in Kenedy County.

4.6.2 No Build Alternative – Vegetation /Wildlife Habitats Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not impact vegetation/wildlife habitats. Therefore, the No Build Alternative would not require any coordination or mitigation for issues related to vegetation/wildlife habitats.

4.6.3 Build Alternative – Vegetation /Wildlife Habitats Consequences

If the proposed Build Alternative were implemented, the proposed project could permanently impact the 3,419.6 acres of vegetation/wildlife habitats located in the project area. Of this, 2,813.5 acres (82.3 percent) consist of maintained vegetation and cropland. **Table 4.6-3** identifies the potential permanent impacts to vegetation/wildlife habitats within the existing and proposed ROW. The impacts reported in this EA represent the worst-case scenario (e.g., removal of all vegetation/wildlife habitats in the project area) because the project may be constructed by a separate developer (other than TxDOT) and no information is currently available on construction details such as methods/equipment, the extent of construction activities or clearing, bridge and culvert layouts, or Project Specific Locations (PSLs) such as staging areas.

Table 4.6-3 Potential Permanent Impacts to Vegetation/Wildlife Habitats

Vegetation Type	Existing ROW (acres)	Proposed ROW (acres)	Total Potential Impacts (acres)
Maintained Vegetation	2,361.0*	9.8	**2,370.8***
Crops	0	442.7	**442.7**
Mesquite-Baccharis Shrub/Parks/Woods	315.7*	0	**315.7***
Pasture	0	162.9	**162.9**
Live Oak Parks/Woods	44.5*	0	**44.5***
Mesquite Parks/Woods	0	32.0	**32.0**
Mesquite Shrub	0	15.5	**15.5**
Huisache Shrub/Brush	0.6	8.0	**8.6**
Mixed Shrub	0	2.0	**2.0**
Cedar Elm-Hackberry Parks/Woods	0	1.0	**1.0**[1]
Aquatic/Semi-aquatic	21.3*	2.6	**23.9***[1]
Total	***2,743.1****	***676.5***	***3,419.6****[1]

* Approximately 1,361.3 acres of the vegetation/wildlife habitats that could be permanently impacted are located within the sand sheet in Kenedy County. This includes approximately 984.5 acres of maintained vegetation, all of the Mesquite-Baccharis Shrub/Parks/Woods (315.7 acres), all of the Live Oak Parks/Woods (44.5 acres), and 16.6 acres of aquatic/semi-aquatic habitats. Permanent and temporay impacts to these habitats would be minimized.
[1] Approximately 5.0 acres of the vegetation/wildlife habitats that could be impacted by the project are considered riparian habitats. This includes approximately 4.0 acres of aquatic/semi-aquatic habitats (herbaceous wetlands along streams) and the 1.0 acre of Cedar Elm Parks/Woods.
Source: Blanton & Associates, Inc., October 2009

TxDOT has designed the project as proposed by the Build Alternative to maximize the use of the existing ROW and roadway, thereby minimizing the amount of new ROW and potential impacts to vegetation/wildlife habitats. While all vegetation/wildlife habitats present in the proposed ROW (676.5 acres) would be cleared and converted to transportation ROW, not all areas of vegetation/wildlife habitat in the existing ROW are likely to be removed. For example, within the Kenedy County sand sheet, the current plans do not call for construction at the Border Patrol Facility, Sarita rest area, and in areas where there are no ranch gates that require access. In addition, at streams and man-made drainages, the construction plans call for bridges, which would likely span most aquatic habitats and riparian areas in these areas. Areas of new construction proposed by the current plan (dated July 2010) are shown in relation to vegetation/wildlife habitats in a set of maps titled *US 77 Vegetation/Wildlife Habitats and Project Plans, SH 107 to FM 892*, which is on file at TxDOT's TTA office.

To further minimize impacts during construction, TxDOT would include notes in the Environmental Permits, Issues and Commitments (EPIC) sheets for the developer/contractor to minimize clearing of and avoiding the placement of PSLs in or adjacent to higher quality habitats such as Live Oak Parks/Woods, mesquite-dominated areas within the Kenedy County sand sheet, and aquatic/semi-aquatic habitats. In addition, disturbed areas would be reseeded with native plant species where possible.

In accordance with Provision (4)(A)(ii) of the TxDOT–TPWD MOU and the MOA, the following habitats were given consideration for non-regulatory mitigation during project planning:

A. Habitat for federal candidate species if mitigation would assist in the prevention of the listing of the species

B. Rare vegetation series (S1, S2, or S3) that also locally provide habitat for a state listed species
C. All vegetation communities listed as S1 or S2, regardless of whether the series in question provide habitat for state listed species
D. Bottomland hardwoods, native prairies, and riparian sites
E. Any other habitat feature considered to be locally important

None of the vegetation communities in the project area provide habitat for federal candidate species. In addition, according to *Plant Communities of Texas (Series Level)* (Texas Natural Heritage Program 1993), none of the plant communities in the project area are listed as S1, S2, or S3. The vegetation/wildlife habitats in the project area are relatively common in South Texas.

The proposed project could impact up to 5.0 acres of riparian vegetation, including 1.0 acre of riparian woodland (Cedar Elm-Hackberry Parks/Woods) along Petronila Creek and 4.0 acres of aquatic/semi-aquatic habitats (herbaceous wetlands) located along several streams and drainage ditches. TxDOT has minimized impacts to the Cedar Elm-Hackberry Parks/Woods vegetation by designing the proposed Driscoll relief route to cross a narrow portion of the riparian corridor and by minimizing ROW requirements. Proposed bridges at streams and man-made drainages would minimize impacts to herbaceous wetlands along them. The impacts to these riparian impacts have been avoided and minimized where possible, and during the PS&E phase of the project, the project details would be designed to minimize impacts to riparian corridors.

The proposed project could remove up to 44.5 acres of Live Oak Parks/Woods, which is a distinctive vegetation feature that provides habitat and cover for many wildlife species. The project has minimized impacts to this habitat by staying within the existing ROW through areas containing these woodlands and by designing the improvements to avoid the Live Oak Parks/Woods where possible. To further minimize impacts during construction, TxDOT would include notes in the EPIC sheets for the developer/contractor to minimize clearing of and avoiding the placement of PSLs in Live Oak Parks/Woods habitats. Although the woodlands are distinctive habitats in the ROW, they are common within the coastal sand sheet.

Aquatic habitats in the various creek, canals, and depressions are considered special habitat features under the TxDOT-TPWD MOA. The proposed project has avoided and minimized impacts to these habitats by staying within the existing ROW and utilizing the existing roadway, culverts, and bridges to the maximum practical extent, and by spanning the streams and larger

canals. Many of the wetlands in the project area are shallow ephemeral features that do not hold water for long periods of time.

None of the vegetation/wildlife habitats in the project area are recognized as a rare series or community that provides critical habitat for any state or federally listed threatened or endangered wildlife species. Based on the avoidance and minimization measures that have occurred during the design of the proposed project, no compensatory mitigation is currently proposed for riparian vegetation, live oak woodlands, or aquatic habitats. Mitigation for aquatic habitats and riparian areas would be re-evaluated during the Section 404 (Clean Water Act) permitting process.

4.6.3.1 Beneficial Landscape Practices and Invasive Species

In accordance with the Executive Memorandum on Beneficial Landscaping and E.O. 13112 on Invasive Species dated August 9, 1994, landscaping would be limited to seeding and replanting the ROW with native species of plants where possible. Soil disturbance would be minimized to reduce the establishment of invasive species in the ROW.

4.6.3.2 Migratory Birds

The Migratory Bird Treaty Act states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. During field investigations, bird nests were observed in culverts, under bridges, and in various habitats throughout the project area. To minimize impacts to migratory birds and their nests, eggs, and young, clearing within the project area would be conducted outside the nesting season to the maximum extent practical. In the event that migratory birds are encountered on site during project construction, appropriate procedures would be implemented to avoid take of protected birds, active nests, eggs, and/or young. Migratory patterns would not be affected by the proposed project.

4.6.3.3 Bats

A colony of Mexican free-tailed bats (*Tadarida brasiliensis*) resides under the US 77 bridges over Los Olmos Creek. The proposed Build Alternative would widen the existing northbound bridge approximately 10 feet. No improvements to the southbound bridge are proposed. To minimize impacts to bats, the proposed northbound bridge widening would be planned to occur during winter months, when the bats are not present.

4.7 THREATENED AND ENDANGERED SPECIES

This section describes the existing conditions concerning threatened and endangered species and their habitats in the project area and discusses the potential consequences to threatened and endangered species resulting from the Build and No Build Alternatives. The project area includes the existing and proposed ROW within the construction limits (SH 107 in Combes to FM 892 in Robstown).

To determine the potential for federally listed, state listed, and other rare species to occur in the project area and be affected by the proposed project, background reviews and field investigations were conducted. Background reviews included the following:

1. Reviewed the USFWS and TPWD lists of threatened and endangered species for the project counties.
2. Reviewed the TPWD's NDD for all previously recorded occurrences of threatened and endangered species in the project vicinity (NDD 2009).
3. Obtained records of known plant populations in the project ROW from the USFWS and TAMUK.
4. Conducted meetings with USFWS Ecological Services and TPWD in June 2008, October 2009, February 2010, June 2011, and January 2012 to discuss the project and its potential effects on federally listed threatened and endangered species.
5. Contacted the Peregrine Fund regarding information on the status of northern aplomado falcons (*Falco femoralis septentrionalis*) in the project vicinity.

6. Conducted a literature review to identify habitat requirements, current distribution, and status of each listed species.
7. Reviewed the project area relative to vegetation communities, soil associations, topography, and aerial photography.

After review of available background information, project biologists conducted on-site habitat assessments for all federally listed, state listed, and other rare species identified on the county lists. In addition, for the five federally listed plant species, presence-absence surveys were conducted between May 2008 and April 2009 in all potential habitat areas in the existing ROW and in portions of the proposed ROW where right-of-entry was granted. A presence-absence survey is a survey to determine whether or not a species is present in an area that provides suitable habitat (in this case, a pedestrian survey within potential habitat to look for the federally listed plant species). During the presence-absence surveys, known plant populations in the area were visited periodically to determine if the plants were flowering, fruiting, or were otherwise identifiable to ensure plant identification during surveys.

4.7.1 Existing Conditions

The threatened and endangered species lists for Cameron, Willacy, Kenedy, Kleberg, and Nueces Counties maintained by the USFWS and the TPWD identify a total of 60 federally and state listed threatened and endangered species that potentially occur within the project counties (USFWS 2012, TPWD 2011a-e). Twenty-six (26) species are federally listed or candidates for federal listing, and an additional 35 species are state listed only. **Table 4.7-1** lists these species by regulatory status, identifies the listed counties, describes their habitat requirements, and identifies whether habitat is present in the project area. In addition, **Table 4.7-1** identifies the anticipated effects of the proposed Build Alternative on listed species, which are discussed further in this section.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
Federally Listed/Candidate Species							
Jaguar[2] *Panthera onca*	E	E	Kleberg, Kenedy, Willacy, Cameron	Not applicable (extirpated from Texas)	Not Applicable	No Effect	Species is extirpated.
Gulf Coast Jaguarundi *Herpailurus yaguarondi cacomitli*	E	E	All	Dense thornshrub	Potential (disjointed travel corridors)	May Affect, Likely to Adversely Affect	No known populations exist in the project vicinity; Build Alt. would include measures to minimize impacts, including installation of three wildlife crossings.
Ocelot *Leopardus pardalis*	E	E	All	Dense thornshrub	Potential (disjointed travel corridors)	May Affect, Likely to Adversely Affect	A December 2010 road mortality on US 77 indicates the potential for future mortality; Build Alt. would include measures to minimize impacts, including installation of three wildlife crossings.
Red Wolf[2] *Canis rufus*	E	E	Nueces, Kleberg, Kenedy	Not applicable (extirpated from Texas)	Not Applicable	No Effect	Species is extirpated.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
West Indian Manatee *Trichechus manatus*	E	E	All	Rivers and coastal waters	No	No Effect	No suitable habitat for species is present in project area.
Brown Pelican *Pelicanus occidentalis*	DM	E	All	Marine/estuarine waters and adjacent lands	Potential	May Affect, Not Likely to Adversely Affect	Los Olmos Creek provides potential (marginal) foraging habitat; no nesting habitat is located within project area; Build Alt. would result in only minor impacts to potential habitat by widening the existing northbound bridge by 10 feet.
Eskimo Curlew[2] *Numenius borealis*	E	E	All	Not applicable (extirpated from Texas)	Not Applicable	No Effect	Species is considered extirpated from Texas; last accepted record nationwide is from 1963
Northern Aplomado Falcon *Falco femoralis septentrionalis*	E	E	All	Open, grassy plains or savannahs	Potential	No Effect	Aplomado falcons are not known to exist near the project area; the nearest known nest is 17 miles from the project area.
Interior Least Tern[2] *Sterna antillarum athalassos*	E	E	Cameron	Not applicable; species only listed if more than 50 miles from coastline	Not Applicable	No Effect	The project is located within 50 miles of the coast.
Piping Plover *Charadrius melodus*	T	T	All	Barrier islands and mainland beaches; mud, sand, algal flats; washover passes; salt marsh; coastal lagoons	Potential	May Affect, Not Likely to Adversely Affect	Los Olmos Creek provides potential (marginal) habitat; Build Alt. would result in only minor impacts to potential habitat by widening the existing northbound bridge by 10 feet.
Whooping Crane *Grus americanus*	E	E	Nueces, Kleberg, Kenedy	Estuaries, marshes, savannahs, grasslands, croplands	No	No Effect	No suitable habitat for species is present in project area. Project area is located more than 40 miles southwest of wintering grounds.
Atlantic Hawksbill Sea Turtle *Eretmochelys imbricata*	E	E	All	Marine/estuarine waters	No	No Effect	No suitable habitat for species is present in project area.
Green Sea Turtle *Chelonia mydas*	T	T	All	Marine/estuarine waters	No	No Effect	No suitable habitat for species is present in project area.
Kemp's Ridley Sea Turtle *Lepidochelys kempii*	E	E	All	Marine/estuarine waters	No	No Effect	No suitable habitat for species is present in project area.
Leatherback Sea Turtle *Dermochelys coriacea*	E	E	All	Marine/estuarine waters	No	No Effect	No suitable habitat for species is present in project area.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
Loggerhead Sea Turtle *Caretta caretta*	T	T	All	Marine/estuarine waters	No	No Effect	No suitable habitat for species is present in project area.
Rio Grande Silvery Minnow[2] *Hybognathus amarus*	E	E	Cameron	Not applicable (extirpated from Texas)	Not Applicable	No Effect	Species is extirpated from Texas; reintroduction efforts in Big Bend area.
Smalltooth Sawfish[2] *Pristis pectinata*	E	E	All	Young prefer shallow waters in seltered bays, estuaries, or river mouths; adults use various marine and estuarine habitats	No	No Effect	Species is virtually extirpated from Texas, and no suitable habitat is present in the project area.
Black Lace Cactus *Echinocereus reichenbachii* var. *albertii*	E	E	Kleberg	Natural openings in mesquite-pricklypear shrublands; sandy clay and loam soils along streams; saline areas	Potential (marginal)	No Effect	Potential (marginal) habitat was surveyed, and no black lace cactus was observed.
Slender rush-pea *Hoffmannseggia tenella*	E	E	Nueces, Kleberg	Native grasslands or openings in mesquite shrublands; sandy clay and loam soils	Yes	May Affect, Not Likely to Adversely Affect	Project has been designed and would be constructed to avoid populations within project area. During construction, fencing would be installed to protect populations.
South Texas Ambrosia *Ambrosia cheiranthifolia*	E	E	Nueces, Kleberg, Kenedy, Cameron	Grasslands, savannahs, openings in mesquite woodlands, often in disturbed areas; sandy clay or loam soils	Yes	May Affect, Not Likely to Adversely Affect	Project has been designed and would be constructed to avoid populations within project area. During construction, fencing would be installed to protect populations.
Star Cactus[2] *Astrophytum asterias*	E	E	Cameron	Sparsely vegetated mesquite woodlands; gravelly, saline clay and loam soils	No	No Effect	No suitable habitat for species is present in project area, and no star cactus was observed during presence-absence surveys.
Texas Ayenia *Ayenia limitaris*	E	E	Willacy, Cameron	Mesquite woodlands and subtropical, mixed riparian woodlands; well-drained, sandy to silty clay and loam soils	No	No Effect	No suitable habitat for species is present in project area, and no Texas ayenia was observed during presence-absence surveys.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
Red-crowned Parrot *Amazona viridigenalis*	C	—	Cameron	Within the LRGV, typically urban areas with large trees; in Mexico, tropical deciduous forest, gallery forest, evergreen floodplain forest, Tamaulipan thornscrub, and semi-open areas	No	No Impact	No suitable habitat for species is present in the existing ROW in Cameron County.
Sprague's Pipit[2] *Anthus spragueii*	C	—	All	Migration/winter; native upland prairie, can be locally common in coastal grasslands	Potential	May Impact[4]	Species not currently protected; Build Alt. would impact potential wintering habitat; however, no nesting habitat would be affected, and substantial amounts of wintering habitat occur in the project vicinity and throughout South Texas.
Texas Hornshell[2] *Popenaias popeii*	C	—	Cameron	In Texas, now known only from Rio Grande near Laredo; crevices, undercut riverbanks, travertine shelves, and under large boulders	No	No Impact[4]	No suitable habitat for species is present in project area.
State Listed Species							
Coues' Rice Rat *Oryzomys couesi*	—	T	Kenedy, Willacy, Cameron	Cattail-bulrush marsh with shallower zone of aquatic grasses near shoreline; prefers salt and freshwater	No	No Impact	No cattail-bulrush marsh is located in project area.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
Southern Yellow Bat *Lasiurus ega*	—	T	All	Trees, palm trees	Potential	May Impact	Records near area; may use trees throughout project area, particularly palm trees in Willacy and Cameron Counties. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
White-nosed Coati *Nasua narica*	—	T	All	Woodlands, riparian corridors, and canyons; most individuals in Texas probably transients from Mexico	Potential	May Impact	Species may utilize woodlands in Kenedy and northern Willacy Counties. Impacts would be limited to removal of potential habitat; individuals are transient and would likely avoid construction activities.
Cactus Ferruginous Pygmy-owl *Glaucidium brasilianum cactorum*	—	T	Kenedy, Willacy, Cameron	Riparian trees, brush, palm, and mesquite thickets	Potential	May Impact	Species may utilize woodlands in Kenedy and northern Willacy Counties. Clearing outside nesting season would minimize impacts.
Common Black-hawk *Buteogallus anthracinus*	—	T	Willacy, Cameron	Cottonwood-lined rivers and streams, willow tree groves on the lower Rio Grande floodplain	No	No Impact	No suitable habitat for species is present in project area.
Gray Hawk *Asturina nitida*	—	T	Cameron	Mature riparian woodlands and nearby semiarid mesquite and scrub grasslands	No	No Impact	No suitable habitat for species is present in project area.
Northern Beardless-Tyrannulet *Camptostoma imberbe*	—	T	Kleberg, Kenedy, Willacy, Cameron	Mesquite woodlands	Potential	May Impact	Species may utilize woodlands in Kenedy and northern Willacy Counties. Clearing outside nesting season would minimize impacts.
Peregrine Falcon *Falco peregrinus*	—	T	All	Only subspecies *anatum* (American peregrine falcon) is listed, but subspecies *tundrius* is not easily distinguishable at a distance; both are potential migrants through area and prefer open areas near water	Potential	May Impact	Species could occur in project area. Impacts would be limited to removal of potential habitat; species does not nest in South Texas and would likely avoid construction activities.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
Reddish Egret *Egretta rufescens*	—	T	All	Brackish marshes, shallow salt ponds, and tidal flats	Potential	May Impact	Incidentally observed near project area during various field investigations. Impacts would be limited to removal of potential habitat; species is not likely to nest in ROW and would likely avoid construction activities.
Rose-throated Becard *Pachyramphus aglaiae*	—	T	Kenedy, Willacy, Cameron	Riparian trees, woodlands, open forest, scrub and mangroves	Potential	May Impact	Species may utilize woodlands in Kenedy and northern Willacy Counties. Clearing outside nesting season would minimize impacts.
Sooty Tern *Sterna fuscata*	—	T	All	Largely marine; rarely lands	No	No Impact	No suitable habitat for species is present in project area.
Texas Botteri's Sparrow *Aimophila botterii texana*	—	T	All	Grassland and short-grass plains with scattered bushes or shrubs, sagebrush, mesquite, or yucca	Potential	May Impact	Species could use habitats throughout project area. Clearing outside nesting season would minimize impacts.
Tropical Parula *Parula pitiayumi*	—	T	Kenedy, Willacy, Cameron	Woods, brush, and trees along edges of rivers and resacas	Potential	May Impact	Species may utilize woodlands in Kenedy and northern Willacy Counties. Clearing outside nesting season would minimize impacts.
White-faced Ibis *Plegadis chihi*	—	T	All	Freshwater marshes, sloughs, and irrigated rice fields	Potential	May Impact	Incidentally observed near project area during various field investigations. Impacts would be limited to removal of potential habitat; species is not likely to nest in ROW and would likely avoid construction activities.
White-tailed Hawk *Buteo albicaudatus*	—	T	All	Coastal prairies; cordgrass flats and live oak scrub	Potential	May Impact	Incidentally observed during various field investigations. Impacts would be limited to removal of potential habitat; species is not likely to nest in ROW and would likely avoid construction activities.
Wood Stork *Mycteria americana*	—	T	All	Prairie ponds, flooded pastures or fields, ditches, and other shallow standing water, including salt water	Potential	May Impact	Species may utilize wetlands/depressions in Kenedy County. Impacts would be limited to removal of potential habitat; species does not nest in South Texas and would likely avoid construction activities.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
Zone-tailed Hawk *Buteo albonotatus*	—	T	Kenedy, Willacy, Cameron	Arid open country, open deciduous or pine-oak woodland, mesa or mountain country	Potentials	May Impact	One incidental observation near project area during field investigations. Impacts would be limited to removal of potential habitat because species is not likely to nest in ROW and would likely avoid construction activities.
Black-striped Snake *Coniophanes imperialis*	—	T	Kenedy, Willacy, Cameron	Semi-arid coastal plain, warm, moist micro-habitats and sandy soils	Potential	May Impact	Records near project area; may utilize sandy soils in Kenedy and Willacy Counties. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
Indigo Snake *Drymarchon corais*	—	T	All	Thornbush-chaparral woodlands of South Texas, dense riparian corridors	Yes	May Impact	Incidentally observed in project area during various field investigations. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
Northern Cat-eyed Snake *Leptodeira septentrionalis septentrionalis*	—	T	Kleberg, Kenedy, Willacy, Cameron	Thorn brush woodland; dense thickets bordering ponds and streams	Potential	May Impact	Records near project area; may utilize wooded areas around wetlands in Kenedy County. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
Speckled Racer *Drymobius margaritiferus*	—	T	Willacy, Cameron	Dense thickets near water, Texas palm groves, riparian woodlands	No	No Impact	No suitable habitat for species is present in project area.
Texas Horned Lizard *Phrynosoma cornutum*	—	T	All	Open, arid and semi-arid regions with sparse vegetation	Yes	May Impact	Incidentally observed in project area during various field investigation; may utilize various habitats in all project counties. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
Texas Scarlet Snake *Cemophora coccinea lineri*	—	T	All	Mixed hardwood scrub on sandy soils	Potential	May Impact	Records near project area; may utilize wooded sandy areas in Kenedy, southern Kleberg, and northern Willacy Counties. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
Texas Tortoise *Gopherus berlandieri*	—	T	All	Open brush with a grass understory	Yes	May Impact	Incidentally observed in project area during various field investigations; may utilize various habitats throughout project area. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
Black-spotted Newt *Notophthalmus meridionalis*	—	T	All	Wet or moist areas, arroyos, canals, ditches, or shallow depressions; aestivates in ground during dry periods	Potential	May Impact	Records near project area; may utilize aquatic habitats throughout project area. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
Mexican Treefrog *Smilisca baudinii*	—	T	Kenedy, Willacy, Cameron	Moist tree bark, burrows, and other moist areas near streams and resacas	Potential	May Impact	Species may utilize wooded areas near aquatic habitats in Kenedy County. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
Sheep Frog *Hypopachus variolosus*	—	T	All	Grasslands and savannah, moist sites in arid areas	Potential	May Impact	Records near project area; may utilize areas near aquatic habitats throughout project area. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.
South Texas Siren *Siren* sp. 1	—	T	Kleberg, Kenedy, Willacy, Cameron	Wet or sometimes wet areas, such as arroyos, canals, ditches, or even shallow depressions	Potential	May Impact	Records near project area; may utilize aquatic habitats in project area. Impacts would be minimized by reducing clearing/construction in potential habitats and re-seeding with native seed mix where possible.

Table 4.7-1 Threatened and Endangered Species of Potential Occurrence in the Project Area for the Build Alternative

Species	Federal Status[1]	State Status[1]	Listed Counties	Description of Suitable Habitat	Habitat Present?	Species Effect/ Impact[3]	Justification[3]
White-lipped Frog *Leptodactylus fragilis*	—	T	Cameron	Grasslands, cultivated fields, roadside ditches	No	No Impact	Only one known locale in southern Cameron County; may be extirpated due to pesticides.
Mexican Goby *Ctenogobius claytonii*	—	T	Cameron	Brackish and freshwater coastal streams	No	No Impact	No suitable habitat for species is present in project area.
Opossum Pipefish *Microphis brachyurus*	—	T	All	Fresh or brackish water in southern coastal areas; young move into more saline waters	Potential	May Impact	May utilize streams in Nueces and Kleberg Counties. Impacts would be limited to minor habitat disturbance due to bridge expansion or construction.
River Goby *Awaous banana*	—	T	Cameron	Clear water with slow to moderate current, sandy or hard bottom, and little or no vegetation	No	No Impact	In Texas, known only from Rio Grande, which is not in project area.
False Spike Mussel *Quadrula mitchelli*	—	T	Cameron	Possibly extirpated in Texas; various substrates in medium to large rivers; Rio Grande, Brazos, Colorado, and Guadalupe (historic) basins	No	No Impact	No suitable habitat for species is present in project area.
Mexican Fawnsfoot Mussel *Truncilla cognata*	—	T	Cameron	Largely unknown; possibly needs flowing streams/rivers with sand or gravel bottoms; Rio Grande basin	No	No Impact	No suitable habitat for species is present in project area.
Salina Mucket *Potamilus metnecktayi*	—	T	Cameron	Lotic waters; submerged soft sediments along river bank; Rio Grande basin	No	No Impact	No suitable habitat for species is present in project area.

[1] E = Endangered; T = Threatened; C = Candidate for Federal Listing; DM = Delisted, Being Monitored for First 5 Years; — = Not listed
[2] The USFWS does not list the jaguar, red wolf, Eskimo curlew, interior least tern, Rio Grande silvery minnow, smalltooth sawfish, star cactus, or Texas hornshell for any of the project counties; however, these species are listed on one or more of the TPWD's county lists.
[3] Species Effect/Impact and Justification are based on habitat assessments for all species and presence-absence surveys for federally listed plant species.
[4] The red-crowned parrot, Sprague's pipit, and Texas hornshell are candidate species that are currently not protected by the Endangered Species Act; therefore, Endangered Species Act effect language is not used for these species.
Source: USFWS 2012, TPWD 2011a-e, accessed in March 2012

The TPWD's NDD was reviewed in December 2009, in accordance with the requirements of the TxDOT-TPWD MOA for sharing and maintaining NDD information. Within 1.5 miles of the project area, the NDD identified 24 records of federally listed species, 38 records of state listed species, and 16 records of other rare species (**Table 4.7-2**).

Table 4.7-2 NDD Elements of Occurrence Records Within 1.5 Miles of Project Area

Element of Occurrence ID No.	Common Name	Scientific Name	Status	Location Description
Federally Listed Threatened and Endangered Species				
4108	Jaguar	*Panthera onca*	FE	Killed near Lyford in 1912
7560	Jaguar	*Panthera onca*	FE	Killed near Kingsville in 1948. This is the last known record of jaguars in Texas
2444	Gulf Coast Jaguarundi	*Herpailurus yaguarondi*	FE	5 mile-radius circle centered 4.7 miles east of US 77 in Kenedy County
131	Ocelot	*Leopardus pardalis*	FE	Roadkill on US 77, 2.8 miles north of Sarita, October 1997
1273	Ocelot	*Leopardus pardalis*	FE	Yturria Ranch conservation easements located 9.0 miles northeast of Raymondville
3745	Ocelot	*Leopardus pardalis*	FE	Roadkill on US 77, 4.0 miles south of Sarita, August 1990
5311	Ocelot	*Leopardus pardalis*	FE	5 mile-radius circle centered 4.7 miles east of US 77 near Willacy/Kenedy County line
7484	Ocelot	*Leopardus pardalis*	FE	Along US 77 near Raymondville
8402	American Burying Beetle	*Nicrophorus americanus*	FE	1.5 mile-radius circle centered 1.4 miles west of US 77 in Kingsville. Record identifies location is highly suspect and far outside the species' range and habitat. Species is not on the USFWS and TPWD endangered species lists for the project counties.
2529	Black Lace Cactus	*Echinocereus reichenbachii* var. *albertii*	FE	5 mile-radius circle centered 0.3 mile west of US 77 in Kingsville
253	Slender rush-pea	*Hoffmannseggia tenella*	FE	In US 77 ROW just south of the Kleberg/Nueces County line
4299	Slender rush-pea	*Hoffmannseggia tenella*	FE	1.25 mile-radius circle centered 1,500 feet northwest of project area in Robstown
6517	Slender rush-pea	*Hoffmannseggia tenella*	FE	0.5 mile west of US 77 in St. James Cemetery, Bishop
1186	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.6 mile east of US 77 near Kingsville
1549	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.4 mile east of US 77 near Kingsville
1680	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.3 mile east of US 77 near Kingsville
2430	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.6 mile east of US 77 near Kingsville
3361	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	0.5 mile west of US 77 in St. James Cemetery, Bishop
4752	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	In US 77 ROW at Carreta Creek
5523	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.6 mile east of US 77 near Kingsville
5923	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	0.6 mile east of US 77 in undeveloped Bishop city park
6583	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.3 mile east of US 77 near Kingsville
6590	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.3 mile east of US 77 near Kingsville
7644	South Texas Ambrosia	*Ambrosia cheiranthifolia*	FE	1.7 miles north of project in Robstown
State Listed Threatened and Endangered Species				
6112	Southern Yellow Bat	*Lasiurus ega*	ST	1.25 mile-radius circle centered 0.5 mile east of US 77 south of Driscoll
3874	Black-striped Snake	*Coniophanes imperialis*	ST	0.6 mile east of US 77 south of Norias
3142	Indigo Snake	*Drymarchon corais*	ST	1.25 mile-radius circle centered 0.5 mile west of US 77 along Escondido Creek south of Kingsville
3444	Indigo Snake	*Drymarchon corais*	ST	At US 77, 1.7 miles south of Sarita

Table 4.7-2 NDD Elements of Occurrence Records Within 1.5 Miles of Project Area

Element of Occurrence ID No.	Common Name	Scientific Name	Status	Location Description
3554	Indigo Snake	*Drymarchon corais*	ST	0.9 mile east of US 77, at BUS 77 and Caretta Creek in Bishop
4492	Indigo Snake	*Drymarchon corais*	ST	2.0 miles east of Riviera on FM 771
7049	Indigo Snake	*Drymarchon corais*	ST	15 miles southeast of Kingsville
2422	Northern Cat-eyed Snake	*Leptodeira septentrionalis septentrionalis*	ST	1.25 mile-radius circle centered 0.3 mile west of US 77 south of the Willacy/Kenedy County Line
3460	Northern Cat-eyed Snake	*Leptodeira septentrionalis septentrionalis*	ST	1.25 mile-radius circle centered 0.5 mile west of US 77 north of the Willacy/Kenedy County Line
5032	Texas Scarlet Snake	*Cemophora coccinea lineri*	ST	US 77, 7.5 miles north of the Willacy/Kenedy County line
6566	Texas Scarlet Snake	*Cemophora coccinea lineri*	ST	US 77, 2.0 miles north of Norias
8204	Texas Scarlet Snake	*Cemophora coccinea lineri*	ST	US 77, 3.0 miles south of Armstrong
2012	Texas Tortoise	*Gopherus berlandieri*	ST	US 77, 12 miles south of Sarita
2382	Texas Tortoise	*Gopherus berlandieri*	ST	Kingsville area
4655	Texas Tortoise	*Gopherus berlandieri*	ST	US 77, 2.0 miles north of Armstrong
7414	Texas Tortoise	*Gopherus berlandieri*	ST	US 77, just north of San Fernando Creek (north of Kingsville)
153	Black-spotted Newt	*Notophthalmus meridionalis*	ST	Kingsville area
912	Black-spotted Newt	*Notophthalmus meridionalis*	ST	2.2 miles east of Riviera
3032	Black-spotted Newt	*Notophthalmus meridionalis*	ST	1.25 mile-radius circle centered 1.1 miles west of US 77, south of Kingsville
4071	Black-spotted Newt	*Notophthalmus meridionalis*	ST	Near Raymondville
4521	Black-spotted Newt	*Notophthalmus meridionalis*	ST	In US 77 ROW between Norias and the Willacy-Kenedy County line
5489	Black-spotted Newt	*Notophthalmus meridionalis*	ST	10 miles south of Raymondville
7225	Black-spotted Newt	*Notophthalmus meridionalis*	ST	1.0 mile south of Raymondville
365	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW 2.9 miles south of Sarita
1204	Sheep Frog	*Hypopachus variolosus*	ST	1.0 mile south of Kingsville
2385	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW 2.2 miles north of Raymondville
2758	Sheep Frog	*Hypopachus variolosus*	ST	Kingsville area
2816	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW 0.3 mile north of Raymondville
3402	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW 12 miles south of Sarita
4621	Sheep Frog	*Hypopachus variolosus*	ST	1.25 mile-radius circle centered 1.8 miles east of US 77 along Santa Gertrudis Creek, south of Kingsville
5477	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW near the Willacy/Kenedy County line
5478	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW near the Willacy/Kenedy County line
5959	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW near the Willacy/Kenedy County line
6316	Sheep Frog	*Hypopachus variolosus*	ST	1.25 mile-radius circle centered 2.0 miles west of US 77 along Ebanito Creek near Ricardo
6683	Sheep Frog	*Hypopachus variolosus*	ST	In US 77 ROW 5.0 miles north of the Willacy/Kenedy County line
7465	Sheep Frog	*Hypopachus variolosus*	ST	Along US 77 on the south side of Kingsville
3826	South Texas Siren	*Siren* sp. 1	ST	10 miles north of Raymondville

Table 4.7-2 NDD Elements of Occurrence Records Within 1.5 Miles of Project Area

Element of Occurrence ID No.	Common Name	Scientific Name	Status	Location Description
7103	South Texas Siren	*Siren* sp. 1	ST	1.25 mile-radius circle centered on US 77 north of Riviera
Other Rare Species				
1892	Sennett's Hooded Oriole	*Icterus cucullatus sennettii*	Rare	On US 77 2.7 miles south of Sarita
2375	Keeled Earless Lizard	*Holbrookia propinqua*	Rare	On US 77 2.0 miles south of Sarita
4259	Keeled Earless Lizard	*Holbrookia propinqua*	Rare	On US 77 4.6 miles south of Sarita
1307	Bailey's Ballmoss	*Tillandsia baileyi*	Rare	5 mile-radius circle centered 4.3 miles east of US 77 near Norias
3881	Bailey's Ballmoss	*Tillandsia baileyi*	Rare	In US 77 rest area 6.0 miles south of Sarita
5828	Bailey's Ballmoss	*Tillandsia baileyi*	Rare	Near Norias
8389	Bailey's Ballmoss	*Tillandsia baileyi*	Rare	In US 77 ROW 2.7 miles South of Sarita
6715	Elmendorf's Onion	*Allium elmendorfii*	Rare	Along US 77 near Willacy/Kenedy County line
445	Kleberg Saltbush	*Atriplex klebergorum*	Rare	1.25 mile-radius circle centered on US 77 south of Ricardo
1529	Lila de los Llanos	*Echeandia chandleri*	Rare	5 mile-radius circle centered 1.0 mile west of US 77 in Kingsville
1797	Lila de los Llanos	*Echeandia chandleri*	Rare	North of Robstown and project area
4438	Lila de los Llanos	*Echeandia chandleri*	Rare	St. James Cemetery, Bishop
5859	Lila de los Llanos	*Echeandia chandleri*	Rare	1.25 mile-radius circle centered 1.7 miles east of US 77 at Robstown
5058	Plains Gumweed	*Grindelia oolepis*	Rare	1.25 mile-radius circle centered 400 feet east of Driscoll
7439	Plains Gumweed	*Grindelia oolepis*	Rare	1.7 miles north of project in Robstown
3579	Texas Windmillgrass	*Chloris texensis*	Rare	6.0 miles west of Corpus Christi on road shoulder
FE = Federally listed as Endangered; ST = State listed as Threatened				

Source: TPWD NDD, December 2009

A habitat assessment was conducted within and adjacent to the project area by reviewing background data, NDD records, and aerial and topographic maps, and conducting field investigations. The following describes the general habitats in and adjacent to the project area:

- Within the southernmost 20.4 miles of the project area, which includes Cameron County and most of Willacy County, the project area is within existing ROW. In this segment, the existing ROW consists of maintained herbaceous vegetation with planted American cotton palms and strips of oleander. Surrounding areas are heavily dominated by cropland, with urbanized areas occurring in Combes, Sebastian, Lyford, and Raymondville. Wooded areas are dominated by mesquite and occur in scattered patches, usually associated with large residential properties, and in strips between US 77 and the UPRR. Aquatic features within this portion of the project area include the North Floodway, Willacy County Drainage Canal, East Main Drain, and a few other small manmade ditches/canals. Scattered excavated ponds and wetland complexes are present in surrounding properties. Soils in this segment are generally clay and sandy loams.
- Within northern Willacy County and all of Kenedy County (51.7 mi), the project area is within existing ROW. This stretch of the project area crosses the South Texas Sand Sheet. The existing ROW in this segment is generally dominated by introduced grasses

but also includes a variety of native grasses and forbs. In addition, strips of mesquite woodlands and scattered live oak mottes are present in the existing median, and portions of several large depressions that periodically hold water extend into the ROW. Within the ROW, the depressions exist as slivers in the median and between the roadway and ROW edge. Surrounding the ROW in this segment are large, undeveloped ranches containing vegetation communities that include mesquite woodlands and savannahs, live oak woodlands, and grasslands.

- Within Kleberg and Nueces Counties (40.2 miles), the project area includes both existing and proposed ROW, with the proposed Build Alternative including new-location relief routes on the east side of Riviera and Driscoll. At the south end of this segment, the South Texas Sand Sheet transitions into loamy soils, and the existing ROW consists of maintained vegetation, while the proposed ROW is dominated by cleared pastureland with scattered mesquite trees. The central and northern portions of this segment are dominated by cropland on primarily clay soils, with scattered patches of mesquite-dominated vegetation. Several creeks and drainageways provide aquatic habitats, including Ebanito, Jaboncillos, Escondido, Santa Gertrudis, Tranquitas, San Fernando, Carreta, and Petronila Creeks. Urbanized areas include Riviera, Ricardo, Kingsville, Bishop, Driscoll, and Robstown.

The following sections describe the potential for threatened and endangered species to occur in the project area based on the habitat descriptions provided in **Table 4.7-1**, the habitat assessment conducted in the project area, and previous records and observations near the project area. The species are discussed in the following three sections:

- Federally Listed Threatened and Endangered Species
- State Listed Threatened and Endangered Species
- Other Rare Species.

4.7.1.1 Federally Listed Threatened and Endangered Species

This section describes habitat requirements for the federally listed species of potential occurrence in the project counties, identifies known records of the species near the project area, and discusses the results of habitat assessments and potential for the species to occur in or near the project area. Since the jaguar (*Panthera onca*), red wolf (*Canis rufus*), Eskimo curlew (*Numenius borealis*), and Rio Grande silvery minnow (*Hybognathus amarus*) are considered extirpated from Texas, they are not discussed further. In addition, the interior least tern (*Sterna antillarum athalassos*) is not discussed because the project is located within 50 miles of the coast. None of these species are listed by the USFWS as potentially occurring in the project counties.

Gulf Coast Jaguarundi
The Gulf coast jaguarundi (*Herpailurus yaguarondi*) is listed by the USFWS as endangered and is identified on both the USFWS and TPWD lists as potentially occurring in all the project counties. This species is thought to have similar habitat requirements to the ocelot, preferring dense thornshrub (see description of ocelot below). Population estimates for the jaguarundi in Texas are not available, and no known populations exist. The last known jaguarundi in Texas was killed on SH 4 east of Brownsville in Cameron County in 1986, although there is photographic evidence of a jaguarundi at the Audubon Sabal Palm Sanctuary near Brownsville in 1989 (NDD 2009). One record of this species occurs within 1.5 miles of the project area in Kenedy County (**Table 4.7-2**). A known population of jaguarundi does exist in the coastal state

of Tamaulipas, Mexico (Arturo Casas, personal communication, 2000).

The habitat assessment conducted in the proposed project area identified that no substantial areas of dense thornshrub are located in or adjacent to the project area, although potential dispersal corridors exist in Kenedy and northern Willacy Counties.

Ocelot
The ocelot (*Leopardus pardalis*) is listed by the USFWS as endangered and is identified on both the USFWS and TPWD lists as potentially occurring in all the project counties. This species prefers dense thornshrub typical of the Tamaulipan Biotic Province. Historically, this habitat occurred throughout southern Texas, but in the 20th century was reduced to less than one percent of its former distribution by conversion into agricultural and suburban land use (Tewes and Everett 1986). Typical brush species include granjeno, brasil, desert yaupon (*Schaefferia cuneifolia*), wolfberry (*Lycium* spp.), lotebush, althorn goatbush, whitebrush (*Aloysia gratissima*), catclaw acacia (*Acacia greggii*), lantana (*Lantana* spp.), cenizo (*Leucophyllum frutescens*), elbowbush (*Forestiera* sp.), and Texas persimmon, with some interspersed trees such as mesquite, live oak, ebony (*Ebenopsis ebano*), and hackberry (*Celtis* spp.).

Suitable habitat is largely based on canopy cover and density of shrubs. Optimal habitat has at least 95 percent canopy cover of shrubs, while marginal habitat has 75 to 95 percent canopy cover. Anything less than 75 percent canopy cover is considered to be inadequate (Campbell 2003). Tracts of at least 100 acres of dense thornshrub with greater than 75 percent canopy cover or 75 acres of brush interconnected with other dense brush patches by corridors are considered important as habitat for ocelots (Campbell 2003).

It is estimated that fewer than 100 ocelots remain in Texas, with the majority distributed in Cameron and Willacy Counties (Tewes and Everett 1986, Haines et al. 2006). Two known breeding populations, both of which are located east of US 77, represent an estimated one-third of the total ocelot population. One population numbering six to 12 ocelots is located on USFWS conservation easements totaling over 2,400 acres on a private ranch in northern Willacy County (Dr. Michael Tewes, TAMUK, personal communication). This population is located approximately 7.0 miles east of US 77. The second population, numbering 10 to 20 ocelots, occurs in the 45,000-acre Laguna Atascosa National Wildlife Refuge (LANWR) located approximately 20 miles east of US 77 in Cameron County (Jody Mays, USFWS, personal communication). Resident ocelots from these two populations are considered to have minimal interaction with US 77 based on (1) their distance from the roadway, (2) the large amount of open land and cropland between US 77 and the populations, (3) the lack of suitable habitat along US 77, and (4) unpublished telemetry data from collared cats in the Yturria population (personal communication with Lon Grassman). However, there have been four documented ocelot road mortalities on US 77 between the project limits: 2.8 miles north of Sarita (October 1997), 4.0 miles south of Sarita (August 1990), 1 mile south of the Kenedy/Willacy County line (December 24, 2010), and 1.0 mile north of Lyford (November 1997). All of these ocelots were young adult males, consistent with dispersers in search of new breeding territories. The ocelot recovery team is currently developing a plan to translocate ocelots from Mexico to the known populations at LANWR and Yturria Ranch to augment those populations. Future plans include possible relocations to historic locations on ranches west of US 77 in Willacy County, which may increase dispersal across US 77 (Dr. Michael Tewes, TAMUK, personal communication).

A habitat assessment conducted for the proposed project identified that, besides a few small, scattered and isolated patches, there are no areas of optimal or suboptimal ocelot habitat along

US 77, and there are no obvious corridors that ocelots would use to cross the roadway. Potential travel corridors were identified near the Kenedy/Willacy County line, which is near the Yturria population, and the December 2010 road mortality indicates that ocelots may disperse through this area. These corridors are characterized as disjointed connections of moderately dense brush that may provide a potential dispersal route west towards areas of dense brush located 7.0 miles west of US 77; however, there are no clear, heavily vegetated corridors. The East Main Drain, located approximately 5.5 miles south of the Kenedy/Willacy County line, also provides a potential corridor.

Kenedy County provides a large expanse of undeveloped rangeland adjacent to the project area, but the primary habitats in the area are grasslands/savannahs and open oak-mesquite woodlands, and no known populations of ocelots exist in these areas. Based on the two documented roadkills of ocelots near Sarita in northern Kenedy County, dispersing ocelots may cross these areas.

West Indian Manatee
The West Indian manatee (*Trichechus manatus*) is listed by the USFWS as endangered and is identified on both the USFWS and TPWD lists as potentially occurring in all the project counties. Manatees inhabit both salt and fresh waters, including rivers, bays, and coastal areas in tropical and sub-tropical regions of the new world. During colder months, they concentrate in areas of warmer water, including natural springs and at power plant outfalls. During warmer months, they appear to choose areas based on an adequate food supply, water depth, and proximity to fresh water (USFWS 1993a). Critical habitat for this species has been designated in Florida.

Records of manatees in Texas are very rare, but near the turn of the century they were apparently not uncommon in the Laguna Madre (Davis and Schmidly 1994), and Perrin et al. (2002) states that they can be found in eastern Texas at the extremes of their summer distribution. Historic records of manatees along the Texas coast include a report from the mouth of the Rio Grande and a relatively recent record (2005) at Port Mansfield (21 miles east of US 77). The project area is located between 4 and 26 miles from coastal bays, and the creeks that cross the project area are relatively small and do not provide suitable habitat. Los Olmos Creek has a wide channel where it crosses US 77 at the Kenedy/Kleberg County line, and the US 77 crossing is located approximately 4.0 miles from the western extent of Baffin Bay (Laguna Salada); however, portions of the channel between US 77 and Baffin Bay appear to be very narrow and shallow. Based on the very rare occurrence of West Indian manatees in Texas and the lack of suitable habitat in or near the project area, this species would not occur in the project area.

Brown Pelican
The brown pelican (*Pelecanus occidentalis*) is a large water bird that was listed as endangered by the USFWS but, due to recovery, was delisted on December 17, 2009. The USFWS will monitor the species' status for no less than five years after delisting. The USFWS and TPWD lists identify brown pelicans as potentially occurring in all the project counties. This species is found along the entire Texas coast, with most nesting colonies concentrated around Pelican Island in Corpus Christi Bay and Sundown Island near Port O'Connor (USFWS 2007). Brown pelicans nest in colonies on small, isolated coastal islands where they are safe from predators. Nesting habitat ranges from mud banks and spoil islands to offshore islands covered with mangroves and other woody vegetation. During the non-breeding season, pelicans use sand pits, offshore sand bars, and islets for nocturnal roosting and daily loafing. Brown pelicans seldom venture more than 20 miles out to sea or too far inland, and most foraging occurs in

shallow marine estuaries and shallow waters of ocean, bays, and lagoons (Sibley 2003, Campbell 2003). No critical habitat has been designated by the USFWS for this species.

The project area ranges from approximately 4 to 26 miles from coastal bays, and the only tidally influenced water in or near the project area is Los Olmos Creek. At the US 77 crossing, Los Olmos Creek may be wide enough and deep enough to provide foraging habitat for brown pelicans. Although there are no NDD records near the project area, and no brown pelicans were observed at Los Olmos Creek during multiple site visits, the use of the creek by foraging pelicans cannot be ruled out. The habitat is considered marginal because the US 77 crossing is approximately 4.0 miles from the western extent of Baffin Bay and near the creek's tidal limit, and the creek is bordered by upland areas between the project area and the bay. Based on this information, the potential for encountering brown pelicans in the project area is considered low. No nesting habitat is located in or near the project area.

Northern Aplomado Falcon
The northern aplomado falcon is listed by the USFWS as endangered and is identified on the USFWS list as potentially occurring in all the project counties except Nueces. The TPWD includes Nueces County in the species' range. This species inhabits open, grassy plains or savannahs with either scattered islands of shrubs or trees or woodland and forest borders. They do not construct their own nests but appropriate stick platforms built by other raptors and corvids (Campbell 2003). In southern Texas, nests have been found in Spanish dagger, honey mesquite, Texas ebony, and on artificial structures such as electric transmission poles. Recent surveys have even found these falcons nesting on the ground (Burnham et al. 2002). No critical habitat has been designated by the USFWS for this species.

Although rare elsewhere in the US, there were regular sightings of northern aplomado falcons on the King Ranch as late as the 1950s (Campbell 2003). The species has been reintroduced in portions of South and West Texas, including releases on the King and Kenedy ranches. However, successful breeding populations of aplomado falcons in South Texas are currently limited to areas in and around the LANWR in Cameron County and Matagorda Island NWR in Aransas and Calhoun Counties (The Peregrine Fund, 2008, personal communication). In 2006, the nearest documented aplomado falcon nest to the project area was located near the confluence of Arroyo Colorado with the Laguna Madre in Cameron County, approximately 17 miles east of the project area (The Peregrine Fund, 2008, personal communication). Although the Kenedy County portion of the project area crosses grassland and savannah habitats that may be suitable for aplomado falcons, correspondence with The Peregrine Fund (which closely monitors the establishment and expansion of reintroduced aplomado falcons) indicates that they have surveyed much of the US 77 corridor and have not found aplomado falcons nesting there, nor made any observations of the presence of individual falcons. Additionally, The Peregrine Fund indicated that establishment of a population in that area would be discouraged by predation pressures from great horned owls (*Bubo virginianus*). There are no NDD records of the species near the project area, and none were observed during multiple field visits conducted for this project. Based on this information, northern aplomado falcons are not expected to occur in the project area.

Piping Plover
The piping plover (*Charadrius melodus*) is listed by the USFWS as threatened and is identified on both the USFWS and TPWD lists as potentially occurring in all the project counties. The Texas coast is one of this species' primary wintering areas and harbors an estimated 35 percent of the known piping plover population (Campbell 2003). In Texas, wintering habitats include

barrier islands and mainland beaches, mud flats, sand flats, algal flats, washover passes, salt marshes, and coastal lagoons (Oberholser 1974, USFWS 2003, USFWS 1996). Critical habitat has been designated along the entire Texas coast. All five project counties contain critical habitat, although there is no critical habitat in Baffin Bay. The nearest critical habitat to the project area is located approximately 13 miles east of the project area in Kenedy County (USFWS 2009b).

Although there are several areas of designated critical habitat within the project counties, all of these areas are located along the coast and not in the vicinity of US 77. The project area ranges from approximately four to 26 miles from coastal waters, and the only tidally influenced water in or near the project area is Los Olmos Creek, which feeds into the Arroyo Salada arm of Baffin Bay, approximately 4.0 miles east of US 77. At the highway crossing, Los Olmos Creek has a wide channel bordered by strips of tidal mudflats/sandflats that may provide foraging habitat by the species. In general though, the habitat is considered marginal because of the distance to larger areas of suitable habitats; therefore, the potential for encountering piping plover in the project area is considered low.

Whooping Crane
The whooping crane (*Grus americana*) is listed by the USFWS as endangered and is identified on the USFWS list as potentially occurring in Nueces County. The TPWD also includes Kenedy and Kleberg Counties in the species' range. This species winters at Aransas National Wildlife Refuge and Matagorda and St. Joseph's Islands in Aransas, Calhoun, and Matagorda Counties on the Texas coast. They forage in brackish bays, marshes, and salt flats. They also fly to upland areas recently burned or flooded by rainfall to feed on acorns, snails, crayfish, and insects. There are several designated critical habitat areas in Texas, the primary being the Aransas National Wildlife Refuge (ANWR).

Within Nueces County, the existing US 77 is located over 7.0 miles from coastal marsh habitats and is surrounded primarily by cropland. In addition, the project area is located approximately 42 miles southwest of the whooping cranes' wintering grounds. Based on the project area's distance from known wintering grounds and lack of suitable habitat, whooping cranes would not occur in the project area.

Sea Turtles (Atlantic Hawksbill, Green, Kemp's Ridley, Leatherback, and Loggerhead)
According to the USFWS and TPWD threatened and endangered species lists, five species of sea turtles that are listed as threatened or endangered by the USFWS and the National Marine Fisheries Service (NMFS) are of potential occurrence in all the project counties. These include the Atlantic hawksbill sea turtle (*Eretmochelys imbricata*), green sea turtle (*Chelonia mydas*), Kemp's ridley sea turtle (*Lepidochelys kempii*), leatherback sea turtle (*Dermochelys coriacea*), and loggerhead sea turtle (*Caretta caretta*). These species are restricted to marine and estuarine waters of the Gulf of Mexico and inshore bays, nesting on gulf beaches. Critical habitat has been designated for Atlantic hawksbill, green, and loggerhead sea turtles (USFWS 1978, 1998), but none is designated along the Gulf Coast.

There are regular sightings of Atlantic hawksbill, green, and Kemp's ridley sea turtles in Texas coastal waters, and these species have been recorded nesting along the Texas Gulf beaches. Leatherback sea turtles are present in the Gulf of Mexico but are rarely seen on the Texas Gulf coast. A few loggerhead sea turtle nests are documented each year at Padre Island National Seashore and South Padre Island.

The project area is located between four and 26 miles from coastal bays, and the only tidally influenced water in or near the project area is Los Olmos Creek. At the US 77 crossing, Los Olmos Creek is a wide, relatively shallow feature with sand/mud flats typically exposed along its edges. Although sea turtles have been recorded in Baffin Bay, the US 77 crossing of Los Olmos Creek is located approximately 4.0 miles from the western extent of Baffin Bay (Laguna Salada) and near the creek's tidal limit, and portions of the channel between US 77 and Baffin Bay are very narrow and shallow. Due to the project area's and adjacent areas existing conditions, the likelihood of sea turtles occupying the project area or adjacent to the project area is extremely low.

Smalltooth Sawfish
The smalltooth sawfish (*Pristis pectinata*) is listed as endangered but is not included on the USFWS lists of threatened and endangered species for the project counties. However, it is included on the NMFS list of threatenened and endangered species for Texas. Historically, this species was common throughout the Gulf of Mexico from Texas to Florida, but its range is currently thought to be restricted to southwestern peninsular Florida. Based on a 2006 national smalltooth sawfish database report (Simpfendorfer and Wiley 2006), only three individual sawfish were reported outside of Florida waters between 1999 and 2006 (one of which was in Texas), but these reports are considered strays from the core population in Florida. Young smalltooth sawfish inhabit shallow waters of sheltered bays, estuaries, and river mouths, typically close to shore, while adult sawfish are encountered in various marine and estuarine habitats. Although Los Olmos Creek is tidally influenced in the project area, the US 77 crossing is located approximately 4.0 miles from the western extent of Baffin Bay (Laguna Salada) and near the creek's tidal limit, and portions of the channel between US 77 and Baffin Bay are very narrow and shallow. Based on the very rare occurrence of the smalltooth sawfish in Texas and the lack of suitable habitat in the project area, this species would not occur in the project area.

Black Lace Cactus
Black lace cactus (*Echinocereus reichenbachii* var. *albertii*) is listed by the USFWS as endangered and is identified by the USFWS and TPWD lists as potentially occurring in Kleberg County. It is a dark green cylindrical cactus with solitary or branching stems (Benson 1970). There are one to 12 stems per plant, 12 to 18 ribs per stem, and spines so dense and numerous that they obscure the stem surface (Gardner and O'Brien 1987, Benson 1970). Black lace cactus produces showy pink flowers from March to June, with peak blooming occurring from mid-April to early May (Poole and Riskind 1987, Benson 1970, Taylor 1985). Black lace cactus is endemic to South Texas and has been reported from Jim Wells, Kleberg, and Refugio Counties as recently as 1986 (Emmett 1989, Gardner and O'Brien 1987, Poole 1986). It grows in natural openings in mesquite-pricklypear shrublands under light to moderate canopy coverage in areas free from disturbance (Gardner and O'Brien 1987). It can be found on sandy clay and loam soils along streams in the South Texas Coastal Plains, often in areas with saline conditions (Gardner and O'Brien 1987).

One record of black lace cactus is centered 0.3 mile west of the project area in Kingsville (NDD 2009), though the current status of this population is unknown (USFWS 1987). A habitat assessment identified potential (marginal) habitat along some of the streams in Kleberg County. Qualified biologists surveyed these and other areas along the project route, and no black lace cactus was observed.

Slender rush-pea
Slender rush-pea (*Hoffmannseggia tenella*) is listed by the USFWS as endangered and is identified by the USFWS and TPWD lists as potentially occurring in Nueces and Kleberg Counties. It is a member of the legume family (Fabaceae). It is a decumbent (lying or growing on the ground but with erect or rising tips) herbaceous perennial up to eight inches tall with a woody taproot (Simpson 1999). The leaves are bi-pinnately compound with one terminal and two to three pairs of lateral pinnae, each with of five to six pairs of leaflets (Eifert 1970). It produces yellow-pink to rose-colored flowers and flattened oblong-elliptic fruits from March to June but has the potential to produce flowers/fruits at other times during the year with adequate rainfall (Simpson 1999, TPWD 2008e).

Slender rush-pea is a South Texas endemic reported from both Nueces and Kleberg Counties. It generally occurs in native grasslands or openings in mesquite shrublands and is often associated with the endangered South Texas ambrosia (*Ambrosia cheiranthifolia*) (Gardner and O'Brien 1988). It is known to occur on sandy clay and loam soils such as Aransas clayey alluvial land, Gertrudis fine sandy loam, and Victoria clay at elevations slightly above sea level.

Review of the records from the TPWD's NDD, the USFWS, and TAMUK revealed that several populations of slender rush-pea have been previously recorded in the project vicinity, including four records within the existing US 77 ROW between the project limits (all listed as NDD Element of Occurrence ID No. 253 in **Table 4.7-2**). Qualified biologists surveyed all areas of potential habitat in the existing ROW and in the portions of the proposed ROW where right-of-entry was granted. The surveys confirmed the presence of slender rush-pea in four previously recorded locations in the existing ROW, as well as identified a single plant in a fifth location (**Table 4.7-3**). These five areas are located in a 1.4-mile stretch of roadway located just south of the Nueces/Kleberg County line (**Figures A.4.5-18, A.4.7-1** and **A.4.7-2**). Within all five areas, slender rush-pea plants are growing within the existing maintained ROW in areas generally dominated by King Ranch bluestem, Angleton bluestem, and bermudagrass. Adjacent properties contain cultivated row crops. No other individuals or populations of slender rush-pea were found in the project area.

Table 4.7-3 Slender Rush-Pea Populations in the Project Area

Area Designation	Location	Size of Area	Number of Plants Observed	Previously Recorded?*
SRP-A	Existing northbound ROW, approximately 1.0 mile north of San Fernando Creek	0.09 acre	29	Yes (EO ID 253)
SRP-B	Existing southbound ROW, approximately 1.0 mile north of San Fernando Creek	NA	1	No
SRP-C	Existing northbound ROW, approximately 0.5 mile south of Carreta Creek	0.42 acre	Several thousand	Yes (EO ID 253)
SRP-D	Within existing median, approximately 0.5 mile south of Carreta Creek	0.06 acre	75	Yes (EO ID 253)
SRP-E	Existing southbound ROW, approximately 0.5 mile south of Carreta Creek	NA	1	Yes (EO ID 253)

*EO ID = NDD Element of Occurrence ID No.
Source: Blanton and Associates, Inc., October 2009

South Texas Ambrosia
South Texas ambrosia is listed by the USFWS as endangered and is identified as potentially occurring in all project counties except for Willacy County. It is a member of the sunflower family (Asteraceae). It is an erect, rhizomatous, perennial herb up to 1.5 feet tall and ashy,

grayish-green throughout (Payne 1970, Turner 1983). Its leaves are alternate, one to two inches long, and it is the only member of the genus *Ambrosia* with entire leaves (Payne 1970). The flowering heads are about 0.25 inch in diameter, pendant, roughly hemispherical, and contain 10 to 20 yellow florets (Turner 1983). Flowering typically occurs from June to November.

South Texas ambrosia has been reported from Cameron, Kleberg, and Nueces Counties in Texas and the State of Tamaulipas, Mexico (Poole 1987). It is also thought to occur in Kenedy County based on the presence of suitable habitat and its presence in bordering counties (Christ Best, USFWS, personal communication). Extant populations are known to occur in Kleberg and Nueces Counties, Texas, but the current status of populations from Cameron County, Texas, and Tamaulipas, Mexico, are currently unknown. The species is locally common in grasslands, savannahs, and openings in mesquite woodlands (USFWS 1993b, 1994). It is often found in disturbed areas and may be associated with the endangered slender rush-pea. South Texas ambrosia occurs on sandy clay or loam substrates. Soils within known populations include Banquete clay, Calallen sandy clay loam, Cranell sandy clay loam, Gertrudis fine sandy loam, Harlingen clay, Hidalgo fine sandy loam, Laredo silty clay loam, Olmito silty clay, Raymondville clay loam, Tiocano clay, and Victoria clay.

Review of the records from the TPWD's NDD, the USFWS, and TAMUK revealed that several populations of South Texas ambrosia have been previously recorded in the project vicinity, including two records within the existing US 77 ROW between the project limits. Qualified biologists surveyed all areas of potential habitat in the existing ROW and in the portions of the proposed ROW where right-of-entry was granted. The surveys confirmed the presence of South Texas ambrosia in two previously recorded locations in the existing ROW (both listed as NDD Element of Occurrence ID No. 4752 in **Table 4.7-2**), as well as identified a third population in the existing ROW (**Table 4.7-4**). These three areas are located in a 2.1-mile stretch of roadway from Carreta Creek southward to near San Fernando Creek (southern Nueces County and northern Kleberg County), in the same vicinity as the slender rush-pea populations (**Figures A.4.5-18, A.4.7-1** and **A.4.7-2**). Within all three areas, South Texas ambrosia plants are growing within the existing maintained ROW in areas generally dominated by King Ranch bluestem, Angleton bluestem, and bermudagrass. Adjacent properties contain cultivated row crops and mesquite-dominated pasture. No other individuals or populations of South Texas ambrosia were found in the project area.

Table 4.7-4 South Texas Ambrosia Populations in the Project Area

Area Designation	Location	Size of Area	Number of Plants Observed	Previously Recorded?*
STA-A	Existing southbound ROW approximately 0.5 mile north of San Fernando Creek	0.08 acre	1,263	No
STA-B	Existing northbound ROW approximately 0.3 mile south of Carreta Creek	0.22 acre	3,068	Yes (EO ID 4752)
STA-C	Existing southbound ROW on Carreta Creek bank	0.07 acre	851	Yes (EO ID 4752)

*EO ID = NDD Elements of Occurrence ID No.
Source: Blanton and Associates, Inc., October 2009

Star Cactus
Star cactus (*Astrophytum asterias*) is listed by the USFWS as endangered, but is not included on the USFWS lists for the project counties because it is currently known in Texas only from Starr County. The TPWD's list for Cameron County includes this species. Star cactus has

been reported from Cameron, Hidalgo, and Starr Counties in Texas and from the States of Tamaulipas and Nuevo Leon in Mexico (USFWS 1992). Currently, only two populations are known to exist, one located in Starr County, Texas, and the other in Tamaulipas, Mexico (USFWS 1992). Star cactus inhabits sparsely vegetated mesquite woodlands growing in clusters under light to moderate canopy coverage (Poole 1987). It grows in gravelly, saline clay and loam soils, and it is thought to benefit from the presence of "guard plants," which provide suitable microclimates where it can thrive.

A habitat assessment identified that the Cameron County portion of the project area consists of maintained ROW and is surrounded primarily by cropland and urban development. No suitable habitat for star cactus is located in or adjacent to the project area; therefore, star cactus would not occur in the project area. Additionally, no star cactus was observed during presence-absence surveys that were conducted in the project area.

Texas Ayenia
Texas ayenia (*Ayenia limitaris*) is listed as endangered by the USFWS and is identified by the USFWS and TPWD lists as potentially occurring in Willacy and Cameron Counties. It is a member of the cacao family (Sterculiaceae). It is a stellate-pubescent, unarmed shrub ranging from two to five feet tall with cordate leaves that are three to 5 inches long and 1.5 to three inches wide (Correll and Johnston 1970, USFWS 1993c). The inflorescence is composed of two to three whitish to greenish flowers in an axillary, umbellate cyme (Correll and Johnston 1970). The fruit is a five-celled, five-seeded capsule covered by multiple pubescent prickles (Correll and Johnston 1970, Cristóbal 1960).

Texas ayenia has been reported from Cameron, Hidalgo, and Willacy Counties in Texas and the State of Tamaulipas, Mexico (Correll and Johnston 1970, Cristóbal 1960). Extant populations are known from three localities in Texas: one in northwestern Willacy County, one in Hidalgo County (Poole and Riskind 1987), and one in Harlingen in Cameron County (NDD 2009). The status of other reported populations from Cameron County and from the State of Tamaulipas, Mexico is currently unknown. This species grows under moderate to heavy canopy cover in mesquite woodlands and subtropical, mixed riparian woodlands (Poole and Riskind 1987, USFWS 1993c). It occurs on well-drained, sandy to silty clay and loam substrates, including Willacy fine sandy loam, Laredo silty clay loam, Harlingen clay, Benito clay, Olmito silty clay, Cameron silty clay, Chargo silty clay, Tiocano clay, and Mercedes clay.

No Texas ayenia records are within 1.5 miles of the project area, although the species is recorded further south in Harlingen. A habitat assessment of the project area identified that the Cameron and Willacy County portions of the project area consist of maintained ROW and are surrounded primarily by cropland and urban development. No suitable habitat for Texas ayenia is located in or adjacent to the project, and no Texas ayenia individuals were found during the presence-absence surveys that were conducted in the project area.

Red-crowned Parrot
In October 2011, the USFWS determined that listing the red-crowned parrot (*Amazona viridigenalis*) as endangered or threatened is warranted, but listing the species is precluded by higher priority actions. As a result, the species has been added to the candidate species list (USFWS 2011). Red-crowned parrots are mid-sized parrots that are endemic to northeastern Mexico, although several introduced populations occur in urban areas of the US, Mexico, and Puerto Rico. Within the LRGV of Texas, the species is listed as occurring in Cameron and Hidalgo Counties, where populations are considered to be at least partially native. Within

Mexico, this species generally occurs in tropical lowlands and foothills, inhabiting tropical deciduous forest, gallery forest, evergreen floodplain forest, Tamaulipan thornscrub, and semi-open areas. In the LRGV of Texas, the species occurs primarily in urban areas containing large trees that provide both food and nesting sites. Red-crowned parrots are not expected to occur within the project area (existing ROW in Cameron County) because of the lack of suitable habitat.

Sprague's Pipit
In September 2010, the USFWS determined that listing Sprague's pipit (*Anthus spragueii*) as endangered or threatened is warranted, but listing the species is currently precluded by higher priority actions. As a result, the species has been added to the candidate species list (USFWS 2010). Sprague's pipit is a small grassland bird that nests in the northern US and Canada and winters in the southern US (including Texas) and Mexico. The species strongly prefers native upland prairie habitats but will utilize non-native pastures (USFWS 2010, US Geological Survey 2010). It has been documented as wintering in many areas of South Texas, including the Kingsville NAS (USGS 2010). Within the project area, potential habitat exists in non-native pastures located within the proposed Riviera relief route ROW and in other narrow strips of proposed ROW in Kleberg County. In addition, large expanses of native grasslands that provide wintering habitat surround US 77 in Kenedy County. Based on this information, Sprague's pipit may occur in portions of the project area during the winter, but no nesting would occur within the project area.

Texas Hornshell
The Texas hornshell (*Popenaias popeii*) is a candidate for placement on the federal threatened and endangered species list. It is a member of the freshwater mussel family Unionidae. In the US, this species historically occurred throughout the Pecos River and some tributaries and in the lower Rio Grande to Brownsville, Texas. Currently, the species is known from only two isolated populations in the US: the Black River in Eddy County, New Mexico and the Rio Grande near Laredo in Webb County, Texas (Carman 2007). Adult Texas hornshells are most often located in crevices, undercut riverbanks, travertine shelves, and under large boulders, where small-grained material such as clay, silt, or sand gathers and provides suitable substrate for anchoring. Texas hornshell is not known from impoundments. The North Floodway crosses US 77 in Cameron County and periodically conveys floodwaters from the Rio Grande. However, this species is not currently known to exist in the Rio Grande south of Laredo, and the North Floodway does not provide suitable habitat in the project area.

4.7.1.2 State Listed Threatened and Endangered Species

As identified in **Table 4.7-1**, the habitats in the project area could be used by 24 of the 35 state listed threatened and endangered species of potential occurrence in the project counties. The 2009-NDD search identified records of nine state listed species within 1.5 miles of the project area (**Table 4.7-2**): southern yellow bat (*Lasiurus ega*), black-striped snake (*Coniophanes imperialis*), indigo snake (*Drymarchon corais*), northern cat-eyed snake (*Leptodeira septentrionalis septentrionalis*), Texas scarlet snake (*Cemophora coccinea lineri*), Texas tortoise (*Gopherus berlandieri*), black-spotted newt (*Notophthalmus merid*ionalis), sheep frog (*Hypopachus variolosus*), and South Texas siren (*Siren* sp. 1). State listed species that were observed in or adjacent to the project area during various field investigations conducted for this project include peregrine falcon (*Falco peregrinus*), reddish egret (*Egretta rufescens*), white-faced ibis (*Plegadis chihi*), white-tailed hawk (*Buteo albicaudatus*), zone-tailed hawk (*B. albonotatus*), indigo snake, Texas horned lizard (*Phrynosoma cornutum*), and Texas tortoise.

Because the northern and southern portions of the project area are surrounded by cropland and urbanized areas, potential habitats for state listed species in and adjacent to the project area are located primarily in undeveloped areas in Kenedy, northern Willacy, and possibly southern Kleberg Counties. Some of the more common species or habitat generalists may occur in remnant habitats in other areas, particularly along drainages or in scattered woodlands. The following identifies general habitats and the state listed species that may use these areas:

- The southern yellow bat has been recorded near the project area and could roost in trees throughout the project area, particularly the American cotton palms that line the existing ROW in Cameron and Willacy Counties.
- The oak and mesquite woodlands present in and adjacent to the project area in Kenedy and (to a lesser extent) northern Willacy County provide suitable habitat for the white-nosed coati (*Nasua narica*), cactus ferruginous pygmy owl (*Glaucidium brasilianum cactorum*), northern beardless tyrannulet (*Camptostoma imberbe*), rose-throated becard (*Pachyramphus aglaiae*), and tropical parula (*Parula pitiayumi*).
- Peregrine falcons (*Falco peregrinus*) are potential migrants through the region and could use a variety of habitats throughout the project area. Texas Botteri's sparrows (*Aimophila botterii texana*) could also use a variety of habitats in the project area.
- Large depressions that hold water and contain wetlands during wet periods provide suitable habitat for the reddish egret, white-faced ibis, wood stork (*Mycteria americana*), black-spotted newt, sheep frog, and South Texas siren. Wooded areas near these features may provide habitat for Mexican treefrog (*Smilisca baudinii*). All of these species except the wood stork have been recorded near the project area through the NDD database and/or field visits.
- The grasslands and savannahs overlying sandy soils in Kenedy, northern Willacy, and possibly southern Kleberg Counties provide suitable habitat for a number of species, including white-tailed hawk, zone-tailed hawk, black-striped snake, indigo snake, northern cat-eyed snake, Texas horned lizard, Texas scarlet snake, and Texas tortoise. All of these species have been recorded in or near the project area through the NDD database and/or field visits.
- The opossum pipefish (*Microphis brachyurus*) may occur in some of the perennial streams in Nueces and Kleberg Counties.
- The North Floodway crosses US 77 in Cameron County and periodically conveys floodwaters from the Rio Grande, where the false spike mussel (*Quadrula mitchelli*), Mexican fawnsfoot mussel (*Truncilla cognata*), and salina mucket (*Potamilus metnecktayi*) have been recorded. However, these species are very rare in the Rio Grande and have not been recorded in the North Floodway, and the North Floodway is not expected to provide suitable habitat in the project area.
- The project area does not contain suitable habitats for Coues' rice rat (*Oryzomys couesi*), common black-hawk (*Buteogallus anthracinus*), gray hawk (*Asturina nitida*), sooty tern (*Sterna fuscata*), speckled racer (*Drymobius margaritiferus*), white-lipped frog (*Leptodactylus fragilis*), Mexican goby (*Ctenogobius claytonii*), or river goby (*Awaous banana*).

Larger, more mobile species are likely to utilize higher quality habitats outside the transportation corridor but may temporarily utilize the habitats in the existing ROW. Smaller, less mobile species or nesting birds may spend a larger portion of their time within the existing ROW.

4.7.1.3 Other Rare Species

In addition to the state and federally listed threatened and endangered species, the TPWD's *Annotated County Lists of Rare Species* for the project counties include 48 other species that the State considers rare, but have no formal regulatory status at the state or federal level (**Appendix E**). Based on the habitat descriptions provided by TPWD (TPWD 2011a-e), the habitats in the project area (**Table 4.7-2**) could be used by 33 of the 48 rare species. Eight of these species have been recorded within 1.5 miles of the project area, including Sennett's hooded oriole (*Icterus cucullatus sennettii*), keeled earless lizard (*Holbrookia propinqua*), Bailey's ballmoss (*Tillandsia baileyi*), Elmendorf's onion (*Allium elmendorfii*), Kleberg saltbush (*Atriplex klebergorum*), lila de los llanos (*Echeandia chandleri*), plains gumweed (*Grindelia oolepis*), and Texas windmillgrass (*Chloris texensis*).

At least one of the rare species, Bailey's ballmoss, is relatively common in and around the project area. Bailey's ballmoss was observed in all the oak woodlands that are located in the existing ROW in Kenedy County. Approximately 44.5 acres of oak woodlands are located in the project area.

Other rare species that may utilize habitats in the project area include maritime pocket gopher (*Geomys personatus maritimus*), plains spotted skunk (*Spilogale putorius interrupta*), Arctic peregrine falcon (*Falco peregrinus tundrius*), Audubon's oriole (*Icterus graduacauda audubonii*), mountain plover (*Charadrius montanus*), three subspecies of snowy plover (*Charadrius alexandrinus*), western burrowing owl (*Athene cunicularia hypugaea*), Mexican black-headed snake (*Tantilla atriceps*), spot-tailed earless lizard (*Holbrookia lacerata*), American eel (*Anguilla rostrata*), several insects, Mexican mud-plantain (*Heteranthera mexicana*), roughseed purselane (*Sesuvium trianthemoides*), and Welder machaeranthera (*Psilactis heterocarpa*).

4.7.2 No Build Alternative – Threatened and Endangered Species Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not impact threatened or endangered species habitats. The potential for road mortality due to vehicle collisions would exist.

4.7.3 Build Alternative – Threatened and Endangered Species Consequences

The potential effects of the proposed Build Alternative on federally listed threatened and endangered species were assessed by reviewing records of known populations or sightings, identifying potential habitats for the species in the project area, conducting surveys for endangered plants, and reviewing project plans. The anticipated effects of the proposed Build Alternative on federally listed threatened and endangered species, state listed species, and other rare species are provided below.

4.7.3.1 Effects on Federally Listed Threatened and Endangered Species

This section describes the effects of the Build Alternative on federally listed species of potential occurrence in the project counties. Four meetings have been held with the USFWS and TPWD to discuss potential effects on federally listed species. During the meetings, the USFWS identified the ocelot, jaguarundi, brown pelican, piping plover, slender rush-pea, and South Texas ambrosia as needing further assessment. The USFWS has reviewed the results of the habitat assessments and presence/absence surveys conducted for these species and, by letter

dated June 5, 2011 (**Appendix B**), concurred with TxDOT's determination that the proposed project may affect but is not likely to adversely affect the brown pelican, piping plover, slender rush-pea, and South Texas ambrosia. The USFWS stated that the project may adversely affect the ocelot and jaguarundi and recommended formal Section 7 consultation. The following paragraphs provide additional information regarding the project's effects to these and other species.

If the Build Alternative were implemented, the proposed project may adversely affect the ocelot and jaguarundi. As a result, the FHWA initiated formal Section 7 consultation with the USFWS. The following identifies the potential impacts to the ocelot and jaguarundi and proposed conservation measures:

> Within Kenedy and northern Willacy County, where ocelots and jaguarundis would most likely cross US 77, the proposed project entails adding access roads on one or both sides of the main lanes at ranch gates for access purposes. While this would increase the width of pavement at these locations, the additional lanes associated with the ranch access roads would receive a low volume of primarily ranch-related traffic. The construction of these interchanges would require the removal of mesquite and oak woodlands that provide cover in the median of the existing roadway in some areas of Kenedy County. The proposed project would not add capacity, increase speed limits, or increase traffic volumes on the roadway; therefore, the potential for collisions between ocelots/jaguarundis and vehicles under the Build Alternative would still exist but would be similar to the potential under existing conditions and the No Build Alternative.
>
> To minimize potential effects of the proposed improvements on the ocelot and jaguarundi, clearing of wooded areas in the existing ROW would be minimized. To provide a potential safe crossing of US 77, TxDOT would install three wildlife crossings under the new roadway. One of the crossings would be placed near the Yturria ocelot population in northern Willacy County, and the other two crossings would be placed in the Rudolph and Norias areas in southern Kenedy County. TxDOT has coordinated the locations and design of the crossings with the USFWS, and the USFWS has approved the locations and design. In addition to these crossings, no work would occur at the East Main Drain canal, which provides another potential travel corridor across US 77 near the Yturria population.

FHWA prepared a Biological Assessment and conducted formal Section 7 consultation with the USFWS regarding the ocelot and jaguarundi. The Biological Opinion for the project is included in **Appendix B**.

If the Build Alternative were implemented, the proposed project may adversely, but is not likely to adversely affect, the following species:

- <u>Brown pelican and piping plover</u> – The proposed project may affect, but is not likely to adversely affect the brown pelican and piping plover. Although potential foraging habitat for these two species is present at Los Olmos Creek, the habitat is considered marginal for both species because the US 77 crossing is approximately 4.0 miles from the western extent of Baffin Bay and associated habitats and near the creek's tidal limit. Additionally, the creek is bordered by upland areas between the project area and the bay; therefore, the potential for encountering these species in or adjacent to the project area is considered low. Furthermore, proposed improvements at Los Olmos Creek

include widening the existing northbound bridge by approximately 10 feet, which would impact a minor amount of potential habitat and cause temporary disturbance during construction. The USFWS concurred with the "may affect, not likely to adversely affect" determination for the brown pelican and piping plover by letter dated June 5, 2011 (**Appendix B**).

- Slender rush-pea and South Texas ambrosia – The proposed project may affect, but is not likely to adversely affect slender rush-pea and South Texas ambrosia. The project has been designed and would be constructed to avoid populations of these species located within the ROW. The interchange for Sage Road, which is on the north edge of Kingsville, was moved approximately 0.75 mile to the south to avoid a population of slender rush-pea that was identified at the original planned interchange location. The proposed improvements near endangered plant populations are shown on **Figures A.4.7-1** and **A.4.7-2**. During construction activities in the vicinity of the populations, orange construction fencing would be installed to prevent construction equipment from impacting these populations. The USFWS concurred with the "may affect, not likely to adversely affect" determination for slender rush-pea and South Texas ambrosia by letter dated June 5, 2011 (**Appendix B**), with the implementation of the conservation measures described above and future survey of areas where right-of-entry was not granted.

If the Build Alternative were implemented, the proposed project would have no effect on the following species:

- The proposed project would have no effect on the jaguar, red wolf, Eskimo curlew, and Rio Grande silvery minnow because these species are considered extirpated from Texas. Reintroduction efforts for the Rio Grande silvery minnow are currently limited to the Big Bend area, which is over 500 miles upstream of the project counties.
- The proposed project would have no effect on the interior least tern because all portions of the proposed project are located within 50 miles, and least terns are only listed in areas greater than 50 miles from the coast.
- The proposed project would have no effect on the West Indian manatee, the five sea turtles, and the smalltooth sawfish because no suitable habitat for these species is present in the project area. They would not occur in Los Olmos Creek near the US 77 crossing because the crossing is located approximately 4.0 miles from the western extent of Baffin Bay (Laguna Salada) and near the creek's tidal limit. Additionally, portions of the channel between US 77 and Baffin Bay are very narrow and shallow.
- The project would have no effect on the northern aplomado falcon because, although the grasslands in Kenedy County provide potential habitat for this species, reintroduction efforts in this area have been unsuccessful, and no known nesting pairs or individuals are known to occur in the area. The nearest known nest is approximately 17 miles from the project area. To date, the USFWS has not shown concern about the effects to this species during coordination efforts.
- The proposed project would have no effect on the whooping crane because there is no suitable habitat within the project area, and the project area is located more than 40 miles southwest of the whooping cranes' wintering grounds.
- The proposed project would have no effect on the black lace cactus, star cactus, and Texas ayenia. There is no suitable habitat for star cactus and Texas ayenia in the project area, and only a small area of potential marginal habitat for black lace cactus. None of

these species were observed during the presence-absence surveys conducted for the project.

The three candidate species listed for the project counties—red-crowned parrot, Sprague's pipit, and Texas hornshell—are not currently protected under the Endangered Species Act; therefore, the effect language used in the Endangered Species Act is not used for these species. The following discusses the potential for the Build Alternative to impact each species.

- The Build Alternative may impact Sprague's pipit by removing potential wintering habitat that primarily consists of non-native pastures within the Riviera relief route in Kleberg County. The Build Alternative would minimize impacts to more preferred native grassland habitats in Kenedy County by keeping proposed improvements within the existing ROW in that portion of the project. Potential impacts of the project on this species are expected to be minor because Sprague's pipit does not nest in Texas, and substantial amounts of wintering habitat for this species are present in the project vicinity and throughout South Texas. In addition, the species is mobile during the wintering period and would avoid construction activities.

- The Build Alternative would not impact the red-crowned parrot or Texas hornshell because no habitat for these species is present in the project area.

4.7.3.2 Impacts to State Listed Threatened and Endangered Species

If the Build Alternative were implemented, the project would have the potential to impact 24 state listed threatened and endangered species that may utilize habitats in the project area (see **Table 4.7-1**), which are addressed below. The proposed project could remove over 3,400 acres of vegetation, although over 2,800 acres (82 percent) consists of existing maintained vegetation and cropland (see **Table 4.6-2**). Up to 44.5 acres of oak woodlands and over 300 acres of mesquite-dominated areas could be removed from the median of the existing ROW in Kenedy County. In addition, nearly 24 acres of aquatic/semi-aquatic habitats could be removed. While these areas provide potential habitats for a number of state listed threatened and endangered species, they are located within an existing transportation corridor, and adjacent properties contain large areas of similar habitats that are more likely to be used by wildlife.
To minimize impacts to potential habitats, clearing of wooded areas and impacts to aquatic/semi-aquatic sites would be minimized during construction of the proposed project. Clearing would occur outside the nesting season to the maximum extent practical in order to avoid direct mortality to listed birds.

Other than the removal of potential habitat, the project is not likely to impact individuals of the white-nosed coati, peregrine falcons, reddish egret, white-faced ibis, white-tailed hawk, wood stork, and zone-tailed hawk because these species are not likely to nest in the project area and would avoid construction activities. In addition, clearing outside the nesting season would minimize impacts to birds that may nest in the wooded areas of the ROW, including the cactus ferruginous pygmy-owl, northern beardless-tyrannulet, rose-throated becard, Texas Botteri's sparrow, and tropical parula.

The project is also not likely to impact the opossum pipefish because the proposed project would require minor widening of existing bridges or would likely span stream channels with new bridges.

If individuals of the southern yellow bat, black-striped snake, indigo snake, northern cat-eyed snake, Texas horned lizard, Texas scarlet snake, Texas tortoise, black-spotted newt, Mexican treefrog, sheep frog, and South Texas siren are present in the project area during construction, they could be impacted. TxDOT would include notes in the EPIC sheets for the contractor to avoid these and other state listed species that may occur in the project area and, if encountered, to let them leave the project area on their own accord.

In addition to minimizing clearing and impacts to aquatic sites, disturbed areas would be re-seeded with a native seed mix where possible to minimize impacts to habitats.

4.7.3.3 Impacts to Rare Species

If the Build Alternative were implemented, the project would have the potential to impact 33 rare species listed by the TPWD in the project counties. Other than removal of potential habitat, the proposed project is not likely to impact the plains spotted skunk, Arctic peregrine falcon, mountain plover, or the three subspecies of snowy plover. In addition, clearing outside the nesting season would minimize impacts to Audubon's oriole, Sennett's hooded oriole, and western burrowing owl.

The project is also not likely to impact the American eel because the proposed project would require minor widening of existing bridges or would likely span stream channels with new bridges.

If individuals of the maritime pocket gopher, keeled earless lizard, Mexican black-headed snake, spot-tailed earless lizard, several insect species, or several plant species are present in the project area during construction, they could be affected; however, the species are not expected to be affected at the population level. In addition to minimizing clearing and impacts to aquatic sites, disturbed areas would be re-seeded with a native seed mix where possible.

Up to 44.5 acres of live oak woodlands that contain Bailey's ballmoss could be permanently removed by the Build Alternative. The removal of Bailey's ballmoss would be unavoidable, but has been minimized by designing the improvements to stay within the existing ROW through areas containing live oak woodlands. To minimize impacts, clearing of live oak woodlands would be minimized during construction. There are thousands of acres of oak woodlands that likely contain this species on adjacent properties.

4.8 CULTURAL RESOURCES

This section describes the existing conditions concerning cultural resources and discusses the potential consequences to those resources resulting from the Build and No Build Alternatives.

Cultural resources are structures, buildings, archeological sites, districts/cultural landscapes (a collection of related structures, buildings, and/or archeological sites), cemeteries, and objects that are generally 50 years of age or older, per the NRHP requirements, and meet one of the following NRHP Criteria:

A. associated with significant events or trends in history
B. associated with people of transcendent importance
C. architectural significance
D. yield important information.

Both federal and state laws require consideration of cultural resources during project planning. At the federal level, NEPA and the NHPA of 1966, among other regulations, apply to transportation projects that have federal involvement such as this one. In addition, state laws such as the Antiquities Code of Texas apply to these projects. Compliance with these laws often requires consultation with the Texas Historical Commission (THC)/Texas State Historic Preservation Officer (SHPO) and/or federally-recognized tribes to determine the project's effects on cultural resources. The federal and state regulatory compliance processes for transportation projects are defined under TxDOT's *First Amended Programmatic Agreement Regarding the Implementation of Transportation Undertakings (PA-TU) among the FHWA, the Texas SHPO, the Advisory Council on Historic Preservation, and TxDOT*, as well as the MOU between TxDOT and the THC.

4.8.1 Historic Resources

Historic resources that may be affected by the proposed project were identified by reviewing the NRHP, the list of State Archeological Landmarks (SALs), and the list of Recorded Texas Historic Landmarks (RTHLs) to determine if any previously recorded historic resources are located in the project's Area of Potential Effect (APE). It has been determined through consultation with the SHPO that the APE for the proposed project is 150 feet from existing/proposed ROW wherever the existing roadway is being expanded and 300 feet from proposed ROW in new-location segments (Driscoll and Riviera relief routes). A reconnaissance-level survey was also completed to identify all historic-age resources (built prior to 1967) in the APE. The reconnaissance-level survey included evaluations of NRHP eligibility for all identified resources and assessments of potential effects the proposed project would pose to NRHP-listed and/or NRHP-eligible resources. The potential effects of the project were determined by reviewing the project plans to see if the aspects of integrity of the historic resources would be adversely affected.

4.8.1.1 Existing Conditions

A review of the NRHP revealed that one NRHP-listed property, the King Ranch, is located within the APE. The King Ranch is also designated a National Historic Landmark (NHL) due to its national significance. The King Ranch NHL boundary, which is larger and more inclusive than the NRHP boundary, is based on the 1948 approximate boundaries (TxDOT ENV 2007; THC 2010) and includes over 1.2 million acres in Nueces, Jim Wells, Kleberg, Brooks, Kenedy, Hidalgo, Willacy, and Cameron Counties. The currently operating King Ranch encompasses approximately 825,000 acres in South Texas (King Ranch 2010). The NHL boundary abuts US 77 in three general locations: on the east and west sides of US 77 from the Nueces/Kleberg County line southward to Kingsville (Laureles Division), on the west side of US 77 from south of Ricardo to the Kleberg/Kenedy County line (Santa Gertrudis Division), and on the east and west sides of US 77 in the southern half of Kenedy County (Norias Division).

A review of the list of Official Texas Historic Markers (OTHMs) revealed that seven OTHMs are located in the APE. Of the seven OTHMs in the APE, two are Texas Centennial Markers: one commemorates Kenedy County and the other commemorates General Zachary Taylor. Texas Centennial Markers, by their association with Texas' 1936 centennial celebration, have been determined NRHP-eligible by TxDOT. The remaining markers are subject markers that are solely commemorative in nature and not historic-age, and are not eligible for the NRHP. The OTHMs and their locations are listed in **Table 4.8-1** below. No SALs or RTHLs were identified in the APE.

Table 4.8-1 Previously Recorded Resources in the APE

Resource/Marker	Designation	General Location
King Ranch	National Historic Landmark; Listed on National Register of Historic Places	NHL boundary abuts US 77 from the Nueces/Kleberg County line south to Kingsville, from south of Ricardo to the Kleberg/Kenedy County line, and in the southern portion of Kenedy County.
Martha Reagan Rabb	Official Texas Historic Marker	Adjacent to the US 77 southbound lanes approximately 0.5 mile north of FM 2826 (just south of Robstown)
First Gas Well in Kleberg County	Official Texas Historic Marker	Adjacent to the US 77 northbound lanes at CR 2130 (south of Kingsville)
US Army March to the Rio Grande	Official Texas Historic Marker	Adjacent to the US 77 southbound lanes, approx. 3.5 miles north of Riviera, between CR 2230 and FM 628
Diego Ortiz Parilla	Official Texas Historic Marker	Adjacent to the US 77 southbound lanes, approx. 3.5 miles north of Riviera, between CR 2230 and FM 628
Kenedy County	Official Texas Historic Marker; Texas Centennial Marker	Adjacent to US 77 southbound lanes in a roadside park located approximately 1,400 feet south of the Kenedy/Kleberg County Line
General Zachary Taylor	Official Texas Historic Marker; Texas Centennial Marker	At Sarita rest area in the US 77 median, approximately 6 miles south of Sarita
James Henry Dishman	Official Texas Historic Marker	At the Dishman Elementary School on Madeley Avenue in Combes

Sources: *Texas Historical Commission Texas Historic Sites Atlas*. http://atlas.thc.state.tx.us/ for Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties, The National Park Service. National Historic Landmarks Program, "The King Ranch." http://tps.cr.nps.gov/nhl/detail.cfm?ResourceId=627&ResourceType=District, accessed in January 2010

TxDOT personnel conducted a reconnaissance-level historic resources survey for the proposed project and identified 359 historic-age resources on 192 individual parcels within the proposed project's APE. TxDOT historians have determined that 36 resources associated with six properties are eligible for or are listed in the NRHP. These resources are described below.

The King Ranch (Resource ID 61) was listed as a NHL in 1961 and on the NRHP in 1966. The ranch is significant for its role in the development of South Texas history, the ranching techniques created there, and the development of the first recognized breed of U.S. cattle – the Santa Gertrudis breed. On the King Ranch, a total of 13 resources were inventoried; eight of these inventoried resources were determined as contributing to the King Ranch NHL. The resources recommended as contributing to the King Ranch include two houses (Resource ID 61B and 61G), four outbuildings (Resource ID 61C-E and 61I), a water tank (Resource ID 61H), and a series of cattle pens (Resource ID 61J). The King Ranch and all of its contributing features viewed from the existing ROW are located in Kleberg and Kenedy Counties.

TxDOT historians also determined the Presbyterian Pan American School (Resource ID 70A-N) as NRHP-eligible under Criterion C (Architecture) at the local level as the work of a master. The school, which was founded in 1911, is located within the survey area just south of Kingsville (Kleberg County). The majority of the Pan American School's extant buildings and its existing campus were designed in the 1950s by master architect O'Neal Ford, and the campus is still recognizable as a Ford-designed school. Nine school buildings and dormitories were determined to be contributing to the NRHP-eligible Presbyterian Pan American School (Resource ID 70A-F, 70H-I, and 70K).

TxDOT historians determined two centennial markers (Resource ID 109A and 115) in Kenedy County as NRHP-eligible. Resource ID 109A commemorates Kenedy County and is located in a small parking area directly adjacent to the southbound US 77 lanes. Resource ID 115

commemorates General Zachary Taylor and is located in a non-historic-age rest area located in the roadway median south of Sarita. TxDOT determined that these meet Criterion Consideration F (Commemorative Properties) and are significant under Criterion A for their association with the 1936 Centennial Celebration.

The Armstrong Ranch (Resource ID 122) was also determined NRHP-eligible under Criterion A for its association with Agriculture and Criterion B for its association with an important person, John Armstrong. A total of seven resources (Resource ID 122A-G) were viewed from the existing ROW and determined contributing to the NRHP-eligible ranch. These resources include two sets of corrals (Resource ID 122A and 122D), a shed (Resource ID 122B), a post office (Resource ID 122E), a house (Resource ID 122F), and two auxiliary domestic structures (Resource ID 122C and 122G).

The Delta Lake Irrigation District (Resource ID 128A-K), established in 1929, extends into the survey area just north of Raymondville in Willacy County. The district is the largest irrigation district in the LRGV. Approximately 135 linear miles of the 360-mile canal system is currently piped, which is approximately 40 percent piped and 60 percent in open canals. The Delta Lake Irrigation District was determined NRHP-eligible under Criterion A, Agriculture, for the purposes of the proposed project. Contributing resources associated with the Delta Lake Irrigation District include two concrete-lined lateral canals (Resource ID 128A and 128I), three concrete siphons (Resource ID 128B and 128J-K), a concrete pipe head (Resource ID 128C), and a steel head gate (Resource ID 128D).
In addition to the 36 NRHP-eligible and NRHP-listed resources, there are 28 historic-age bridges and bridge-class culverts located in the APE. In compliance with Section 110 of the NHPA and the MOU between TxDOT and the THC, TxDOT historians evaluated the bridges in the APE to establish their historical significance. In accordance with the registration evaluation criteria established by the THC and TxDOT, these bridges were determined not eligible for the NRHP. The bridges and bridge-class culverts do not exhibit distinctive engineering or design characteristics. Therefore, these structures do not possess sufficient design or engineering significance to meet National Register eligibility under Criterion C: Engineering at the state level of significance. Because the bridges may have local or regional significance, TxDOT submitted letters to the County Historical Commissions (CHCs) in July 2010, regarding local significance of the bridges. Since none of the CHCs responded to TxDOT within the 30-day comment period, TxDOT determined these bridges not eligible for the NRHP.

The results of the reconnaissance-level historic resources survey are detailed in a report titled *Reconnaissance Level Historic Resources Survey Report, US 77 Upgrade Project from IH 37 in Corpus Christi to US 83 in Brownsville* (dated November 2010), which is on file at TxDOT's TTA office. In addition, a supplemental report titled *Reconnaissance Level Historic Resources Survey Supplemental Report, US 77 Upgrade Project from IH 37 in Corpus Christi to US 83 in Brownsville* was submitted to the SHPO in April 2011 to address the SHPO's comments regarding TxDOT's eligibility determinations for specific ranch properties and a potential rural historic landscape within or partially within the APE. The Texas SHPO concurred with TxDOT's eligibility determinations for historic-age resources located in the project APE in letters dated January 13, 2011, and April 27, 2011 (**Appendix B**).

4.8.1.2 No Build Alternative – Historic Resources Consequences

If the No Build Alternative were implemented, the proposed improvements on US 77 and relief routes around Driscoll and Riviera would not be constructed. Scheduled maintenance on the

existing facility would continue. The No Build Alternative would have no adverse effect to historic resources; therefore, no coordination regarding this issue would be required.

4.8.1.3 Build Alternative – Historic Resources Consequences

TxDOT historians applied the Criteria of Adverse Effects under Section 106 of the NHPA, and they determined that the proposed project would pose no adverse effect to the 36 NRHP-eligible and NRHP-listed resources located in the proposed project's APE. TxDOT engineers took the NRHP-eligible and NRHP-listed resources located in the APE into consideration and avoided adverse effects to the historic properties, as discussed below. The Texas SHPO concurred with TxDOT's determination that the proposed project poses no adverse effect to NRHP-eligible and NRHP-listed resources located within the proposed project's APE in the April 27, 2011 letter (**Appendix B**).

TxDOT historians determined that the Build Alternative would have no adverse effect to the King Ranch NHL (Resource ID 61), including contributing resources visible from the proposed project ROW. The proposed undertaking has been designed by TxDOT engineers so that no ROW acquisition or easements (permanent or temporary) would be required from the NHL property. Construction planned adjacent to the NHL includes constructing new main lanes and frontage roads, constructing grade-separated interchanges at ranch gates and local roadways, constructing new bridges at creeks and cattle passes, and removing existing crossovers and access drives at some secondary gates. In addition, direct connectors would be constructed near the NHL boundary at both ends of the proposed Riviera relief route, and a truck weigh station located south of Riviera would be relocated to the north of Riviera. TxDOT historians have determined that none of the proposed improvements would change the utility of the King Ranch or affect the character-defining features that qualify the ranch for listing on the NRHP or as an NHL.

TxDOT historians determined that the Build Alternative would have no adverse effect to the Pan American School (Resource ID 70A-N) or its contributing resources. TxDOT engineers designed the project so no ROW acquisition or easements (permanent or temporary) would be required from the school's NRHP-eligible boundary. Furthermore, the school is separated from the proposed project by the UPRR tracks and ROW, and the closest contributing buildings are approximately 1,000 feet from the proposed project activities. TxDOT historians have determined that none of the proposed improvements would affect the character-defining features of the Pan American School that qualify it for NRHP eligibility.

TxDOT historians have determined that the Build Alternative would have no adverse effect to the two Centennial Markers located in the APE. The highway would not be expanded at these locations, and the markers would not be relocated. Although an existing crossover providing access to the Kenedy County Centennial Marker (Resource ID 109A) for northbound traffic would be removed, the marker would still retain its location, and southbound access would remain unchanged. Access to the General Zachary Taylor Centennial Marker (Resource ID 115) would remain unchanged.

TxDOT historians determined that the Build Alternative would have no adverse effect to the Armstrong Ranch (Resource ID 122), including contributing resources visible from the proposed project ROW. The proposed undertaking has been designed so that no ROW acquisition or easements (permanent or temporary) would be required from the property. Construction proposed along the Armstrong Ranch includes the removal of crossovers, the construction of

several interchanges at the various ranch gates to provide access, and the construction of additional bridges over an existing cattle overpass. Although the project would remove access to some secondary gates that are not regularly used, access to the ranch gates was coordinated with the ranch owner, and access to the main gates would be maintained. TxDOT historians have determined that none of the proposed improvements would change the utility of the Armstrong Ranch or affect the character-defining features that qualify the ranch for listing on the NRHP.

TxDOT historians also determined that the Build Alternative would have no adverse effect to the Delta Lake Irrigation District (Resource ID 128A-K) or its contributing resources. The highway at these locations has already been expanded to include main lanes, frontage roads, and interchanges, and the irrigation canals are currently piped under the existing facility; therefore, no construction is proposed along US 77 at this location, and there would be no potential impairment to the function of the irrigation district or any of its features as a result of this project.

The proposed project calls for the relocation of one OTHM, the First Gas Well in Kleberg County. Although this marker is not NRHP-eligible, TxDOT would coordinate the marker's relocation with the Kleberg CHC and the THC's Marker Programs Branch per the MOU between TxDOT and the THC. These marker relocation activities would be completed prior to the commencement of the proposed project at that location. The remaining OTHMs would not be relocated as part of the proposed project.
Pursuant to Stipulation VI "Undertakings with the Potential to Affect Historic Resources" of the *First Amended Programmatic Agreement Regarding the Implementation of Transportation Undertakings (PA-TU) between the FHWA, the Texas SHPO, the Advisory Council on Historic Preservation, and TxDOT*, and the MOU, TxDOT historians determined that individual coordination with the Texas SHPO was required for the proposed project. In this coordination activity, TxDOT determined that the proposed action would not adversely affect historic properties, and the proposed undertaking would not have reasonably foreseeable adverse effects that may occur later in time, be farther removed in distance, or be cumulative. The Texas SHPO concurred with these findings in the letter dated April 27, 2011 (**Appendix B**).

4.8.2 Archeology

Archeological resources that may potentially be affected by the proposed project were identified by reviewing the records at the Texas Archeological Research Laboratory (TARL) and data available on the THC's online Texas Archeological Sites Atlas (TASA), followed by an intensive pedestrian archeological survey with subsurface investigations. Due to the size of APE for archeology (existing and proposed ROW), a probability model was developed, in consultation with TxDOT archeologists, which stratified the APE for archeology into areas with high, moderate, and low probability for containing prehistoric and historic archeological resources. The probability model accounted for a number of factors, including soils, topography, the presence of hydrologic features (e.g., drainages and artesian wells), and known prehistoric and historic site locations in or adjacent to the APE. Systematic shovel testing was conducted in high-probability areas, while judgmental shovel testing was conducted where necessary in moderate- and low-probability areas based on field conditions. In the low-probability areas, a windshield survey was conducted, followed by an intensive pedestrian survey of a 20-percent sample that, based on the windshield survey, appeared the most conducive to containing archeological properties or sites. Survey of all proposed ROW in Nueces and Kleberg Counties was not possible due to right-of-entry denial on some properties. There are a total of 60 parcels with proposed ROW where access was not possible. TxDOT would survey those locations as

necessary prior to the proposed roadway construction to ensure those areas do not contain sites eligible for inclusion to the NRHP or for formal SAL designation.

4.8.2.1 Existing Conditions

A review of records available at the TARL and on the THC's online TASA indicates that there are 21 previously recorded archeological sites within a 1,000-meter search radius of the APE for archeology, six of which are in or adjacent to the APE (41NU113, 41NU114, 41NU119, 41NU246, 41KN1, and 41WY123). The APE for archeology includes the existing and proposed ROW from SH 107 in the City of Combes in Cameron County to FM 892 in the City of Robstown in Nueces County, a distance of approximately 112 miles (**Figures A.4.5-1** through **A.4.5-21**).

Between September 2008 and July 2009, archeologists conducted an intensive archeological survey (as per 13 TAC 26.20 and 26.5) within the existing and proposed ROW prior to proposed improvements. Guided by the probability model, the archeological survey resulted in the recording of one previously undocumented historic site (41KL96) in Kleberg County and one previously undocumented historic site (41NU331) in Nueces County, as well as the re-recording of previously documented prehistoric site 41NU119. Additional discoveries within the APE in Kenedy County included two surficial prehistoric Isolated Finds (IFs 1 and 2) in the existing US 77 ROW. A report describing the results of the archeology survey is in on file at TxDOT's TTA office. The Texas SHPO concurred with TxDOT's eligibility determinations and recommendations for further work, as described for each site below, on August 13, 2010 (**Appendix B**).

Surface investigations at 41NU119 revealed a large surface scatter of chipped-stone debitage, mussel shell fragments, asphaltum, one Late Prehistoric *Perdiz* arrowpoint, and one Archaic *Tortugas* dart point randomly distributed across a plowed field on the north bank of Petronila Creek within the proposed Driscoll relief route. When 41NU119 was originally recorded in the late 1970s, archeologists reported several eroded human skull fragments exposed on the ground surface in the plowed field. The excavation of 22 shovel tests across the APE revealed no buried deposits but exhibited some recent alluvium. Since there is a potential for site 41NU119 to contain an unknown human burial (or burials), systematic scraping should be conducted on the north side of Petronila Creek within 200 meters of the north bank prior to construction (to date, mechanical excavations at this site have not been possible due to right-of-entry denial). In addition, due to the presence of alluvium, backhoe trenching should be conducted to ensure that no deeply buried component would be impacted by the proposed project. If human remains are discovered, they would be treated in accordance with Texas Health and Safety Code requirements, as well as with the requirements of the Native American Graves Protection and Repatriation Act (NAGPRA).

The historic site 41KL96 is a remnant of a ranching facility that includes a standing concrete water tank, a concrete water cattle trough, and miscellaneous domestic debris (e.g., doorknob, white ironstone, bottle glass, and screw-top glass bottles). Given the excellent surface visibility, previous plowing disturbances at this site, and the presence of upland clay soil that developed *in situ* from ancient marine sediments, subsurface investigations at 41KL96 were unwarranted. Archival research, including an analysis of historical maps, indicated that a complex was constructed at this location between 1904 (when the railroad was constructed and development began in the area) and 1951 and was demolished between 1968 and 1974. Discussion with the current leasee indicated that the complex likely included tenant housing, which is consistent with the historic context provided in the November 2010 Historic Resources Survey Report that was

prepared for this project and approved by the Texas SHPO. With the exception of the standing concrete water tank, no extant historic structures exist on the property. Given significant surface and subsurface disturbances from extensive plowing, the lack of subsurface deposits, and the poor integrity of structural remains at historic site 41KL96, this site is not recommended eligible for inclusion to the NRHP (under Criterion A, B, C, or D) or for formal SAL designation, and the proposed construction should be allowed to proceed as planned at that location.

The historic site 41NU331 is a remnant of a mid-20th century house. At this site, archeologists primarily observed construction materials (e.g., bricks, planks, wire nails, and concrete) and collapsed structural debris (e.g., probable collapsed house and remnants of outbuildings). Subsurface investigations across 41NU331 included the excavation of six shovel tests, which contained only recent glass, metal, and plastic in dense upland clay that developed *in situ* from ancient marine sediments and has little to no potential to contain intact archeological deposits. Given significant surface and subsurface disturbances from extensive plowing, the lack of subsurface deposits, and the poor integrity of structural remains at historic site 41NU331, this sites is not recommended eligible for inclusion to the NRHP (under Criterion A, B, C, or D) or for formal SAL designation, and the proposed construction should be allowed to proceed as planned at that location without additional investigations.

Isolated Find (IF) 1 consists of a single untyped dart point in an area of exposed basal clay. The excavation of six shovel tests around IF 1 contained no buried archeological material. Isolated Find (IF) 2 consists of three small (less than 1 centimeter diameter) burned clay fragments, one thumbnail size flake, and two highly deteriorated unidentified bone fragments in a five square-meter area of exposed basal clay within the existing US 77 ROW. Discussions with the TxDOT archeologist for this project resulted in the determination that the material recorded as IF 2 does not warrant formal site designation given its clearly disturbed context, resulting from cut-and-fill roadway construction and buried and overhead utilities that have disturbed the original ground surface and/or truncated the natural sediments to various depths below ground surface, as well as a lack of associated subsurface deposits. Based on these data, it is recommended that the planned construction at IF 1 and IF 2 proceed as planned without additional investigations.

With the exception of 41NU119, survey efforts to date have discovered no traces of previously recorded archeological sites in or adjacent to the APE. At Petronila Creek, previously recorded sites near the APE include prehistoric site 41NU113 (west of the proposed Driscoll relief route on the north bank of Petronila Creek), prehistoric site 41NU114 (east of the proposed Driscoll relief route on the south bank of Petronila Creek), and site 41NU246, a late-Pleistocene fossil assemblage (west of the proposed Driscoll relief route on the south bank of Petronila Creek). In addition, investigations discovered no remnants within the existing US 77 ROW of previously recorded sites 41KN1 (Kenedy County) and 41WY123 (Willacy County).

Although no buried deposits were identified in shovel tests excavated in the APE along Petronila Creek, it is recommended that survey-level backhoe trenching occur on both banks of Petronila Creek to determine if buried deposits exist below the depth of the shovel tests. Furthermore, although the survey discovered no trace of site 41NU246 in the proposed Driscoll relief route, this site has been reported to be 4 to 5 meters (13 to 16.5 feet) below the ground surface (Lewis 2009), and neither shovel test excavations nor survey-level backhoe trenching are sufficient to determine if the site extends into the proposed APE. The known extent of the site is several hundred feet west of the APE; however, the full extent of the deposits has not been determined (C. R. Lewis, personal communication, August 2009). Based on the above data, it is

recommended that deep testing with a geoarcheological assessment occur in the planned Driscoll relief route on the north and south sides of Petronila Creek to determine if the deeply buried deposits associated with site 41NU246 extend into the APE. To date, trenching along Petronila Creek has not been possible due to right-of-entry denial. If site 41NU246 contains a late Pleistocene faunal assemblage in primary association with chipped-stone tools, then the resource could have high research potential and could be eligible for formal SAL designation and inclusion to the NRHP (under Criterion D for the deposit's ability to provide new and important data concerning regional prehistory).

4.8.2.2 No Build Alternative – Archeology Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not impact archeological resources; therefore, no coordination regarding this issue would be required.

4.8.2.3 Build Alternative – Archeology Consequences

Work up to this point has identified no archeological resources within the APE that would be afforded further consideration under cultural resource laws and that the Build Alternative would adversely affect. However, TxDOT recommended further work in the form of additional archival research at historic site 41KL96 and survey-level backhoe trenching and deep testing within the proposed Driscoll relief route on the north and south banks of Petronila Creek is recommended. Additional archival research was conducted at site 41KL96 and is documented in a supplemental archeology report dated January 2012. The archival research confirmed that the site likely consisted of the remnants of a common agricultural complex ranch complex and is not eligible for the NRHP and does not warrant formal SAL designation. The SHPO concurred with this assessment on February 17, 2012.

In addition, 60 parcels with proposed ROW have not been surveyed due to right-of-entry denial. Once access to these areas has been obtained, TxDOT will complete all required investigations and consultation. The Texas SHPO concurred with TxDOT's eligibility determinations and recommendations for further work, as described for each site below, on August 13, 2010 (**Appendix B**). Section 106 review and consultation for those areas that have been surveyed proceeded in accordance with the PA-TU among TxDOT, the Texas SHPO, FHWA, and the Advisory Council on Historic Preservation, as well as the MOU between the THC and TxDOT. The Texas SHPO concurred with TxDOT's eligibility determinations and recommendations for further work on August 13, 2010 and February 17, 2012 (**Appendix B**). Consultation with federally recognized Native American tribes with a demonstrated interest in the area was conducted by letters dated January 30, 2008 and September 23, 2010 (**Appendix B**).

Pursuant to Stipulation IX.B.3 of the PA, the proposed undertaking may proceed with further project development, including completion of the environmental process and ROW acquisition, without further SHPO concurrence. After obtaining access to the proposed ROW, TxDOT will complete the archeological inventory on unsurveyed properties and conclude any additional work that may be required under the terms of the PA and MOU.

In the event that unanticipated archeological deposits are encountered during construction, work in the immediate area would cease, and TxDOT archeological staff would be contacted to initiate post-review discovery procedures under the provisions of the PA-TU and MOU.

4.9 SECTION 4(F) AND SECTION 6(F) RESOURCES

This section identifies properties protected by Section 4(f) of the Department of Transportation Act of 1966 and Section 6(f) of the Land and Water Conservation Act and discusses the potential consequences to those properties resulting from the Build and No Build Alternatives. Properties protected by Section 4(f) and Section 6(f) were identified by conducting land use and cultural resource surveys.

4.9.1 Existing Conditions

Section 4(f) of the Department of Transportation Act of 1966 helps protect publicly-owned lands such as parks, recreational areas, wildlife and waterfowl refuges, and significant historic sites from impacts due to highway construction. Section 6(f) of the Land and Water Conservation Fund Act requires that recreational facilities receiving US Department of Interior funding from the Land and Water Conservation Fund Act as allocated by TPWD may not be converted to non-recreational uses unless approval is received from TPWD and the National Park Service.

The Driscoll City Park, located just east of the existing US 77 in Driscoll, is subject to Section 4(f) and Section 6(f) protection. No other parks, recreational areas, or wildlife and waterfowl refuges are located in the project area. A number of recommended eligible historic resources are located in the APE for the proposed project (see Section 4.8.1).

4.9.2 No Build Alternative – Section 4(f) and Section 6(f) Resources Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not result in the taking of any property protected under Section 4(f) of the Department of Transportation Act or Section 6(f) of the Land and Water Conservation Fund Act; therefore, no coordination regarding Section 4(f) or Section 6(f) would be required.

4.9.3 Build Alternative – Section 4(f) and Section 6(f) Resources Consequences

In evaluating project alternatives and designing the recommended Build Alternative, TxDOT engineers avoided acquisition of ROW from the Driscoll City Park, the King Ranch NHL, and other historic resources/districts (see Section 4.8.1) that are listed or are recommended eligible for listing on the NRHP. Therefore, the proposed Build Alternative would not result in the taking of any property protected under Section 4(f) of the Department of Transportation Act or Section 6(f) of the Land and Water Conservation Fund Act, and no coordination regarding Section 4(f) or Section 6(f) would be required.

4.10 WATER RESOURCES/WATER QUALITY

This section describes the existing conditions concerning water resources and water quality in the project area and discusses the potential consequences to water resources and water quality resulting from the Build and No Build Alternatives. Water resource and water quality issues addressed include:

- Wetlands and Other Waters of the US
- Water Quality

- Section 9 and 10 Navigable Waters
- Waters Regulated by the International Boundary and Water Commission
- Floodplains
- Coastal Natural Resource Areas
- Essential Fish Habitat
- Coastal Barrier Resources Act
- National Wild and Scenic Rivers

The project area includes the existing and proposed ROW within the construction limits (SH 107 in Combes to FM 892 in Robstown)

4.10.1 Existing Conditions

The project area is located within the Nueces-Rio Grande Coastal Basin, which covers approximately 10,400 square miles and encompasses all or part of 12 counties in South Texas. The southern portion of the basin, including Cameron and Willacy Counties, consists largely of cropland and urbanized areas and is drained by a network of manmade canals, with Arroyo Colorado being the dominant natural feature in the area. Drainage features in this portion of the basin eventually flow into the Lower Laguna Madre and associated estuaries. Within the middle portion of the Nueces-Rio Grande Coastal Basin, including Kenedy County, drainage features are largely absent, and runoff in this area drains into isolated depressions and low areas between dune ridges. The northern portion of the basin, including Kleberg and Nueces Counties, contains numerous streams that drain to Corpus Christi Bay, Baffin Bay, and the Upper Laguna Madre.

4.10.1.1 Wetlands and Other Waters of the US

Investigations to identify wetlands and other potential waters of the US within the project area included review of background information (including aerial photography, topographic maps, soils surveys, USFWS National Wetland Inventory maps, and Federal Emergency Management Agency (FEMA) floodplain maps) followed by a wetlands assessment of all areas where right-of-entry was provided. The determination/delineation of wetlands was conducted in accordance with the *1987 US Army Corps of Engineers (USACE) Manual*. For each water resource identified, a jurisdictional determination was made based on water flow regime, adjacency and connectivity to other water features, and hydrologic contribution to a Traditional Navigable Waters (TNW).

Wetlands and other waters of the US are regulated by the USACE under Section 404 of the Clean Water Act. Currently, waters of the US that are subject to USACE regulation include the following (USACE 2007):

1. TNWs and all wetlands adjacent to TNWs

2. Relatively permanent waters (RPW), which include non-navigable tributaries of TNWs that typically flow year-round or have continuous flow at least seasonally, and all wetlands that directly abut RPWs

3. Other water bodies (such as non-RPWs, wetlands adjacent to non-RPWs, and wetlands adjacent to but not directly abutting an RPW) that are analyzed and determined to have a significant nexus with a TNW. A significant nexus exists if the

tributary, in combination with all of its adjacent wetlands, has more than a speculative or an insubstantial effect on the chemical, physical, and/or biological integrity of a TNW.

The proposed project area includes 10 single and complete crossings of waters of the US that are subject to regulation under Section 404 of the Clean Water Act. All of these crossings are located in the northern portion of the project in Kleberg and Nueces Counties (**Figures A.4.5-14** and **A.4.5-20**). The waters of the US identified in the project area include ephemeral, intermittent, and perennial streams and adjacent herbaceous wetlands. These features are considered waters of the US because they are (1) TNWs or RPWs; (2) wetlands adjacent to TNWs and RPWs; or (3) non-RPWs that drain directly into an RPW. **Table 4.10-1** lists each crossing and provides the area of waters of the US present at each crossing by type. **Figures A.4.10-1** through **A.4.10-8** show the types and boundaries of waters of the US located at each crossing on aerial base maps. A report titled *Wetland Delineation Report and Proposed Jurisdictional Determination*, *US 77 Upgrade from IH 37 to US 83* describes all water features identified in the project area and provides a jurisdictional determination for each resource. The delineation report would be submitted to the USACE for review and final jurisdictional determination.

Table 4.10-1 Waters of the US in the Project Area

Crossing No. (Name)	Feature Type[1]	Area (Length) Stream in Project Area	Area of Wetlands in Project Area	Total Amount of Waters of the US in Project Area
Crossing 1 (Los Olmos Creek)	TNW (Tidal) and Adjacent Wetland	1.45 acres (356 linear feet)	0.13 acre	1.58 acres (356 linear feet)
Crossing 2 (Unnamed Tributary of Escondido Creek)	RPW (Intermittent) and Adjacent Wetland	0.04 acre (545 linear feet)	0.20 acre	0.24 acre (545 linear feet)
Crossing 3 (Escondido Creek)	RPW (Intermittent) and Adjacent Wetlands	0.06 acre (335 linear feet)	0.79 acre	0.85 acre (335 linear feet)
Crossing 4 (Santa Gertrudis Creek)	RPW (Intermittent) and Adjacent Wetlands	0.11 acre (440 linear feet)	1.21 acres	1.32 acres (440 linear feet)
Crossing 5 (Tranquitas Creek)	RPW (Intermittent)	0.05 acre (310 linear feet)	None	0.05 acre (310 linear feet)
Crossing 6 (San Fernando Creek)	RPW (Perennial)	0.12 acre (320 linear feet)	None	0.12 acre (320 linear feet)
Crossing 7 (Unnamed Tributary to Carreta Creek)	Non-RPW (Ephemeral)	88 sq. ft. (32 linear feet)	None	88 sq. ft. (32 linear feet)
Crossing 8 (Carreta Creek)	RPW (Perennial)	0.05 acre (311 linear feet)	None	0.05 acre (311 linear feet)
Crossing 9 (Bishop Channel)	RPW (Intermittent) and Adjacent Wetlands	0.17 acre (309 linear feet)	0.22 acre	0.39 acre (309 linear feet)
Crossing 10 (Petronila Creek)	RPW (Perennial)	0.17 acre (360 linear feet)	None	0.17 acre (360 linear feet)

[1] TNW = traditional navigable water; RPW = relatively permanent water
Source: Blanton and Associates, Inc., October 2009

A number of other water features that are potentially non-jurisdictional features are located in the project area. These include manmade drainage ditches, canals, and stock ponds that were excavated in uplands, drainage features that consist of broad low swales and do not exhibit an

ordinary high water mark (OHWM) or continuous wetland vegetation, and a number of isolated wetlands that are not connected to and do not have a significant nexus with a TNW or tributaries of a TNW. The locations of the potentially non-jurisdictional features are shown on **Figures A.4.5-1** through **A.4.5-21**. **Table 4.10-2** summarizes the existing conditions at the non-jurisdictional features. Notable features that are potentially non-jurisdictional include Arana, Radicha, Ebanito, and Jaboncillos Creeks in Kleberg County, which are indicated as blue lines on topographic maps and have mapped 100-year floodplains (**Figures A.4.5-14** and **A-4.5-15**). Both Arana and Radicha Creeks consist of broad drainage swales that do not exhibit OHWMs and are dominated by upland vegetation. Ebanito and Jaboncillos Creeks contain wetlands within and adjacent to the project area; however, the wetlands are within shallow excavated areas, and the portions of these drainages upstream and downstream of the project area consist of broad swales dominated by upland vegetation broken by scattered stock ponds. Notable manmade drainages in the project area include the North Floodway (Cameron County), the Willacy County Drainage Canal, and the East Main Drain (Willacy County). Based on current USACE policies regarding Section 404 permitting, TxDOT will request an Approved Jurisdictional Determination from the USACE for all features identified in **Tables 4.10-1** and **4.10-2**.

Table 4.10-2 Potentially Non-jurisdictional Water Resources in the Project Area

Feature No.	Feature Type	Area (Length) of Ditch/Canal/Non-wetland in Project Area	Area of Wetlands in Project Area	Total Amount in Project Area
Cameron County				
NJF 259 (North Floodway)	Flood-control/ Drainage Canal	0.28 acre (300 linear feet)	None	0.28 acre (300 linear feet)
Willacy County				
NJF 279 (Willacy County Drainage Canal)	Drainage Canal	0.45 acre (300 linear feet)	None	0.45 acre (300 linear feet)
NJF 290	Drainage Ditch	0.15 acre (325 linear feet)	None	0.15 acre (325 linear feet)
NJF 293	Drainage Ditch	0.03 acre (350 linear feet)	None	0.03 acre (350 linear feet)
NJF 296	Isolated Wetland	None	0.06 acre	0.06 acre
NJF 299	Drainage Ditch	350 linear feet (all within culvert)	None	350 linear feet (all within culvert)
NJF 301 (Raymondville Draw)	Drainage Ditch	0.14 acre (300 linear feet)	None	0.14 acre (300 linear feet)
NJF 305	Drainage Ditch	350 linear feet (all within culvert)	None	350 linear feet (all within culvert)
NJF 303 (East Main Drain)	Drainage Ditch with Adjacent Wetlands	0.26 acre (300 linear feet)	0.08 acre	0.34 acre (300 linear feet)
NJF 232	Isolated Wetland	None	0.03 acre	0.03 acre
Kenedy County				
NJF 218A-B	Isolated Wetlands	None	0.40 acre	0.40 acre
NJF 215	Isolated Wetland	None	0.05 acre	0.05 acre
NJF 209A-B	Isolated Wetland	None	0.34 acre	0.34 acre

Table 4.10-2 Potentially Non-jurisdictional Water Resources in the Project Area

Feature No.	Feature Type	Area (Length) of Ditch/Canal/Non-wetland in Project Area	Area of Wetlands in Project Area	Total Amount in Project Area
NJF 207A-B	Isolated Wetlands	None	0.03 acre	0.03 acre
NJF 204A-B	Isolated Wetlands	None	0.21 acre	0.21 acre
NJF 199	Isolated Wetland	None	0.36 acre	0.36 acre
NJF 188A-C	Isolated Wetlands	None	2.13 acres	2.13 acres
NJF 185A-C	Isolated Wetlands (Road Ditch)	None	8.06 acres (1.3 mile of ditch)	8.06 acres (1.3 mile of ditch)
NJF 176	Isolated Wetland	None	0.13 acre	0.13 acre
NJF 174	Isolated Wetland	None	0.15 acre	0.15 acre
NJF 170A-D	Isolated Wetlands	None	1.55 acre	1.55 acre
NJF 160	Isolated Wetland	None	0.07 acre	0.07 acre
NJF 159A-E	Isolated Wetlands	None	1.13 acre	1.13 acre
NJF 158A-F	Isolated Wetlands	None	1.31 acre	1.31 acre
NJF 147A-C	Isolated Wetlands	None	0.48 acre	0.48 acre
NJF 146A-C	Isolated Wetlands	None	0.50 acre	0.50 acre
Kleberg County				
NJF RB1	Isolated Wetland	None	1.01 acre	1.01 acre
NJF RB2	Isolated Wetland and Stock Pond	None	0.85 acre	0.85 acre
NJF 134	Isolated Wetland	None	0.16 acre	0.16 acre
NJF 130	Stock Pond near Radicha Creek	0.02 acre	None	0.02 acre
NJF 123 at Ebanito Creek	Wetland Swale (Scoured under Bridges)	0.09 acre	0.40 acre	0.49 acre
NJF 121 at Jaboncillos Creek	Wetland Swale (Scoured under Bridges)	0.18 acre	0.92 acre	1.10 acre
NJF 107	Drainage Ditch	0.11 acre (475 linear feet)	None	0.11 acre (475 linear feet)
Nueces County				
NJF 74	Drainage Ditch	0.04 acre (400 linear feet)	None	0.04 acre (400 linear feet)
NJF 70	Drainage Ditch within Road Ditch	1.25 miles within ditch	None	1.25 miles within ditch
NJF 68	Drainage Ditch/ Wetland	0.06 acre (310 linear feet)	0.07 acre	0.13 acre (310 linear feet)
NJF 61	Isolated Wetland	None	0.01 acre	0.01 acre

Source: Blanton and Associates, Inc., October 2009

4.10.1.2 Water Quality

Water quality data and concerns in and near the project area were identified by reviewing the Texas Commission on Environmental Quality's (TCEQ) mapped stream segments, 2008 surface water quality inventory, and Section 303(d) list. Additional information was obtained from the Total Maximum Daily Load document that has been prepared for Petronila Creek (TCEQ 2007).

Water quality is regulated and monitored by the TCEQ under Sections 401, 402, and 303 of the Clean Water Act. Section 401 requires state water quality certification for activities that affect waters of the US. Section 402 authorizes the Texas Pollutant Discharge Elimination System (TPDES), which regulates the discharge of pollutants into waters. Section 303 authorizes states to establish water quality standards and implementation plans and to identify waters that do not meet water quality standards (e.g., threatened/impaired waters listed on the 303(d) list).

Runoff from the project area would flow into seven designated stream segments (**Figure A.4.10-9**). **Table 4.10-3** lists these segments, identifies the general portions of the project area that drain to the segments, and provides water quality information for the segments. Of the seven segments, four are listed on the 2010 303(d) list of threatened/impaired waters. One of the threatened/impaired segments is within 5.0 miles of the project area (Segment 2492A: San Fernando Creek crosses the project area north of Kingsville); therefore, this EA will be reviewed by TCEQ in accordance with the TxDOT-TCEQ MOU. In addition, although Segment 2204 (Petronila Creek Above Tidal) is not listed on the 2010 303(d) list, it has been listed as impaired in the past, and there is an improved Total Maximum Daily Load document for chloride, sulfate, and total dissolved solids for this segment (TCEQ 2007).

Table 4.10-3 Water Quality Segments Receiving Runoff from Project Area

Portion of Project Area	Segment ID	Segment Name	On 2010 303(d) List?	Concerns	Distance from Project Area
At Combes	2201	Arroyo Colorado Tidal	Yes	Bacteria, depressed dissolved O_2, and DDE, mercury, and polychlorinated biphenyls (PCBs) in edible tissue	>5.0 miles
Combes to North of East Main Drain	2491	Laguna Madre	Yes	Bacteria, depressed dissolved O_2	>5.0 miles
North of East Main Drain to South of Los Olmos Creek	Area drains to isolated depressions and swales.				
South of Los Olmos Creek to North of Bishop	2492	Baffin Bay/Alazan Bay/Cayo del Grullo/Laguna Salada	No	NA	<5.0 miles
	2492A	San Fernando Creek	Yes	Bacteria	Crosses project area
North of Bishop to FM 892	2204	Petronila Creek Above Tidal	No*	NA	Crosses project area
	2204A	Unnamed Drainage Ditch Tributary (A) to Petronila Creek	No (Not Assessed)	NA	Crosses project area
At FM 892	2485A	Oso Creek	Yes	Bacteria	>5.0 miles

* Although Segment 2204 is not on the current (2010) 303(d) list, it has been in the past, and there is an approved TMDL for chloride, sulfate, and total dissolved solids for this segment (TCEQ 2007).
Source:TCEQ - 303(d) list of threatened/impaired waters 2010, November 2011

4.10.1.3 Section 9 and 10 Navigable Waters

Navigable waters in the project area that may be subject to Sections 9 and 10 of the Rivers and Harbors Act were identified by reviewing the USACE Galveston District's preliminary list of navigable waters and by conducting field investigations to assess the potential for tidal influence or navigability of streams in the project area.

Navigable waters are regulated under Sections 9 and 10 of the Rivers and Harbors Act of 1899 and the General Bridge Act of 1946. The USACE administers Section 10 permits, while the US Coast Guard (USCG) administers permits under Section 9 and the General Bridge Act of 1946. Navigable waters are determined by the USACE Galveston District and the USCG on a case-by-case basis.

Based on field investigations and its proximity to the Laguna Salada arm of Baffin Bay, Los Olmos Creek (located at the Kenedy/Kleberg County line) appears to be tidally influenced in the project area; therefore, it is expected to be considered a Section 10 navigable water. TxDOT would coordinate with the USACE to verify this determination and obtain the appropriate permit. No other Section 10 navigable waters are located in the project area.

Los Olmos Creek is not expected to be regulated by the USCG under Section 9 of the Rivers and Harbors Act or the General Bridge Act of 1946. No lighting or other navigational aids were observed on the existing bridge, and the creek at this location does not appear to be navigable-in-fact because water flow and depth is very restricted between the project area and the Laguna Salada arm of Baffin Bay downstream. TxDOT would coordinate with the USCG to confirm this determination.

4.10.1.4 Waters Regulated by the International Boundary and Water Commission

The International Boundary and Water Commission (IBWC) is responsible for applying the boundary and water treaties between the US and Mexico and for settling differences that may arise from those treaties. Construction activities within the limits of IBWC-regulated floodways require coordination with the IBWC. One waterway within the project area (the North Floodway located just south of the Cameron/Willacy County line, see **Figure A.4.5-2**) is regulated by the IBWC. The North Floodway is bounded by levees that, based on review of floodplain maps, contain 100-year flood events; therefore, the floodway is separated from other floodplains in the area.

4.10.1.5 Floodplains

Special flood hazard areas (SFHA), which include 100-year floodplains, crossed by the proposed project were identified, mapped, and assessed for potential impacts by obtaining GIS data from FEMA and overlaying the data on the proposed improvement schematics. Zones identified with an A# represent areas inundated by 100-year floodplain for which there is no base flood elevations.

Executive Order 11988 on Floodplain Management requires that federal agencies avoid activities that directly or indirectly result in the development of a floodplain area. According to FEMA's most current Flood Insurance Rate Maps (FIRM), the project area crosses 100-year floodplains in a number of locations throughout the project corridor. The project area is shown relative to 100-year floodplains on **Figures A.4.5-1** through **A.4.5-21**. The following gives a

general description of floodplains crossed by the project by county/location.

- In Cameron County at the southern end of the project, the project area crosses mapped 100-year floodplains at the North Floodway and north of the floodway to the Cameron-Willacy County line (**Figures A.4.5-1** and **A.4.5-2**). The North Floodway is bounded by levees that, based on review of floodplain maps, contain 100-year flood events. Outside of the levees, the floodplains are the result of the flat nature of the area and lack of adequate drainage.
- Floodplains are not mapped in Willacy County, with the exception of some urbanized areas. The project crosses mapped 100-year floodplains in the cities of Lyford and Raymondville. These floodplains appear to be portions of broad floodplains that occur as a result of the flat nature of the area (**Figures A.4.5-2** through **A.4.5-5**).
- In Kenedy County, mapped 100-year floodplains are associated with isolated blow-out depressions and low areas among dune ridges. These floodplain areas are not associated with drainage features but are a result of runoff collecting in internal low areas. The project area crosses 15 to 20 of these isolated floodplains (**Figures A.4.5-5** through **A.4.5-14**).
- Within Kleberg County, the project area crosses 100-year floodplains at the following streams: Los Olmos, Arana, Radicha, Jaboncillos, Ebanito, Escondido, Santa Gertrudis, Tranquitas, and San Fernando Creeks (**Figures A.4.5-14** through **A.4.5-18**).
- Within Nueces County, the project area crosses 100-year floodplains at Carreta Creek, an unnamed tributary of Carreta Creek, and Petronila Creek. In addition, at the north end of the project in Robstown, the project area crosses a broad flat floodplain that drains to Oso Creek (**Figures A.4.5-18** through **A.4.5-21**).

27.3 miles of the 122 mile project have been completed and brought up to Interstate standards. Of the remaining 94.7 miles, 89 miles of the US 77 Upgrade Project would be upgraded from an existing four-lane divided highway to a four-lane facility that meets Interstate highway standards, by either widening or expanding within the existing ROW. The remaining seven miles would constitute two highway relief routes for Driscoll and Riviera.

The UPRR parallels US 77 for almost the entire length of the project, and it historically has had a large effect on the 100-year floodplain. It acts to limit the 100-year floodplain to the west side of the railroad and away from US 77 in some areas.

For the majority of the length of US 77 from Robstown to Harlingen, improvements consist only of widening the existing roadway or improvements in the existing ROW. However, due to physical, environmental and social constraints, expansion of the existing facility within existing ROW or widening through two of the communities was not feasible. In both Driscoll and Riviera, the proposed alignment would be constructed to the east of each respective community. Each of these relief routes would cross over the regulatory floodplain (defined as the areas within the regulated floodplain such as the 100-year floodplain), and this section discusses the floodplain finding for each relief route.

In consideration of the upgrade being limited to widening or expansion within existing ROW, the discussion of alternatives considered is limited to the options considered at Driscoll as described in **Section 3.1**.

US 77 in the Driscoll area is subject to several physical constraints that dictate the general placement of viable alignments (those that meet the project's need and purpose). The most

significant constraint is the UPRR, which runs just to the west of the existing alignment of US 77 through Driscoll. The other physical constraints are Petronila Creek, which runs north of the city, the urban area, the very flat topography, and the lack of natural drainage channels.

For the most part, Driscoll is either within the 100-year or 500-year floodplain. Petronila Creek is designated as a SFHA Zone "A4" upstream and downstream of the existing US 77. Base flood elevations have been determined for Petronila Creek, and it is not possible to avoid the 100-year floodplain of Petronila Creek. Although some options have less effect on the floodplain, these same options have substantially more extensive effects on the human environment in a small rural community.

The Driscoll east option, which is part of the Build Alternative, would have the least effect on Driscoll residents because the effects are limited to one residence and no businesses. The majority of the area of the east option is not in the 100-year floodplain (88 percent). The area that is (17 acres) would not support incompatible development with the exception of a small area (3 acres) near the northwest quadrant of the US 77 relief route and FM 665 proposed interchange. The other three quadrants are not in the 100-year floodplain. The city of Driscoll could impose restrictions on development on this quadrant of the interchange to prevent further impacts to the floodplain. The east option is downstream of Driscoll, so the proposed drainage structures incorporated into the project would pass the design flood without raising the base flood elevation.

The second area to be considered for a relief route is the unincorporated area of Riviera. US 77 in the Riviera area is subject to several physical constraints that dictate the general placement of viable alignments (those that meet the project's need and purpose). These constraints are the UPRR, which runs just to the west of the existing alignment of US 77 through Riviera, Los Olmos Creek, which runs south of the community, the urban area, the very flat topography, and the lack of natural drainage channels. Additionally, the historic King Ranch is located west of the UPRR in the area of Riviera.

The existing US 77 lanes cross two SFHA "A2" Zones in Riviera, and base flood elevations have been determined for these floodplains. The "A2" Zones become "A1" Zones upstream of where the east option crosses these zones. The east option, which became part of the Build Alternative, would have the least effect on the Riviera residents because the effects are limited to three residences and no businesses. It does affect 16 acres of floodplains and crosses two long narrow floodplains, 0.5 mile long. The length of the relief route is 4.2 miles. One of the floodplains is located in the area of a proposed interchange with US 77 and FM 771. Any development around the interchange would have to be designed to detain any increase in flow due to an increase in impervious cover and prevent an increase in base flood elevations. The other floodplain is in an area where there are no access roads and development would not take place. Drainage structures would be placed to pass the design flood and not raise the base flood elevations by more than one foot.

Many communities in Texas regulate development in the floodplain through the National Flood Insurance Program (NFIP). However, the project area is not a community as it is linear in nature and 122 miles in length. There is no enforced State of Texas floodplain protection standard. However, TxDOT would coordinate with FEMA and the local Floodplain Managers where flood risks in NFIP communities are affected. TxDOT uses Title 23 CFR Part 650 Subpart A, which prescribes FHWA's policies and procedures for the location and hydraulic design of highway encroachments on floodplains. In addition, TxDOT follows guidance

procedures which ensure compliance with all applicable federal regulation that apply to any federally approved highway construction, reconstruction, rehabilitation, repair, or improvement project which affects the base floodplain. The Department's premise is as follows:

- Avoid significant floodplain encroachment where practicable
- Minimize the impact of highway actions that adversely affect the base floodplain
- Be compatible with the NFIP of the FEMA.

There is no local floodplain protection standard to which the project is subject. Although there is no existing standard, the project was designed so that it would not practically support incompatible 100-year floodplain development.

4.10.1.6 Coastal Natural Resource Areas

Consistency of the proposed project with the Texas Coastal Management Program (TCMP) was determined by reviewing the goals and policies of the TCMP, conducting field investigations to identify coastal natural resource areas (CNRA) located in the project area, and assessing the potential impacts of the project to CNRAs.

The TCMP was established to improve the management of the state's CNRAs and to ensure the long-term ecological and economic productivity of the coast. The TCMP is administered by the Coastal Coordination Council (CCC), which coordinates state, local, and federal programs and activities within the coastal zone. Activities within the coastal zone must be consistent with the goals and policies of the TCMP, which focus on the management of 16 CNRAs identified in 31 TAC Chapter 501.31.

The southernmost portion of the project area, from Combes to Raymondville, is located outside the Texas coastal zone, as identified by the TCMP. From Raymondville northward to the northern project limit, US 77 serves as the boundary of the coastal zone. Of the 16 CNRAs designated by the TCMP, six are located in the project area (**Table 4.10-4**). With the exception of special hazard areas (floodplains), the CNRAs are limited to the area in and within 100 feet of Los Olmos Creek. Special hazard areas (floodplains) occur along Los Olmos Creek, as well as several other creeks and at isolated depressions and swales.

Table 4.10-4 Coastal Natural Resource Areas within Project Area

CNRA	General Description of Resource	Location in Project Area
Waters under Tidal Influence	Those waters that are contained behind coastal barrier islands and within bays and estuaries and rivers to the inland extent of tidal influence; provide important aquatic habitat, serve as prime recreation areas, and provide some domestic water supply.	Los Olmos Creek
Submerged Lands	Lands underlying waters under tidal influence or waters of the open Gulf of Mexico, independent of whether they are State-owned; sediments of submerged lands are habitat for a diverse benthic (bottom-dwelling) animal community.	Los Olmos Creek

Table 4.10-4 Coastal Natural Resource Areas within Project Area

CNRA	General Description of Resource	Location in Project Area
Coastal Wetlands	Wetlands in or within one mile of the mean high tide line of tidal river and stream segments; provide wildlife habitat, convey and store floodwaters, trap sediment, and reduce water pollution.	Los Olmos Creek
Tidal Sand and Mud Flats	Silt, clay, or sand substrates, unvegetated or vegetated by algal mats, that occur in the intertidal zone and that are regularly or intermittently exposed and flooded by tides; serve as feeding grounds for coastal shorebirds, fish, and invertebrates.	Los Olmos Creek
Coastal Shore Areas	All areas within 100 feet landward of the high water mark on submerged land; function as buffers, protecting upland habitats from erosion and storm damage and adjacent marshes and waterways from water quality degradation.	Within 100 feet on either side of Los Olmos Creek.
Special Hazard Areas	Areas designated by the administrator of the Federal Insurance Administration under the National Flood Insurance Act as having special flood, mudslide, and/or flood-related erosion hazards; receive the brunt of storms, act as natural water-detention systems, and are natural filters for upland runoff.	The project area crosses 100-year floodplains at the edge of the coastal boundary at several creeks and a number of isolated depressions.

Source: *TCMP Final Environmental Impact Statement, August 2006. Part II. Description of the Proposed Action: The Texas Coastal Management Program. Chapter Four Program Goals and Policies*. http://www.glo.state.tx.us/coastal/cmpdoc/chap4.html, October 2009

4.10.1.7 Essential Fish Habitat

Essential fish habitat (EFH) is evaluated under the authority of the Magnuson-Stevens Fishery Conservation and Management Act of 1976, as amended. EFH is defined as “those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity." In Texas, EFH requirements apply to all estuarine habitats and inland of all waters to the extent of salt-water influence.

Since Los Olmos Creek is tidally influenced in the project area, the channel, substrate, and adjacent wetlands are considered EFH. Approximately 1.58 acres of EFH are present at Los Olmos Creek. No other tidally influenced waters or EFH is present in the project area.

4.10.1.8 Coastal Barrier Resources Act (CBRA)

The Coastal Barrier Resources Act (CBRA) is administered by the USFWS and identifies and protects coastal areas by placing restrictions on the use of federal funds for development activities. This project is located within Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties but is not located within a designated CBRA map unit (see **Figure A.4.10-9**).

4.10.1.9 National Wild and Scenic Rivers

The Wild and Scenic Rivers Act of 1968 protects rivers that are listed on the National Inventory of Wild and Scenic Rivers, which are characterized as possessing outstandingly remarkable

scenic, recreational, geological, fish and wildlife, cultural, or other similar values. There are no rivers designated as Wild and Scenic Rivers in or near the project area.

4.10.2 No Build Alternative – Water Resources and Water Quality Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not impact wetlands or other waters of the US, water quality, navigable waters, waters regulated by the IBWC, floodplains, coastal natural resource areas, EFH, coastal barrier resources, or National Wild and Scenic Rivers. Therefore, the No Build Alternative would not require any coordination or permits for issues related to water resources or water quality.

4.10.3 Build Alternative – Water Resources and Water Quality Consequences

The following sections describe the environmental consequences of the proposed Build Alternative to water resources and water quality.

4.10.3.1 Wetlands and Other Waters of the US

As proposed, the Build Alternative would require construction within waters of the US at eight of the 10 crossings. **Figures A.4.10-1** through **A.4.10-8** show the plan proposed by the Build Alternative at each crossing. **Table 4.10-5** identifies the potential impacts to waters of the US that would result at each crossing if the proposed Build Alternative were implemented, as well as identifies the anticipated Section 404 permit that would be required at each crossing. Discharges of dredged or fill material into waters of the US require permitting under Section 404 of the Clean Water Act. Roadway projects such as this are often authorized by Nationwide Permit (NWP) 14 provided they do not result in a loss of more than 0.5 acre of non-tidal waters or more than 0.33 acre of tidal waters at any single crossing. NWP 14 authorizes activities required for the construction, expansion, modification, or improvement of linear transportation projects, including roads. Under NWP 14, a Pre-Construction Notification (PCN) is required to be submitted to the USACE for each crossing where (1) the loss of waters of the US exceeds 0.1 acre or (2) where there is a discharge into a special aquatic site, including wetlands. If the proposed construction exceeds the thresholds of NWP 14, a Section 404 Individual Permit may be required.

At the time this EA was submitted, bridge/culvert layouts and construction details such as abutment extents, riprap needs, and channel modifications were not available. Furthermore, the project may be constructed by a separate developer (other than TxDOT). As a result, the impacts to wetlands and other waters of the US presented in **Table 4.10-5** are estimates. While the Build Alternative could impact all areas of wetlands and other waters of the US present in the project area, as presented in **Table 4.10-1**, it is likely that the ultimate design would avoid some areas because the current plans call for the widening of existing bridges/culverts or the construction of new bridges, which would largely span most waters of the US. Therefore, the potential impacts reported in **Table 4.10-5** are based on the following assumptions:

- At crossings where the amount of waters of the US in the project area exceeds 0.5 acre of non-tidal waters (Crossings 3 and 4) or 0.33 acre of tidal waters (Crossing 1), an effort would be made during the PS&E phase to design the proposed improvements so that they would not result in the loss of greater than 0.5 acre of non-tidal waters (at Crossings

3 and 4) or greater than 0.33 acre of tidal waters (at Crossing 1). Temporary impacts at these crossings could affect the remaining waters of the US in the project area.

- At crossings where the amount of waters of the US in the project area is less than 0.5 acre, the proposed project could permanently impact the entire area; therefore, no temporary impacts are reported at these crossings.

To minimize impacts to wetlands and other waters of the US, TxDOT would include notes in the EPIC sheets for the developer/contractor to minimize permanent and temporary impacts to these areas.

Table 4.10-5 Potential Impacts to Waters of the US Resulting from the Proposed Build Alternative

Crossing No.	Existing Structures[1]	Proposed Work	Potential Permanent Fill	Potential Temporary Fill	Anticipated Permit[2]	PCN[3] Required?
Crossing 1 (Los Olmos Creek)	Two 580-ft, 12-span bridges	Widen northbound bridge by 10 ft	Up to 0.33 acre	Up to 1.25 acres	NWP 14	Yes (impacts >0.1 acre and wetland impacts)
Crossing 2 (Unnamed Tributary of Escondido Creek)	One 5-ft x 4-ft x 198-ft CBC	Construct northbound and southbound access roads and extend culvert 159 ft	0.24 acre	None	NWP 14	Yes (impacts >0.1 acre and wetland impacts)
Crossing 3 (Escondido Creek)	Two 200-ft, 5-span bridges	Construct two new 200-ft bridges for access roads	Up to 0.5 acre	Up to 0.35 acre	NWP 14	Yes (impacts >0.1 acre and wetland impacts)
Crossing 4 (Santa Gertrudis Creek)	Two 260-ft, 6–span bridges	Replace existing bridges with 540-ft bridges to span crossroad; add two new 240-ft bridges for access roads	Up to 0.5 acre	Up to 0.82 acre	NWP 14	Yes (impacts >0.1 acre and wetland impacts)
Crossing 5 (Tranquitas Creek)	Two 210-ft, 3-span bridges; two 170-ft, 4-span bridges	None	None	None	None	No
Crossing 6 (San Fernando Creek)	Two 240-ft, 6-span bridges	Construct one new 240-ft bridge for southbound access road	0.12 acre	None	NWP 14	Yes (impacts >0.1 acre)

Table 4.10-5 Potential Impacts to Waters of the US Resulting from the Proposed Build Alternative

Crossing No.	Existing Structures[1]	Proposed Work	Potential Permanent Fill	Potential Temporary Fill	Anticipated Permit[2]	PCN[3] Required?
Crossing 7 (Unnamed Tributary to Carreta Creek)	Two 3-ft RCPs	None	None	None	None	No
Crossing 8 (Carreta Creek)	Two 170-ft, 4-span bridges	Widen southbound bridge by 16 ft	0.05 acre	None	NWP 14	Yes (endangered plants)
Crossing 9 (Unnamed Tributary to Carreta Creek)	Two 160-ft, 5-span bridges	Construct two new 160-ft bridges in existing median	0.39 acre	None	NWP 14	Yes (impacts >0.1 acre and wetland impacts)
Crossing 10 (Petronila Creek)	None (New location)	Construct two 1,725-ft bridges	0.17 acre	None	NWP 14	Yes (impacts >0.1 acre and potential historic property)

[1] ft = feet; CBC = concrete box culvert; RCP = reinforced concrete pipe
[2] NWP = Nationwide Permit
[3] PCN = Pre-construction Notification
Source: Blanton and Associates, Inc., October 2009

Based on the assumptions listed above, the following paragraphs summarize required permits at each of the 10 crossings along the US 77 Upgrade Project.

Crossings Where No Section 404 Permit is Required
No Section 404 permit would be required at Crossing 5 (Tranquitas Creek) and Crossing 7 (Unnamed Tributary to Carreta Creek) because no construction is proposed at these crossings. The proposed project would utilize the existing facility at these locations (**Figures A.4.10-4** and **A.4.10-6**).

Crossings Requiring NWP 14
Construction at Crossings 1 through 4, Crossing 6, and Crossings 8 through 10 would be authorized under NWP 14. Each of these crossings would require a PCN because construction would result in an impact greater than 0.1 acre, would require discharge into a special aquatic site (i.e., wetland), or would have the potential to affect threatened or endangered species (Crossing 8 at Carreta Creek) or a significant historic property (Crossing 10 at Petronila Creek).

The purpose of the proposed activity is to improve the linear transportation facility at each of the crossings of waters of the US. Appropriate measures would be taken to maintain normal downstream flows and minimize flooding. Temporary fills would consist of materials and be placed in a manner that would not be eroded by expected high flows. Temporary fills would be removed in their entirety and the affected area returned to pre-construction elevations and re-vegetated as appropriate. Stream channel modifications, including bank stabilization, would be

limited to the minimum necessary to construct or protect the proposed structures and to the immediate vicinity of the project. The project would comply with all general and regional conditions applicable to NWP 14.

Final impacts to waters of the US and final determination of the appropriate Section 404 permits would occur after the specific project components are designed at each crossing. Should the ultimate project design result in the loss of more than 0.33 acre of tidal waters at Crossing 1 or more than 0.5 acre of waters of any of the other crossings, a Section 404 Individual Permit could be required for impacts at those crossings. Compensatory mitigation for permanent losses to wetlands and other waters of the US would be developed as appropriate during the Section 404 permitting process. General Condition 20 of the NWP program and the NWP regional conditions require compensatory mitigation for all losses of wetlands or other special aquatic sites that exceed 0.1 acre and require PCN, as well as for losses of streams that exceed 300 linear feet and require PCN.

Potentially Non-jurisdictional Features
Table 4.10-6 summarizes the proposed construction and associated impacts to potentially non-jurisdictional features. As noted above, design and construction details are not known; therefore, the potential impacts represent a worst-case scenario except in areas where the current plans show no construction (e.g., at NJF 259–North Floodway). Impacts to potentially non-jurisdictional water resources would be minimized where possible.

If the USACE agrees that the water features listed in **Table 4.10-6** are non-jurisdictional, then no Section 404 permits would be required at these features. If the USACE determines that any of the water features in **Table 4.10-6** are jurisdictional waters of the US, additional Section 404 permits (i.e., NWP 14) may be required. If the wetlands at Jaboncillos Creek (or other areas where impacts may exceed 0.5 acre) are determined to be jurisdictional, a Section 404 Individual Permit could be required for impacts at the crossing.

Table 4.10-6 Impacts to Potentially Non-Jurisdictional Features Resulting from the Proposed Build Alternative

Feature No.	Existing Structures[1]	Proposed Work[1]	Potential Permanent Impact
NJF 259 (North Floodway)	Three multi-span bridges	None	None
NJF 279 (Willacy County Drainage Canal)	Two 140-ft bridges	Construct two new 140-ft bridges for proposed main lanes	0.45 acre
NJF 290	Two 60-ft bridges	Construct two new 60-ft bridges for main lanes	0.15 acre
NJF 293	Two RCPs	Replace existing RCPs with two 36-inch RCPs	0.03 acre
NJF 296	None	None	0.06 acre (potential impacts from nearby construction)
NJF 299	Two RCPs, one CBC	None	None
NJF 301 (Raymondville Draw)	Two 70-ft bridges and two 60-ft bridges	None	None
NJF 305	Two CBCs	None	None

Table 4.10-6 Impacts to Potentially Non-Jurisdictional Features Resulting from the Proposed Build Alternative

Feature No.	Existing Structures[1]	Proposed Work[1]	Potential Permanent Impact
NJF 303 (East Main Drain)	Two 110-ft bridges and two 100-ft bridges	None	None
NJF 232	RCP	Construct partial interchange (SB)	0.03 acre
NJF 218A-B	RCP	None	0.40 acre (potential impacts from nearby construction)
NJF 215	RCP	Replace existing culvert with 18-inch RCP	0.05 acre
NJF 209A-B	RCP	Transition to existing from proposed partial interchange (NB)	0.34 acre
NJF 207A-B	RCP	None	None
NJF 204A-B	RCP	Replace existing culvert with 24-inch RCP	0.21 acre
NJF 199	RCP	Replace existing RCP with 3-ft x 2-ft CBC	0.36 acre
NJF 188A-C	Four CBCs	None	None
NJF 185A-C	RCP	Construct partial interchange (NB); None on west side of existing lanes, where wet ditch is located	<0.1 acre
NJF 176	RCP	Construct partial interchange (NB); replace existing RCP with 36-inch RCP	0.13 acre
NJF 174	RCP	Interchange transition	0.15 acre
NJF 170A-D	RCP	None	None
NJF 160	Two 100-ft cattle pass bridges	Add two new 100-ft bridges and replace one 100-ft bridge; maintain existing NB main lanes to be used as NB access	0.07 acre
NJF 159A-E	RCP	Add new main lanes and SB access road; install 4-ft x 3-ft CBC	1.13 acre
NJF 158A-F	RCP	Add NB main lanes and SB ramp transition; install two 36-inch RCPs	1.31 acre
NJF 147A-C	Two 10-ft x 7-ft CBCs	Extend CBCs 170 ft to east	0.48 acre
NJF 146A-C	RCPs/CBC	Add new main lanes and overpass at Sarita	0.50 acre
NJF RB1	None	Construct Riviera relief route	1.01 acre
NJF RB2	None	Construct Riviera relief route	0.85 acre
NJF 134	Two RCPs	Add main lanes and NB access road; replace existing culvert with two 5-ft x 3-ft CBCs	0.16 acre
NJF 130	Two 70-ft bridges	Add two new 70-ft bridges	0.02 acre
NJF 123 at Ebanito Creek	One 60-ft bridge and one 75-ft bridge	Construct new main lanes and access road; construct two new 75-ft bridges and replace existing 75-ft bridge	0.49 acre
NJF 121 at Jaboncillos Creek	Two 130-ft bridges	Construct new main lanes and access road; construct two new 120-ft bridges	1.10 acre

Table 4.10-6 Impacts to Potentially Non-Jurisdictional Features Resulting from the Proposed Build Alternative

Feature No.	Existing Structures[1]	Proposed Work[1]	Potential Permanent Impact
NJF 107	Two CBCs under access roads; concrete lined under main lane bridges	None	None
NJF 74	One 75-ft bridge and one 100-ft bridge	Construct new main lanes and access road; Construct one new 230-ft bridge and one new 155-ft bridge	0.04 acre
NJF 70	Four CBCs	Construct new main lanes and access road; On west side where ditch is located, proposed construction is limited to the northern 0.2 mile of roadway along ditch	0.2 acre
NJF 68	Three CBCs	Construct new main lanes; replace existing CBCs with three 6-ft x 4-ft CBCs	0.13 acre
NJF 61	None	Construct new main lanes and access road	0.01 acre

[1] ft = feet; CBC = concrete box culvert; RCP = reinforced concrete pipe; NB = northbound; SB = southbound
Note, if the USACE determines that any of the water features in **Table 4.10-6** are jurisdictional waters of the US, additional Section 404 permits may be required.
Source: Blanton and Associates, Inc., October 2009

4.10.3.2 Water Quality

Section 401 of the Clean Water Act: State Water Quality Certification
Proposed construction within waters of the US as a result of the proposed Build Alternative would be authorized by NWP 14. The 401 certification requirements would be met by implementing approved best management practices (BMPs) from the TCEQ's *401 Water Quality Certification Conditions for Nationwide Permits*. These BMPs would address erosion control, sedimentation control, and post-construction total suspended solids. **Table 4.10-7** provides a list of approved BMPs. BMPs would be outlined in the Storm Water Pollution Prevention Plan (SW3P) prepared for the project and would be implemented during and after construction. With the implementation of temporary and permanent BMPs, no long-term water quality impacts are expected as a result of the proposed project.

Table 4.10-7 Approved 401 Best Management Practices for Nationwide Permits

Erosion Control	Sedimentation Control	Post Construction TSS
Temporary Vegetation	Sand Bag Berm	Retention/Irrigation Systems
Blankets/Matting	Silt Fence	Vegetative Filter Strip
Mulch	Triangular Filter Dike	Constructed Wetlands
Sod	Rock Berm	Wet Basins
Interceptor Swale	Hay Bale Dike	Vegetation Lined Drainage Ditches
Diversion Dikes	Brush Berm	Grassy Swales
Erosion Control Compost	Stone Outlet Sediment Trap	Sand Filter Systems

Table 4.10-7 Approved 401 Best Management Practices for Nationwide Permits

Erosion Control	Sedimentation Control	Post Construction TSS
Mulch Filter Berms/Socks	Sediment Basin	Extended Detention Basins
Compost Filter Berms/Socks	Erosion Control Compost	Erosion Control Compost
	Mulch Filter Berms/Socks	Mulch Filter Berms/Socks
	Compost Filter Berms/Socks	Compost Filter Berms/Socks
		Sedimentation Chambers*

*Sedimentation chambers can only be used when there is no space available for other approved BMPs.
Source: *TCEQ's 401 Water Quality Certification Conditions for Nationwide Permits* – April 2007

Section 303(d) of the Clean Water Act: Threatened/Impaired Streams
Runoff from a portion of the proposed project would discharge directly into Segment 2492A (San Fernando Creek), which is listed as threatened/impaired for bacteria on the 2010 303(d) list. In addition, runoff from a portion of the project would discharge directly into Segment 2204 (Petronila Creek Above Tidal), which has an approved total maximum daily load (TMDL) for chloride, sulfate, and total dissolved solids. Appropriate BMPs would be used to control the constituents of concern at these locations. The project is not expected to contribute the constituents of concern to the impaired water bodies. Coordination with the TCEQ would be required.

Section 402 of the Clean Water Act: TPDES
The proposed Build Alternative would include five or more acres of earth disturbance. Therefore, TxDOT would comply with the TCEQ's TPDES Construction General Permit (CGP). A SW3P would be implemented, and a construction site notice would be posted on the construction site. A Notice of Intent (NOI) would be required.

Combes is located within the boundaries of the Phase II Harlingen Municipal Separate Storm Sewer System (MS4). Due to the reconfiguration of the ramps at the southernmost extent of the project area, the Build Alternative would comply with the applicable MS4 requirements.

4.10.3.3 Section 9 and 10 Navigable Waters

The proposed Build Alternative would widen the existing northbound bridge over Los Olmos Creek by 10 feet. Based on the location of existing bridge columns within the Los Olmos Creek channel, the proposed bridge widening would require the placement of additional columns in the channel and adjacent wetlands. Work within this Section 10 navigable water would be authorized under NWP 14 with a PCN.

No USCG Bridge Permit is anticipated because Los Olmos Creek is not expected to be regulated by the USCG. TxDOT would coordinate with the USCG to verify this determination.

4.10.3.4 Waters Regulated by the International Boundary and Water Commission

The proposed Build Alternative does not involve construction within the floodplain associated with the North Floodway or within any other part of the Rio Grande floodplain. However, the proposed improvements include the reconfiguration of a northbound exit ramp located just north of the North Floodway levee, as well as the improvements of an access driveway to the north levee road. Construction that may affect the levee would be coordinated with the IBWC.

4.10.3.5 Floodplains

The proposed Build Alternative would require construction within the 100-year floodplain in several areas throughout the project corridor. The hydraulic design for the proposed Build Alternative would be in accordance with current FHWA and TxDOT design policies. The facility would permit the conveyance of the 100-year flood, inundation of the roadway being acceptable, without causing significant damage to the facility, stream, or other property. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. As there is no local Floodplain Administrator, no coordination with the local Floodplain Administrator would be required.

While the No Build Alternative would eliminate all new impacts to the floodplains directly caused by the US 77 Upgrade Project, it was determined not to be practicable since it would not meet the project's need and purpose.

Pursuant to the requirement of 23 CFR 650, Subpart A, this floodplain assessment demonstrates that the Build Alternative is the only practicable alternative.

Based on studies carried out by TxDOT on behalf of the FHWA, no practicable alternative to the proposed alternative exist (23 CFR 650, Subpart A). All other potential alternatives are not possible within natural, social, and economic constraints. In addition, all measures to minimize potential harm within the floodplain, consistent with the regulations issued in accord with Section 2(d) of Executive Order 11988 have been taken. Furthermore, two sets of public meetings (10 meetings total) were held in various locations in the corridor of the project showing the action proposed and the location of the 100-year floodplains.

4.10.3.6 Coastal Natural Resource Areas

The proposed Build Alternative would require work within CNRAs at Los Olmos Creek, including waters under tidal influence, submerged lands, coastal wetlands, tidal flats, coastal shore areas, and special hazard areas (floodplains). In addition, the proposed Build Alternative would require construction within special hazard areas in several areas throughout the project corridor. Impacts to CNRAs at Los Olmos Creek would be minor and limited to the widening of the existing northbound bridge and approaches by 10 feet. Permanent impacts at Los Olmos Creek and associated CNRAs would be limited to the placement of pilings in the channel and minor fill within the adjacent shoreline. Construction within special hazard areas throughout the project would be designed to have minimal effects to floodplain areas. Overall, the proposed Build Alternative would have minor effects to CNRAs that are located at the edge of the coastal zone.

TxDOT has reviewed the proposed action for consistency with the TCMP goals and policies in accordance with the regulations of the CCC and has determined that the proposed action is consistent with the applicable TCMP goals and policies and would not have a direct and significant adverse effect on the CNRAs identified in 31 TAC Chapter 501.31.

4.10.3.7 Essential Fish Habitat

The proposed Build Alternative would widen the existing northbound bridge over Los Olmos Creek by approximately 10 feet. Based on the location of existing bridge columns within the Los Olmos Creek channel, the proposed bridge widening would require the placement of additional columns in the channel, which is expected to have only a minor impact to EFH. An EFH

assessment has been prepared and would be coordinated with NMFS if necessary.

4.10.3.8 Coastal Barrier Resources Act (CBRA)

Since the project is not located within a designated CBRA map unit, the proposed Build Alternative would not impact coastal barrier resources. Therefore, coordination with the USFWS, the managing agency for the CBRA, is not required for this issue.

4.10.3.9 National Wild and Scenic Rivers

The proposed Build Alternative would not affect Wild and Scenic Rivers, as none are located in or near the project area.

4.11 AIR QUALITY

The methodology used to determine air quality impacts utilized the TxDOT Air Quality Guidelines issued in June 2006 with the most recent update of the EPA MOBILE6.2 MODEL conducted on August 20, 2009. This shows the national Mobile Source Air Toxics (MSAT) emission trends from 1999 – 2050 for motor vehicles operating on roadways. The EPA tool used to estimate the MSAT and particulate matter (PM) emissions from motor vehicle use along US 77 was the MOBILE6.2 trip-based dispersion model. The model uses emission factors projected over a typical highway trip of 7.5 miles at average motor vehicle speeds. The MOBILE6.2 model is currently the only tool available for use by the FHWA and functions adequately for large scale projects.

The proposed project is located within Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties which are designated areas in attainment for all National Ambient Air Quality Standards (NAAQS). Therefore, the transportation conformity rules do not apply.

However, because the Corpus Christi area is near nonattainment for ozone, local officials reached formal agreements with the EPA and the TCEQ in 1996 to participate in the Flexible Attainment Region (FAR) program for ozone, which was modified and continued in 2002 in an O3FLEX MOA. The city agreed to take voluntary measures to reduce pollution, such as implementing vapor control systems for gasoline, improving future emissions inventory, and setting up local ozone-alert-day mechanisms. Per this agreement, should a violation occur, EPA would consider any air quality-related factors that the Administrator deems appropriate in exercising its discretion to redesignate the area to nonattainment status. Air quality-related factors would include sufficient air quality data, planning and control considerations, and time to allow the implemented contingency measures to reduce emissions levels. Energy, environment, air quality, cost, and mobility considerations are addressed in the programming of the TIP.

4.11.1 Traffic Air Quality Analysis (TAQA)

The proposed project is consistent with the financially constrained 2035 MTP and 2011-2014 TIP of the Corpus Christi MPO and the HSBMPO. The US 77 traffic data for 2030 ranges from 20,800 vpd to 81,850 vpd as shown in **Table 2.1-2**. Cross-street traffic data for 2030 ranges from 50 vpd to 57,450 vpd. None of the traffic projections exceed 140,000 AADT. Therefore, this project would be considered a *Low Potential MSAT Effect Project.* A prior TxDOT modeling study and previous analyses of similar projects demonstrated that it is unlikely that a carbon monoxide standard would ever be exceeded as a result of any project with an average annual

daily traffic (AADT) below 140,000. Therefore, a Traffic Air Quality Analysis (TAQA) was not required.

4.11.2 Mobile Source Air Toxics (MSATs)

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

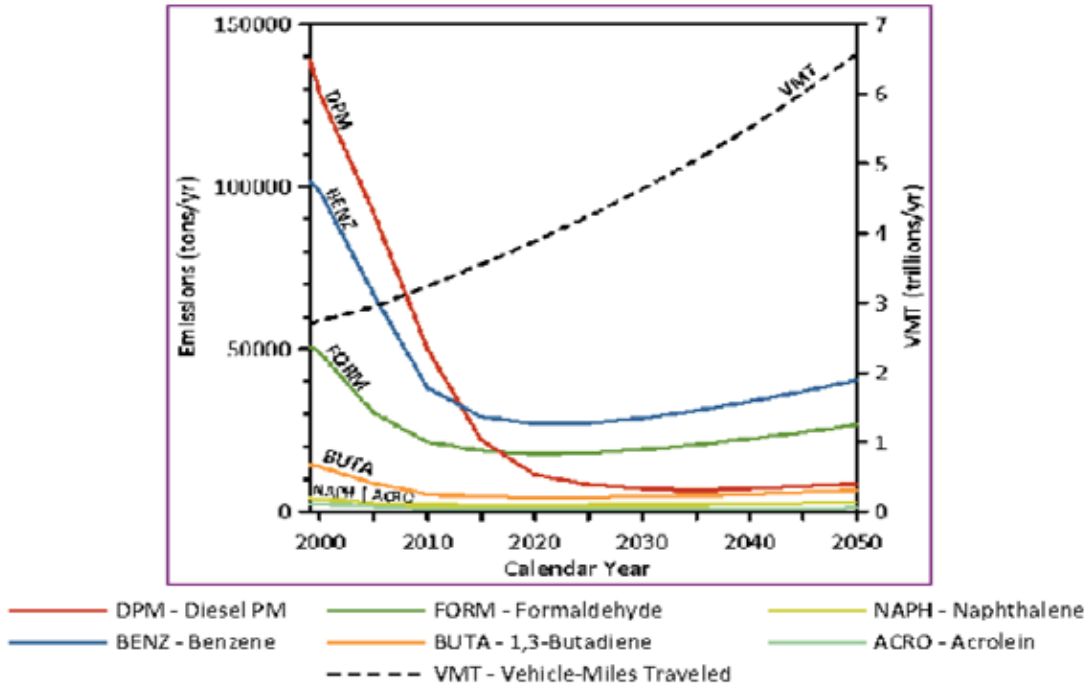
MSATs are a subset of the 188 air pollutants defined by the Clean Air Act (CAA). The MSATs are pollutants emitted from highway vehicles and non-road equipment. Some air pollutant compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other pollutants are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air pollutants also result from engine wear or from different impurities in oil or gasoline.

The EPA is the lead federal agency for administering the CAA and has certain responsibilities regarding the human health effects of MSATs. EPA issued a final rule on *Controlling Emissions of Hazardous Air Pollutants from Mobile Sources* (FR Vol. 66, Pg. 17229, March 29, 2001), which was issued under the authority in Section 202 of the CAA. In this rule, EPA examined the impacts of existing and newly promulgated mobile source emission control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) 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. FHWA has projected that, even with a 145 percent increase in vehicle activities assumed between 1999 and 2050, these programs will reduce the on-highway emissions of these pollutants including:

- acrolein
- benzene
- formaldehyde
- 1,3-butadiene
- naphthalene
- diesel PM plus diesel exhaust organic gases
- polycyclic organic matter.

As shown in the **Graph 4.11-1,** trends show that with a large increase in vehicle miles traveled (VMT), there is a corresponding decrease in Air Toxics Emissions.

Graph 4.11-1 US Annual VMT vs. MSAT 1999-2050



Note:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Source: U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009.

In an ongoing review of MSATs, the EPA has finalized additional rules under authority of CAA Section 202(l) to further reduce MSAT emissions that are not reflected in **Graph 4.11-1**. The EPA issued additional guidance rules on *Control of Hazardous Air Pollutants from Mobile Sources* (FR Vol. 72, No. 30, Pg. 8430, February 26, 2007) under Title 40 CFR Parts 59, 80, 85 and 86. The rule changes were effective on April 27, 2007. These rules include new requirements to significantly lower emissions of benzene and the other MSATs by:

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

Beginning in 2011, petroleum refineries must meet an annual average gasoline benzene content standard of 0.62 percent by volume for both reformulated and conventional gasoline nationwide. The national benzene content of gasoline in 2007 was about 1.0 percent by volume. EPA standards to reduce NMHC exhaust emissions from new gasoline-fueled vehicles will become effective in phases. Standards for light-duty vehicles and trucks (less than or equal to 6,000 pounds (lbs)) become effective during the period from 2010 to 2013, standards for heavy light-duty trucks (6,000 to 8,000 lbs) and medium-duty passenger vehicles (up to 10,000 lbs) become effective during the period from 2012 to 2015. Evaporative requirements for portable gas containers become effective with containers manufactured in 2009. Evaporative

emissions must be limited to 0.3 gram of hydrocarbons per gallon per day (GPD).

In Chapter 3 of its Regulatory Impact Analysis (RIA) for the 2007 MSAT rules, EPA states that there are a number of additional significant uncertainties associated with the air quality, exposure and risk modeling. The modeling also has certain key limitations such as the results are most accurate for large geographic areas, exposure modeling does not fully reflect variation among individuals, and non-inhalation exposure pathways and indoor sources are not taken into account. Chapter 3 of the RIA is found at: http://www.epa.gov/otaq/regs/toxics/fr-ria-sections.htm.

EPA has also adopted more stringent evaporative emission standards (equivalent to current California standards) for new passenger vehicles. The new standards become effective in 2009 for light vehicles and in 2010 for heavy vehicles. In addition to the reductions from the 2001 rule, the new rules will significantly reduce annual national MSAT emissions. For example, EPA estimates a reduction of 365,000 tons of MSATs (including 90,000 tons of benzene, 130,000 tons of diesel PM, and 20,000 tons of formaldehyde) emissions in 2050 compared to emissions in the base year prior to the rule.

Project Specific MSAT Information

Numerous technical shortcomings of emissions and dispersion models and uncertain science with respect to human 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 MSATs, it can provide a basis for identifying and comparing the potential differences among MSAT emissions. 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*, which can be found at:

www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm

For either alternative in this EA, the amount of MSATs 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 slightly higher than that of the Build Alternative, regional MSAT levels are expected to be higher for the No Build Alternative than for the Build Alternative. Regardless of the alternative chosen, emissions would 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 study area would likely be lower in the future.

The new relief routes, ramps and access roads proposed as part of the Build Alternative would have the effect of moving some traffic closer to nearby homes, schools, and businesses. The localized differences in MSAT concentrations would likely be most pronounced along the new/expanded roadway sections that would be built at each cross street. However, as previously discussed, the magnitude and duration of these potential increases cannot be accurately quantified because of limitations on modeling techniques.

In summary, under the Build Alternative in 2030, MSAT emissions in the study area are less likely to be relative to the No Build Alternative due to the reduced VMT. Throughout the Build Alternative, MSAT levels could be slightly elevated in some locations relative to other locations. However, current tools and science are not adequate to quantify MSAT emission concentrations in small areas. However, on a regional basis, EPA's vehicle and fuel regulations coupled with fleet turnover will cause region-wide MSAT levels to be significantly lower than today in almost all cases.

Sensitive Receptor Assessment

There may be localized areas where ambient concentrations of MSATs are slightly higher in the Build Alternative than in the No Build Alternative. Dispersion studies have shown that the "roadway" air toxics start to decrease at about 100 meters (m). Most studies have found it very difficult to distinguish the roadway from background toxic concentrations in any given area, within 500 m. Sensitive receptors include those facilities most likely to contain large concentrations of the more sensitive population, such as hospitals, schools, licensed day care facilities, and elder care facilities.

Within the limits of the logical termini of the Build Alternative, the sensitive receptor data verified nine receptors within 328 feet (100 m) of the proposed ROW and 30 receptors within 1,640 feet (500 m) of the proposed ROW. The sensitive receptors are listed in **Table 4.11-1**.

Table 4.11-1 Sensitive Receptors by Distance

Build Alternative within:	Length (miles – approx.)	Number of Receptors within:	
		328 ft (100 m)	1,640 ft (500 m)
Limits of Logical Termini	127	9	30
Construction Limits	95	4	19

Source: Jacobs Engineering Group, Inc., September 2009

Table 4.11-2 lists the sensitive receptors located in the study area.

Table 4.11-2 Sensitive Receptors in the Study Area

Map ID[1]	Name	Address	City	Zip Code	Distance from ROW (m)
1	Calallen Middle School	4602 Cornett	Corpus Christi	78410	100*
2	Wilma Magee Elementary School	4201 Calallen Drive	Corpus Christi	78410	100*
3	Wilma Magee – Licensed Day Care Center	4201 Calallen Drive	Corpus Christi	78410	100*
4	Calallen High School	4001 Wildcat Drive	Corpus Christi	78410	500*
5	Corpus Christi Home Care	13330 Leopard St., Ste. 26	Corpus Christi	78410	500*
6	Carestat LLC	13310 Leopard St., Ste. 20	Corpus Christi	78410	500*
7	Corpus Christi Medical Center Northwest	13725 FM 624	Corpus Christi	78410	500*

Table 4.11-2 Sensitive Receptors in the Study Area

Map ID[1]	Name	Address	City	Zip Code	Distance from ROW (m)
8	Maria Saenz – Licensed Day Care	3833 Brooklane Drive	Corpus Christi	78410	500*
9	Bee First Primary Home Care	818 E. Main Avenue	Robstown	78381	500
10	Teen Challenge of Texas-Coastal Bend Center	2547 US Highway 77	Driscoll	78351	500
11	St. Paul Lutheran Private School	805 E. Main Street	Bishop	78343	500
12	St. Paul Lutheran Child Enrichment - LDCC	805 E. Main Street	Bishop	78343	500
13	King's Crossing Child Development Center	1505 E. Corral, Bldg 7	Kingsville	78363	500
14	The Children's Corner	306 S. 21st Street	Kingsville	78363	500
15	Christian Life Academy	1727 Carlos Truan Blvd	Kingsville	78363	100
16	H. M. King High School	2210 S. Brahma Blvd	Kingsville	78363	500
17	Christus Spohn Hospital	1311 General Cavazos Blvd	Kingsville	78363	500
18	Kingsville Nursing and Rehabilitation Center	3130 S. Brahma Blvd	Kingsville	78363	500
19	Presbyterian Pan American School	223 N. FM 772	Kingsville	78363	500
20	Ricardo Elementary School	138 W. County Road 2160	Kingsville	78363	500
21	Ricardo Middle School	138 W. County Road 2160	Kingsville	78363	500
22	Kaufer High School	207 S. 9th Street	Riviera	78379	500
23	De La Paz Middle School	203 Seahawk Drive	Riviera	78379	500
24	Nanny Elementary School	203 S. 9th Street	Riviera	78379	500
25	Riviera Learning Center	203 Seahawk Drive	Riviera	78379	500
26	Sarita Elementary School	300 E. La Parra Street	Sarita	78385	100
27	Nurses That Care Sitter Services	957 E. Hidalgo Avenue, Ste. B2	Raymondville	78580	500
28	Sunshine Day Care	268 S. 15th Street	Raymondville	78580	500
29	Mirasoles Adult Day Care I	100 N. Expressway 77, Ste. K	Raymondville	78580	100
30	Sunglo Adult Day Care IV	100 N. Expressway 77, Ste. Q	Raymondville	78580	100
31	Otis Klar Head Start	1305 E. Hidalgo Avenue	Raymondville	78580	500
32	Retama Manor Nursing Center	1700 S. Expressway 77	Raymondville	78580	100*
33	Raymondville High School	1 Bearkat Blvd	Raymondville	78580	500*
33	Myra Green Middle School	1 Bearkat Blvd	Raymondville	78580	500*

Table 4.11-2 Sensitive Receptors in the Study Area

Map ID[1]	Name	Address	City	Zip Code	Distance from ROW (m)
33	Pittman Elementary School	1 Bearkat Blvd	Raymondville	78580	500*
33	Smith Elementary School	1 Bearkat Blvd	Raymondville	78580	500*
34	Dishman Elementary School	309 Madeley	Combes	78535	100*
35	Glory Days Adult Day Care	2004 W. Jefferson, Ste. D	Harlingen	78550	500*
36	Nurses That Care	1830 W. Jefferson	Harlingen	78550	500*

Source: Jacobs Engineering Group, Inc., September 2009
[1]*Map ID corresponds to ID numbers found on Schematics in Appendix G.*
* *Located outside of construction limits*.

Unavailable Information for Project Specific MSAT Impact Analysis

This document includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools and lack of health-based MSAT standards do not enable the prediction of project-specific health impacts from the emission changes associated with the alternatives in this project. 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 MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

1. **Emissions**: The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE6.2 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 MOBILE6.2 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, MOBILE6.2 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 PM, 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 MOBILE6.2 for both PM and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as obstacles to quantitative analysis.

These deficiencies compromise the capability of MOBILE6.2 to estimate MSAT emissions. MOBILE6.2 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. However, MOBILE6.2 is currently the only available tool for use by FHWA/TxDOT and may function adequately for larger scale projects for comparison of alternatives.

2. **Dispersion**: The tools to predict how MSATs disperse are also limited. The EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide (CO) 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. 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 MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude us from reaching meaningful conclusions about project-specific health impacts. Exposure levels are difficult to quantify, because of the inability to calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because assumptions would have to be made regarding changes in travel patterns and vehicle technology that could potentially change emissions rates over the 70-year period. Due to low-dose extrapolation and translation of occupational exposure data to the general population, there are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs pollutant. As a result of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating those 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.

<u>Summary of Existing Credible Scientific Evidence Relevant to Evaluating the Impacts of MSATs</u>
Research into the health impacts of MSATs is ongoing. For different emission types there are a variety of studies that show that some either are statistically associated with adverse health outcomes through epidemiological studies (frequently based on emissions levels found in occupational settings) or that animals demonstrate adverse health outcomes when exposed to large doses.
Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or state level.

The EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to chemical substances found in the environment. The IRIS database is located at http://www.epa.gov/ncea/iris/index.html. The following toxicity information for the six prioritized MSATs was taken from the IRIS database *Weight of Evidence Characterization* summaries. This information is taken 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** – characterized as a known human carcinogen
- **Acrolein** – potential carcinogenic that cannot be determined because existing data are inadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure
- **Formaldehyde** – probable human carcinogen, based on sufficient evidence in animals but limited evidence in humans
- **1, 3-butadiene** – is characterized as carcinogenic to humans by inhalation
- **Naphthalene** – is not considered a human carcinogen, but is toxic by deterioration of human tissue if absorbed or ingested
- **Acetaldehyde** – probable human carcinogen based on increased incidence of nasal tumors in male/female rats and laryngeal tumors in male/female hamsters after inhalation exposure
- **Diesel engine exhaust** – likely to be carcinogenic to humans by inhalation from environmental exposures. Diesel exhaust as reviewed in this document is the combination of diesel particulate matter and diesel exhaust organic gases. Diesel exhaust also represents chronic respiratory effects, possibly the primary non-cancer hazard from MSATs. Prolonged exposures may impair pulmonary function and could produce symptoms, such as cough, phlegm, and chronic bronchitis. Exposure relationships have not been developed from these studies.

There have been other studies that address MSAT health impacts 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 MSATs, instead surveying the full spectrum of both criteria and other pollutants. The FHWA cannot evaluate the validity of these studies, but more importantly, they do not provide information that would be useful to alleviate the uncertainties listed above and enable a more comprehensive evaluation of the health impacts specific to this project.

In the preamble to the 2007 MSAT rule, EPA summarized recent studies with the following statement: “Significant scientific uncertainties remain in our understanding of the relationship between adverse health effects and near-road exposure, including the exposures of greatest concern, the importance of chronic versus acute exposures, the role of fuel type (e.g., diesel or gasoline) and composition (e.g., % aromatics), relevant traffic patterns, the role of co-stressors including noise and socioeconomic status, and the role of differential susceptibility within the

"exposed" populations." (Volume 73 Federal Register Page 8441 (February 26, 2007) Control of Hazardous Air Pollutants from Mobile Sources)."

Relevance of Unavailable or Incomplete Information
While available tools do allow for a reasonable prediction of 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 previously, 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."

In this document, a qualitative assessment has been provided relative to the various alternatives of MSAT emissions and has acknowledged that all of the project alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

4.11.3 No Build Alternative – Air Quality Consequences

If the No Build Alternative were implemented, the proposed improvements and relief routes would not be constructed. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not require any coordination or mitigation for issues related to air quality.

4.11.4 Build Alternative – Air Quality Consequences

A qualitative assessment has been provided relative to the various alternatives of MSAT emissions and has acknowledged that the Build Alternative for the proposed project may result in increased exposure to MSAT emissions in certain locations. With the concentrations and duration of exposures are uncertain, the health effects from these emissions cannot be estimated due to the uncertainty. There would be a reduction in VMT under the Build Alternative relative to the No Build Alternative that would reduce the MSAT emissions.

4.12 NOISE

This analysis was completed 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."

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 4.12-1 FHWA Noise Abatement Criteria

Activity Category	dBA Leq	Description of Land Use Activity Areas
A	**57 (exterior)**	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	**67 (exterior)**	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries, and hospitals.
C	**72 (exterior)**	Developed lands, properties, or activities not included in categories A or B above.
D	**--**	Undeveloped lands.
E	**52 (interior)**	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums.

Source: *TxDOT's (FHWA approved) Guidelines for Analysis and Abatement of Highway Traffic Noise - 1996*, Decemeber 2009
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 one dBA below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dBA or above.

Relative criterion: 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 existing and 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.

The traffic noise analysis was completed for the entire project limits including Nueces County, Kleberg County, Kenedy County, and Willacy County. Neither additional through-traffic lanes nor any physical alternation of existing US 77 that would substantially change the horizontal or vertical alignment is proposed in Cameron County. Therefore, according to *TxDOT's (FHWA approved) Guidelines for Analysis and Abatement of Highway Traffic Noise,* a traffic noise analysis for Cameron County is not required. Traffic noise levels are presented for each of the remaining four counties.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at an impacted receiver by at least five dBA; and to be "reasonable," it must not exceed the cost-effectiveness criterion of $25,000 for each receiver that would benefit by a reduction of at least five dBA.

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

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

Buffer zone: The acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Noise barriers: This is the most commonly used noise abatement measure. Noise barriers were evaluated for each of the impacted receiver locations. This evaluation is presented below by county.

For purposes of identification, receivers were numbered from north to south during the initial noise analysis. Receiver numbers originated as R1=Receiver 1. However, as the analysis progressed and more receivers were identified, these receivers were labeled using additional letters such as PR1=Proposed Receiver 1, RR1=relief route 1, and PRA1 or R1K, etc.

Within the project limits, larger areas of cropland, pastureland, or ranchland were not modeled as Category D (Undeveloped Lands) for noise contours, as there is no residential development located within these areas and no residential development is proposed within these areas for the next five years.

Table 4.12-2 identifies the traffic count by county for the US 77 Upgrade Project.

Table 4.12-2 VPD Traffic By County

County	Existing Year 2010	Predicted Year 2030
Willacy	13,100	20,800
Kenedy	13,100	20,800
Kleberg from CR 2340 in Riviera to CR 2160/FR 1118	24,400	42,725
Kleberg from CR 2120/BUS 77 to CR 2010 south of San Fernando Creek	32,125	48,900
Nueces	32,125	48,900

Source: Jacobs Engineering Group, Inc., September 2009
Note: Cameron County is not identified in the table since a traffic noise analysis is not required for Cameron County by FHWA Regulation 23 CFR 772 or *TxDOT's* (FHWA approved) *1996 Guidelines for Analysis and Abatement of Highway Traffic Noise*.

The existing and predicted noise levels and the results of the Traffic Noise Analysis are presented below by county.

Nueces County - Existing and predicted traffic noise levels were modeled at receiver locations **(Table 4.12-3** and **Figures A.4.12-1** to **A.4.12-11)** that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Table 4.12-3 Traffic Noise Levels for Nueces County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
1. R2 Residence	B	67	69	70	+1	Yes
2. R5 Residence	B	67	71	71	0	Yes
3. R7 Residence	B	67	72	73	+1	Yes
4. R8 Residence	B	67	74	73	*-1	Yes
5. R9 Residence	B	67	68	68	0	Yes
6. R10 Residence	B	67	71	71	0	Yes
7. R11 Residence	B	67	72	73	+1	Yes
8. R12 Residence	B	67	63	67	+4	Yes
9. R13 Residence	B	67	73	72	-1	Yes

Table 4.12-3 Traffic Noise Levels for Nueces County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
10. R14 Residence	B	67	68	73	+5	Yes
11. R17 Residence	B	67	72	61	*-11	No
12. PR1 Residence	B	67	50	67	*+17	Yes
13. PRA1 Residence	B	67	50	66	*+16	Yes
14. PRB1 Residence	B	67	50	67	*+17	Yes
15. PRC1 Residence	B	67	50	67	+17	Yes
16. PRD1 Residence	B	67	50	67	*+17	Yes
17. PRE1 Residence	B	67	50	67	*+17	Yes
18. R19 Residence	B	67	76	65	*-11	No
19. R20 Residence	B	67	78	66	*-12	Yes
20. R21 Residence	B	67	67	58	*-9	No
21. PR2 Residence	B	67	51	67	*+16	Yes
22. PR5 Residence	B	67	48	62	*+14	Yes
23. PR6 Residence	B	67	52	69	*+17	Yes
24. PR7 Residence	B	67	53	66	*+13	Yes
25. R26 Residence	B	67	77	76	*-1	Yes

Source: Jacobs Engineering Group, Inc., September 2009
*Receivers R17, R19, R20, R21, and R22 are located adjacent to the existing roadway near the proposed relief route where approximately 30 percent of traffic from the existing roadway is potentially diverted and expected to utilize the new relief route. Receivers PR1, PRA1, PRB1, PRC1, PRD1, PRE1, PR2, PR5, PR6, and PR7 are all located along the proposed relief route. Receivers R3, R8, R13, and R26 have lower proposed noise levels than existing as a result of the conversion of the existing main lanes to proposed access roads, thereby reducing traffic volumes and speeds closest to the receivers.

As indicated above in **Table 4.12-3**, the proposed project would result in a traffic noise impact in Nueces County. Noise barriers were evaluated for each of the impacted receiver locations. Receivers with similar characteristics have been grouped together for discussion purposes below:

Receivers R2, R5, R7, R11, R12, PRA1, PRB1, PR5, R8, R10, R13, R14, PR1, PRC1, PRD1, PR6, and R26 are separate individual residences. Noise barriers were analyzed as an appropriate abatement measure. However, noise barriers that may achieve the minimum

feasible reduction of five dBA at each of these receivers would exceed the reasonable, cost-effectiveness criterion of $25,000.

Receivers R9, R20, PRE1, PR2, and PR7 are separate individual residences with driveway openings facing the roadway. Noise barriers were analyzed as an appropriate abatement measure. However, a continuous noise barrier would restrict access to these residences. Gaps in a noise barrier would satisfy access requirements but the resulting non-continuous barrier segments would not be sufficient to achieve the minimum feasible reduction of five dBA.

None of the above noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this project within Nueces County.

Kleberg County - Existing and predicted traffic noise levels were modeled at receiver locations **(Table 4.12-4** and **Figures A.4.12-12** to **A.4.12-26)** that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Table 4.12-4 Traffic Noise Levels for Kleberg County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
1. R1 Residence	B	67	75	69	*-6	Yes
2. R2 Community Baptist Church	E	52	74	70	*-4	Yes
4. RR3 Nanny Elementary School	E	52	53	57	+4	No
5. RR4 Riviera Learning Center	E	52	52	57	+5	No
6. RR5 De La Paz Middle School	E	52	50	58	+8	No
7. R1B Residence	B	67	66	71	+5	Yes
8. RR6 Residence	B	67	48	63	+15	Yes
9. R3 Residence	B	67	76	72	*-4	Yes
10. R1K Residence	B	67	58	67	+9	Yes
12. R1L Residence	B	67	68	72	+4	Yes
13. R1M Residence	B	67	65	67	+2	Yes
14. R1MA Residence	B	67	67	70	+3	Yes
15. R1MB Residence	B	67	64	67	+3	Yes
16. R1MC Residence	B	67	70	71	+1	Yes
17. R1MD Residence	B	67	65	67	+2	Yes
18. RD1 Residence	B	67	71	72	+1	Yes
19. RE1 Residence	B	67	70	71	+1	Yes
20. RF1 Residence	B	67	64	66	+2	Yes
21. RG1 Residence	B	67	69	71	+2	Yes
22. R5 Residence	B	67	70	74	+4	Yes
23. R6 Residence	B	67	63	68	+5	Yes

Table 4.12-4 Traffic Noise Levels for Kleberg County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
24. R7 Residence	B	67	69	73	+4	Yes
25. R8 Residence	B	67	73	75	+2	Yes
26. RA8 Residence	B	67	70	73	+3	Yes
27. R10 Residence	B	67	74	76	+2	Yes
28. R12 Residence	B	67	71	74	+3	Yes
29. R15 Residence	B	67	67	70	+3	Yes
30. R16 Residence	B	67	68	71	+3	Yes
31. R17 Kleberg Ball Fields	B	67	64	67	+3	Yes
32. R18 Residence	B	67	71	72	+1	Yes
34. RA19 Residence	B	67	66	67	+1	Yes
35. R20 Residence	B	67	75	73	*-2	Yes
36. R21 Residence	B	67	77	76	*-1	Yes
37. R21A Residence	B	67	74	75	+1	Yes
38. R21B Residence	B	67	75	76	+1	Yes
39. R22 Residence	B	67	75	77	+2	Yes
40. R22A Residence	B	67	75	77	+2	Yes
41. R22B Residence	B	67	73	76	+3	Yes
42. R22C Residence	B	67	73	75	+2	Yes
43. R22D Residence	B	67	73	75	+2	Yes
44. R23 Residence	B	67	72	74	+2	Yes
45. R23A Residence	B	67	68	70	+2	Yes
46. R23B Residence	B	67	72	74	+2	Yes
47. R23C Residence	B	67	72	74	+2	Yes
48. R23D Residence	B	67	72	74	+2	Yes
49. R23E Residence	B	67	72	74	+2	Yes

Source: Jacobs Engineering Group, Inc., September 2009
*Receivers R1, R2, RR2, and R3 are all located adjacent to the existing roadway near the proposed relief route where traffic is taken away from the existing roadway and placed on the new relief route. Receiver R1B, RR6, R1K, and R1J are located along the proposed relief route. Receivers R20 and R21 have lower proposed noise levels than existing due to the fact that the existing main lanes became proposed access roads, thereby reducing traffic volumes and speeds closest to the receivers, as well as elevations that may be causing a shielding factor.

As indicated in **Table 4.12-4**, the proposed project would result in a traffic noise impact in Kleberg County. Noise barriers were evaluated for each of the impacted receiver locations.

Receivers with similar characteristics have been grouped together for discussion purposes below:

Receivers R1B, R1L, R8, RA8, and R12: These receivers are separate, individual residences. Noise barriers that would achieve the minimum feasible reduction of five dBA at each of these receivers would exceed the reasonable, cost-effectiveness criterion of $25,000.

R2 is a church located on the existing alignment, and R17 is the Kleberg Ball Fields. For purposes of this analysis, each of these receptors represents one benefited receiver. Noise barriers that would achieve the minimum feasible reduction of five dBA at each of these locations would exceed the reasonable, cost-effectiveness criterion of $25,000.

Receivers R1, R3, R1M, R1MA, R1MB, R1MC, R1MD, R5, R7, R10, R15, and R16 are separate, individual residences with driveway openings facing the roadway. A continuous noise barrier would restrict access to these residences. Gaps in a noise barrier would satisfy access requirements, but the resulting non-continuous barrier segments would not be sufficient to achieve the minimum, feasible reduction of five dBA.

Noise barriers were analyzed as an appropriate abatement measure for receivers RR6, R1K, RD1, RE1, RF1, RG1, R6, R18, RA19, R20, and R23A. However, these receivers are separate individual residences that are located on lots that do not allow the distance required to achieve the minimum, feasible reduction of five dBA.

Noise barriers would be feasible and reasonable for the following impacted receivers and, therefore, are proposed for incorporation into the project:

Receivers R21, R21A, R21B, R22, R22A, R22B, R22C, R22D, R23, R23B, R23C, R23D, and R23E: These receivers represent a total of 13 residences. Features of the proposed noise barrier are presented in **Table 4.12-5**.

Table 4.12-5 Traffic Noise Levels for Kleberg County (dBA Leq)

Barrier	Representative Receivers	Total No. Benefit	Length (feet)	Height (feet)	Total Cost	Cost/ Benefit Per Receiver
1 With 5 Sections	R21, R21A, R21B, R22, R22A, R22B, R22C, R22D, R23, R23B, R23C, R23D, and R23E	13	1,173	9-13	$250,794	$19,292

Source: Jacobs Engineering Group, Inc., September 2009

Kenedy County - Existing and predicted traffic noise levels were modeled at receiver locations **(Table 4.12-6** and **Figure A.4.12-27)** that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement. With the exception of the town of Sarita, Kenedy County is comprised of multiple large ranches with no receivers. The two noise receivers at Sarita are presented in **Table 4.12-6** and identified in **Figure A.4.12-27**.

Table 4.12-6 Traffic Noise Levels for Kenedy County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
1. R2 Sarita Elementary School	E	52	69	69	0	Yes
2. R3 Residence	B	67	68	69	+1	Yes

Source: Jacobs Engineering Group, Inc., September 2009

As indicated in **Table 4.12-6**, the project would result in a traffic noise impact in Kenedy County. Noise barriers were evaluated for each of the impacted receiver locations. Receivers with similar characteristics have been grouped together for discussion purposes below:

Receiver R2 is the Sarita Elementary School and for the purposes of this analysis represents one benefited receiver. A noise barrier that would achieve the minimum feasible reduction of five dBA at this location would exceed the reasonable, cost-effectiveness criterion of $25,000.

Receiver R3 is a residence with a driveway opening facing the roadway. A continuous noise barrier would restrict access to this residence. Gaps in a noise barrier would satisfy access requirements, but the resulting non-continuous barrier segments would not be sufficient to achieve the minimum, feasible reduction of five dBA.

None of the above noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this project within Kenedy County.

Willacy County – Existing and predicted traffic noise levels were modeled at receiver locations **(Table 4.12-7** and **Figures A.4.12-28** to **A.4.12-37)** that represent 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 4.12-7 Traffic Noise Levels for Willacy County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
1. R1 Residence	B	67	70	70	0	Yes
2. R2 Residence	B	67	69	69	0	Yes
3. R3 Residence	B	67	69	71	+2	Yes
4. R4 Residence	B	67	63	66	+3	Yes
5. R5 Residence	B	67	67	68	+1	Yes
6. R5A Residence	B	67	67	69	+2	Yes
8. R7 Residence	B	67	71	72	+1	Yes
9. R7D Residence	B	67	71	71	0	Yes
10. R8 Residence	B	67	67	70	+3	Yes
11. R9 Residence	B	67	67	70	+3	Yes

Table 4.12-7 Traffic Noise Levels for Willacy County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
12. R9A Residence	B	67	68	70	+2	Yes
13. R9B Residence	B	67	67	69	+2	Yes
14. R9C Residence	B	67	67	69	+2	Yes
15. R9D Residence	B	67	68	69	+1	Yes
16. R9E Residence	B	67	67	70	+3	Yes
17. R9F Residence	B	67	67	69	+2	Yes
18. R9G Residence	B	67	66	67	+1	Yes
19. R10 Residence	B	67	68	68	0	Yes
20. R11 Residence	B	67	75	72	*-3	Yes
22. R12A Residence	B	67	65	67	+2	Yes
24. R14 Residence	B	67	65	68	+3	Yes
25. R15 Residence	B	67	70	72	+2	Yes
26. R16 Residence	B	67	71	73	+2	Yes
27. R17 Residence	B	67	65	66	+1	Yes
28. R18 Residence	B	67	68	68	0	Yes
29. R18A Residence	B	67	69	70	+1	Yes
30. R18B Residence	B	67	68	69	+1	Yes
32. R20A Residence	B	67	70	69	*-1	Yes
33. R21 Residence	B	67	73	71	*-2	Yes
34. R21C Residence	B	67	69	69	0	Yes
35. R22 Residence	B	67	68	69	+1	Yes
36. R22A Residence	B	67	67	67	0	Yes
37. R22C Residence	B	67	67	67	0	Yes
38. R22D Residence	B	67	70	70	0	Yes
39. *R23 Residence	B	67	62	65	+3	No
40. R25A Residence	B	67	71	69	*-2	Yes
41. R25B Residence	B	67	70	69	*-1	Yes
42. R25C Residence	B	67	68	68	0	Yes

Table 4.12-7 Traffic Noise Levels for Willacy County (dBA Leq)

Receiver	NAC Category	NAC Level	Existing 2010	Predicted 2030	Change (+/-)	Noise Impact
43. R25D Residence	B	67	68	68	0	Yes
44. R25E Residence	B	67	67	68	+1	Yes
45. R25F Residence	B	67	72	71	*-1	Yes
46. R25G Residence	B	67	70	70	0	Yes

Source: Jacobs Engineering Group, Inc., September 2009
*R23 can be seen on Figure A 4.12-36
* Receivers R11, R12, R13, R20A, R21, R25A, R25B and R25F have lower proposed noise levels than existing due to the fact that the existing main lanes became proposed access roads, thereby reducing traffic volumes and speeds closest to the receivers, as well as elevations that may be causing a shielding factor.

As indicated in **Table 4.12-7**, the proposed project would result in a traffic noise impact in Willacy County. Noise barriers were evaluated for each of the impacted receiver locations. Receivers with similar characteristics have been grouped together for discussion purposes and are addressed below:

Receivers R3, R7, R9A, R9C, R9F, R18A, R20A, R22D, R25F, and R25G are separate, individual residences. The analysis showed that noise barriers would achieve the minimum feasible reduction of five dBA at each of these receivers; however, they would exceed the reasonable, cost-effectiveness criterion of $25,000.

Receivers R1, R2, R4, R5A, R7D, R8, R9, R9B, R9D, R9E, R9G, R10, R12A, R17, R18, R18B, R21, R21C, R22, R22A, R22C, R25A, R25B, R25C, R25D, and R25E are separate, individual residences with driveway openings facing the roadway. A continuous noise barrier would restrict access to these residences. Gaps in a noise barrier would satisfy access requirements, but the resulting non-continuous barrier segments would not be sufficient to achieve the minimum, feasible reduction of five dBA.

Noise barriers were analyzed as an appropriate abatement measure for receivers R5 and R14. However, these receivers are separate individual residences that are located on lots that do not allow the distance required to achieve the minimum, feasible reduction of five dBA.

Noise barriers would be feasible and reasonable for the following impacted receivers and, therefore, are proposed for incorporation into the project:

Receivers R11, R15, and R16: These receivers represent a total of three residences. The proposed noise barriers are presented in **Table 4.12-8**.

Table 4.12-8 Noise Barrier Proposal for Willacy County

Barrier	Representative Receivers	Total No. Benefit	Length (feet)	Height (feet)	Total Cost	Cost/Benefit Per Receiver
1	R11	1	78	8	$12,636	$12,636
2	R15	1	150	8	$21,600	$21,600
3	R16	1	138	8	$19,872	$19,872

Source: Jacobs Engineering Group, Inc., September 2009

Cameron County – Within this county, the proposed improvements are limited to ramp relocations only within existing ROW, are not on new location, and do not substantially alter either the horizontal or vertical alignment or increase the number of through-traffic lanes. Therefore, a traffic noise analysis is not required in Cameron County by FHWA Regulation 23 CFR 772 or *TxDOT's* (FHWA approved) *1996 Guidelines for Analysis and Abatement of Highway Traffic Noise*.

4.12.1 No Build Alternative – Noise Consequences

If the No Build Alternative were implemented, no improvements or new construction would occur. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not require any coordination or mitigation for project-related issues related to noise.

4.12.2 Build Alternative – Noise Consequences

Since there is no known development planned or programmed within the project study areas and no residential development is proposed within these areas for the next five years, a predicted noise impact contour was not developed for the larger undeveloped areas of cropland, pastureland, or ranchland within the project limits.

A summary of the locations where noise barriers would be required for the Build Alternative is identified below by county:

1. **Nueces County** - Noise abatement measures were neither feasible nor reasonable; therefore, no noise abatement measures are proposed for Nueces County.
2. **Kleberg County** - One noise barrier with five sections is proposed for traffic noise impacts. The estimated cost for the proposed noise barrier totals $250,794.
3. **Kenedy County** - Noise abatement measures were neither feasible nor reasonable; therefore, no noise abatement measures are proposed for Kenedy County.
4. **Willacy County** - Three noise barriers are proposed for traffic noise impacts in Willacy County. The estimated cost for the three proposed noise barriers totals $54,108.
5. **Cameron County** - No noise analysis required.

A total of four locations for noise barriers are considered feasible and reasonable for the proposed US 77 Upgrade Project. The estimated cost for the four noise barriers totals $304,902.

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

Noise associated with construction is discussed in **Section 4.15 – Construction Impacts**.

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

4.13 HAZARDOUS MATERIALS

A preliminary investigation was conducted to identify sites within the project study area that are at "risk" of environmental contamination by hazardous wastes or substances. This initial investigation was conducted to identify areas of potential concern for further investigation or precautionary actions. The scope of the preliminary investigation consisted of a review of federal and state environmental databases, review of oil and gas well and pipeline information from the Texas Railroad Commission (RRC), review of topographic maps and aerial photographs, and the performance of a site visit to confirm reviewed information and note additional field observations. No land use history, title searches, interviews, or consultation with local, state, or federal authorities were conducted.

4.13.1 No Build Alternative – Hazardous Materials Consequences

If the No Build Alternative were implemented, no improvements or new construction or excavation would occur. Scheduled maintenance on the existing facility would continue. The No Build Alternative would not require any coordination or mitigation for project-related issues related to hazardous materials.

4.13.2 Build Alternative – Hazardous Materials Consequences

The database search, following American Society of Testing and Materials (ASTM) E1527-05 and conducted by Geosearch, reviewed 59 environmental regulatory databases on August 4, 2008, and identified 189 sites within ASTM search distances from the project corridor. Considering the type of incident and activity reported within the regulatory databases, status of the corrective action or resolution, distance from the proposed project, general topography, and field observations, 24 sites are considered of medium or high risk to the proposed project.

Sites considered high risk include those where information indicates hazardous materials or substances would likely be encountered during construction activities. An example of a high risk site is a site with an underground storage tank (UST) that would be directly displaced by project improvements or a UST site located near project improvements that was reported leaking and undergoing active monitoring or remediation. Sites are believed to be medium risk if contamination may exist and construction activities may affect the site. An example of a medium risk site is a site with a reported leaking UST near the proposed project where the extent of affected soils and groundwater is unknown or the presence of a structure with potential asbestos-containing materials (ACM) or painted with hazardous concentrations of heavy metals.

Sites are considered low risk if available information indicates the site is not likely to pose a contamination issue for proposed construction activities.

Table 4.13-1 provides a summary of the facilities that are considered high, medium, or low risk based on available information and field observations. Map ID numbers correlate with features shown on **Figures A-4.13-1** through **A.4.13-14** in **Appendix A**. Ground photographs from field observations are provided in **Appendix D – Photos 16 to 26**.

Table 4.13-1 Identified Potential Hazardous Materials Sites

Map ID	Facility Name	Address/Location	Risk	Status/Risk
1	Exxon/ McDonalds (Gas Station)	301 S Highway 77, Robstown, Adjacent to existing ROW.	Low	LPST, PST, and FRS site that had affected groundwater. FCICC status from TCEQ. Review of LPST files indicated minimal potential for contamination within project limits.
2	Mid Valley Chemicals Incorporated	S Highway 77 1/2 Mile South of Robstown, Adjacent to existing ROW.	Low	FRS site that is apparent chemical manufacturing/processing facility and hazwaste handler. Review of waste, generator, and storage tank files indicated minimal potential for contamination within project limits.
3	Agricultural Coop Facility	Intersection of Lincoln Ave and S HWY 77, Robstown, Adjacent to existing ROW.	Medium	Four USTs and monitoring wells observed. Not reported by database search.
4	Highway Travel Center (Gas Station)	950 S Hwy 77, Robstown, Adjacent to existing ROW.	High	LPST, PST, and FRS site that had affected groundwater. Remediation noted in 2006. Review of LPST files indicated potential for contamination within project limits.
5	Hoerbiger E.J. Mitchell Inc. (Gas Station)	Intersection of Industrial Ave and S Hwy 77, Robstown, Adjacent to existing ROW.	Medium	Abandoned gas station. USTs apparently still in place. Not reported by database search.
6	Atlas Tubular Inc.	1710 S Hwy 77, Robstown, Within proposed ROW.	High	~500-gal unlabeled AST in proposed ROW. Office and storage buildings. IHW and FRS site that fabricates metal product. Potential ACM and Lead-based paint.
7	Abandoned Homestead	Near intersection of CR 34 and S Hwy 77, Robstown, Within proposed ROW.	Medium	Site with potential water well and water AST. Potential ACM and Lead-based paint.
8	Abandoned Tank Battery with Petroleum Wells	Near Intersection of CR 75 and S Hwy 77, Robstown, Within proposed ROW.	High	Petroleum tank battery (3 large empty tanks) and concrete foundations (indicating petroleum wells). Potential Lead-based paint.

Table 4.13-1 Identified Potential Hazardous Materials Sites

Map ID	Facility Name	Address/Location	Risk	Status/Risk
9	US Ecology	Near Intersection of CR 30 and S Hwy 77, Robstown, Rail station is near existing ROW.	Low	Site contains rail station that serves a waste (hazardous and NORM) treatment and disposal facility. Review of waste registration files indicated the treatment and disposal facility is at least two miles east of the ROW.
10	Potential Petroleum Wells	Near Intersection of Gandy Spur and S Hwy 77, Robstown, Within proposed ROW.	High	Site contains two concrete foundations indicating petroleum wells.
11	Abandoned Oil-Related Dump Site	Near Hwy 77 and Petronila Creek, Driscoll, Location of site unverified.	High	CALF site with reported mud, oil, and other waste dumped near Creek and in area of proposed ROW.
12	Water Storage Tank	Near Intersection of CR 14 and S Hwy 77, Driscoll, Within proposed ROW.	Medium	Site contains water AST. Potential ACM and Lead-based paint.
13	Light-Industrial and Residential Buildings	Near Intersection of FM 3354 and S Hwy 77, Bishop, Within proposed ROW.	Medium	Buildings with residential and light-industrial (probably vehicle maintenance) uses. Not reported by database search. Potential ACM and Lead-based paint.
14	La Bodega 5 (Gas Station)	1229 Hwy 77, Bishop, Within proposed ROW.	High	PST and FRS site is gas station Three USTs observed with hydrocarbon odor. Review of PST files indicated two USTs are present but out-of-service.
15	Abandoned Structure	Near Intersection of Oregon St and Hwy 77, Bishop, Adjacent to existing ROW.	Medium	Site contains structure likely used as gas station. USTs potentially still present. Not reported by database search.
16	Oil Patch Petroleum (Distribution Facility)	102 Hwy 77, Bishop, Adjacent to existing ROW.	High	LPST, PST, ICIS, and FRS site that had affected groundwater and is being monitored. Monitoring wells, USTs, and ASTs observed. Review of LPST files indicated groundwater moves away from ROW but risk exists for contamination within ROW.
17	Amigos Food Mart (Gas Station)	201 S Hwy 77, Kingsville, Adjacent to existing ROW.	Medium	LPST, PST, and FRS site that had affected groundwater. FCICC status from TCEQ. Review of LPST files indicated potential exists for contamination within ROW.

Table 4.13-1 Identified Potential Hazardous Materials Sites

Map ID	Facility Name	Address/Location	Risk	Status/Risk
18	FFP 259 (Gas Station)	Near Intersection of FM 1118 and Hwy 77, Ricardo, Partially in proposed ROW.	Medium	PST and FRS site tanks not in proposed ROW but piping system may be. Four USTs in use. USTs installed between 1979 and 1989. Site not reported in LPST database.
19	Abandoned Structure with Water Well	Intersection of FM 628 and Hwy 77, Riviera, Within proposed ROW.	Medium	Abandoned structure of unknown use with water well. Not reported by database search. Potential ACM and Lead-based paint.
20	Kleberg County Pct 3 Maintenance Yard	E CR 2310, Riviera, Adjacent to existing ROW.	Medium	LPST site that had affected groundwater. FCICC status from TCEQ. Review of LPST files indicated groundwater flow is not towards proposed ROW and plume was not fully defined.
21	Abandoned B&E Texaco (Gas Station)	3 Hwy 77, Raymondville, Adjacent to existing ROW.	Low	LPST and FRS site that had affected soil. Observed abandoned gas station with present USTs. FCICC status from TCEQ. Review of LPST files indicated minimal potential for contamination within project limits.
22	Rodriguez Texaco (Gas Station)	Intersection of Hwy 186 and Hwy 77, Raymondville, Adjacent to existing ROW.	High	LPST site that had affected groundwater with noted remediation. FCICC status from TCEQ. Review of LPST files indicated potential exists for contamination within ROW and piezomter wells within existing ROW.
23	Breaktime 341 (Gas Station)	1095 E. Hidalgo Ave, Raymondville, Adjacent to existing ROW.	Medium	LPST, PST, and FRS site that had affected groundwater. FCICC status from TCEQ. Review of LPST files indicated plume was not fully defined and potential exists for contamination within ROW.
24	Uncle Sams 2 (Gas Station)	858 E. Hidalgo Ave, Raymondville, Located 500 feet west of existing ROW.	Medium	LPST, GWCC, PST, and FRS site that had affected groundwater with noted remediation and is currently being monitored. Review of LPST files indicated groundwater moves west and away from ROW and plume was not fully defined.
25	Best Best Inn (Gas Station)	Near intersection of FM 3168 and Hwy 77, Raymondville, Adjacent to existing ROW.	Medium	Abandoned site once used as motel, nightclub, and gas station. Observed five USTs and monitoring wells. Not reported by database search.

Table 4.13-1 Identified Potential Hazardous Materials Sites

Map ID	Facility Name	Address/Location	Risk	Status/Risk
26	Lyford Superette (Gas Station)	Intersection of Spur 112 and Hwy 77, Lyford, Adjacent to existing ROW.	High	LPST, PST, and FRS site that had affected groundwater and is currently being monitored. Located adjacent to existing ROW. Review of LPST files indicated potential exists for contamination within ROW.
27	Triangle Manufacturing Co.	Intersection of Orphanage Rd and Hwy 77, Combes, Adjacent to existing ROW.	Medium	CALF site reported to be two acres in size and open from 1986 to 1990. Nature of waste unknown.
28	Combes Auto Truck Stop (Gas Station)	Intersection of Hwy 107 and Hwy 77, Combes, Adjacent to existing ROW.	Medium	LPST and PST site that had affected groundwater with noted remediation. FCICC status from TCEQ. Review of LPST files indicated potential exists for contamination within ROW.

ACM = Asbestos-Containing Material
AST = Aboveground Storage Tank
CALF = Closed and Abandoned Landfill
FCICC = Final Concurrence Issued, Case Closed
FRS = Facility Registry System
GWCC = Groundwater Contamination Cases
ICIS = Integrated Compliance Information System
IHW = Industrial and Hazardous Waste
LPST = Leaking Petroleum Storage Tank
NORM = Naturally-Occurring Radioactive Materials
PST = Petroleum Storage Tank
ROW = Right-of-Way
RRC = Texas Railroad Commission
TCEQ = Texas Commission on Environmental Quality
UST = Underground Storage Tank

Source: Jacobs Engineering Group, Inc., September 2009

Nine sites are considered to have high potential to impact the Build Alternative. Those sites are further discussed below.

Map ID 4: The Highway Travel Center site located adjacent to the existing ROW was reported as a Leaking Petroleum Storage Tank (LPST) facility that had affected groundwater. Information from the TCEQ's LPST database indicated that active remediation at the site was occurring in 2006. At the time of the data collection (March 2009), this site had not reached a Final Concurrence Issued, Case Closed (FCICC) status from the TCEQ. An assessment of LPST files at the TCEQ indicated that potential exists for contamination to be present within the ROW. Further assessment of the Highway Travel Center site, including soil or groundwater sampling, would be conducted to determine the likelihood of encountering contaminated soils or groundwater during construction activities.

Map ID 6: The Atlas Tubular Inc. site is partially located within the proposed ROW. An approximate 500-gallon aboveground storage tank (AST), an office building, and a storage building would be displaced as a result of the proposed project. The AST was unlabeled and its contents are not known. The contents of the AST would be characterized and then disposed of according to applicable regulations. Additionally, paint on structures would be assessed for hazardous-concentrations of lead. If hazardous concentrations of lead are found on exterior paint, the surrounding soil would be evaluated for the occurrence of lead-impacted soil

exhibiting a toxicity characteristic for leachate, indicating the soil must be managed in accordance with Resource Conservation and Recovery Act (RCRA) Subtitle C requirements.

Map ID 8: An abandoned tank battery is located with the proposed ROW. The soil under the three abandoned ASTs would be further assessed for the presence of contamination prior to earth moving activities.

Map ID 8 and 10: Four concrete foundations were observed within the proposed ROW that appear similar to pumpjack pad sites used for petroleum extraction. These sites would be assessed further by TxDOT, and any petroleum wells identified within the proposed ROW would be properly plugged and abandoned following RRC Statewide Rule 14(b)(2).

Additionally, the soil in the vicinity of these potential petroleum wells would be further assessed for impacts from past petroleum activities.

Map ID 11: A site in this area was reported as an abandoned dump site for material, including mud and oil waste, related to oil and gas extraction operations. It was reported that no pits or covers were used at this site and that waste material was carried downstream during flooding of Petronila Creek. The date and precise location information of dumping activities and status of site closure are not currently available. An active tank battery operation was observed in the area, although signs of past dumping activities were not observed. Considering the many unknowns surrounding this site, further assessment, including soil or groundwater sampling, would be conducted to determine the likelihood of encountering contaminated soils or groundwater during construction activities.

Map ID 14: The abandoned La Bodega gas station is located within the proposed ROW. The site was not reported within the LPST database, but three USTs were observed at the site. One UST fill port was open during field observations, and hydrocarbon odors were noted. TxDOT would properly remove the USTs following TxDOT Technical Guides for Hazardous Materials Management (i.e., Technical Guide: Removal of USTs Encountered During Construction) and in accordance with TCEQ Technical Standards (30 TAC §334.55, Permanent Removal from Service) and TCEQ Regulatory Guidance (RG-411, Investigating and Reporting Releases from PSTs). If required, remediation would be completed according to applicable standards.

Map ID 16: The Oil Patch Petroleum distribution facility is located adjacent to the existing ROW and was reported in the LPST database. The site had reportedly affected groundwater, and the TCEQ 's LPST database indicated that monitoring at the site was occurring in 2008. At the time of this report preparation (March 2009), this site had not reached a FCICC status from the TCEQ. An assessment of LPST files at the TCEQ indicated that potential exists for contamination to be present within the ROW. Further assessment of the Oil Patch Petroleum distribution facility, including soil or groundwater sampling, would be conducted to determine the likelihood of encountering contaminated soils or groundwater during construction activities.

Map ID 22: The Rodriguez Texaco gas station is located adjacent to the existing ROW and was reported in the LPST database. The site had reportedly affected groundwater and reached a FCICC status from the TCEQ in 2007. An assessment of LPST files at the TCEQ indicated that residual contamination still exists at the gas station and potential exists for contamination to be present within the ROW. Further assessment of the Rodriguez Texaco gas station, including soil or groundwater sampling, would be conducted to determine the likelihood of encountering contaminated soils or groundwater during construction activities.

Map ID 26: The Lyford Superette gas station is located adjacent to the existing ROW and was reported in the LPST database. The site had reportedly affected groundwater, and the TCEQ's LPST database indicated that monitoring at the site was occurring in 2007. At the time of this report preparation (March 2010), this site had not reached a FCICC status from the TCEQ. An assessment of LPST files at the TCEQ indicated that potential exists for contamination to be present within the ROW. Further assessment of the Lyford Superette gas station, including soil and groundwater sampling, would be conducted to determine the likelihood of encountering contaminated soils or groundwater during construction activities.
The sites considered high and medium risk to the proposed project, as identified in **Table 4.13-1**, would be further assessed by TxDOT prior to or during ROW acquisition to determine the likelihood of encountering contaminated soils and groundwater during construction activities. These assessments may include sampling of soil or groundwater in the vicinity of proposed excavations. If warranted, remediation activities would then be completed prior to construction to address contaminated soil/groundwater impacting the construction zone. Waste management plans would be in-place to address contamination during construction activities, if remediation is not complete prior to construction.

Information obtained from the RRC identified 307 petroleum wells within 1,500 feet from the proposed project, with 244 of those wells occurring in Nueces County. None of the petroleum wells were reported as radioactive by data from the RRC. Petroleum pipelines were identified in the study area with the majority of the lines also occurring in Nueces County. The pipelines appear to carry crude oil, natural gas, and highly volatile liquids. No evidence of oil and gas well activities located within the boundaries of the proposed project area was determined during the field survey (i.e., dry holes, abandoned locations, disposal, injection). However, additional assessment could be required for confirmation of these findings.

Water well information from the TWDB identified 55 water wells within 1,500 feet from the proposed project. Abandoned water wells are regulated by the Texas Department of Licensing and Registration (TDLR) and local Groundwater Conservation Districts through Texas Occupations Code, Sections 1901.255 and 1901.256. TxDOT would properly plug and abandon identified water wells within the proposed ROW to prevent potential contamination of groundwater resources. No evidence of water wells, such as any true or active groundwater wells, domestic wells, or water supply wells, were noted within the proposed project corridor during field surveys. Before any planned construction, a more detailed search may be required to supplement this database.

Structures, such as tanks, buildings, and bridges, are located within the proposed ROW and would be demolished or renovated as part of construction activities. The Texas Department of State Health Services (DSHS) Texas Asbestos Health Protection Rules (25 TAC §295.31 through §295.73) and the US EPA 40 CFR 61, Subpart M – *National Emissions Standards for Hazardous Air Pollutants* (NESHAPS) require a survey for ACM and a 10 working day, pre-demolition notification prior to the renovation or demolition of any public structure. The DSHS has determined that span bridges are public structures. The structures would be surveyed for ACM and abated, if asbestos is present, by properly trained and licensed individuals prior to renovation or demolition. The proposed project would require displacements of seven residential properties and five businesses. One business would need to relocate a structure on their property. An assessment for asbestos containing materials would be advised for evaluating potential releases within the project corridor and would be addressed during ROW acquisition.

Paint on structures may contain hazardous concentrations of heavy metals, specifically lead. TxDOT would test paint on structures to be renovated or demolished, and if the analytical testing determines that hazardous concentrations of heavy metals are present, TxDOT would abate the paint prior to construction activities. When hazardous concentrations of lead are found on exterior paint, the surrounding soil would be evaluated for the occurrence of lead-impacted soil exhibiting a toxicity characteristic for leachate, indicating the soil must be managed in accordance with RCRA Subtitle C requirements.
During any construction project, there exists the potential to encounter contaminated soil or water. Included in the contract would be the TxDOT standard specifications for construction that require the contractor to be familiar with and comply with all federal, state, and local laws, ordinances, and regulations related to the treatment and disposal of hazardous materials. Should hazardous materials/substances be encountered, the TxDOT Corpus Christi or Pharr District Office (dependent on location within the project area) would be notified and steps would be taken to protect personnel and the environment.

The contractor would respond appropriately to prevent, minimize, and control the spill of hazardous materials in the construction staging area. The use of construction equipment, particularly the storage of fuels and chemicals, within sensitive areas, including water resources such as floodplains and streams, would be minimized or eliminated. Water resources are discussed in detail in **Section 4.10**. Any unanticipated hazardous materials and/or petroleum contamination encountered during construction would be handled according to applicable federal, state, and local regulations per *TxDOT Standard Specifications*. All construction materials used for this project would be removed as soon as work schedules permit.

4.14 UTILITY RELOCATION IMPACTS

The utility relocation, displacement, and ROW report was prepared to initially determine the extent of the proposed project's impact on utilities, displacement, and ROW. The impact assessment identified and inventoried utilities along the US 77 corridor by reviewing both TxDOT Districts' database for utility permits, utilizing various GIS files available online, and by contacting various utility companies to determine the extent of utilities within the corridor.

4.14.1 No Build Alternative – Utilities Consequences

If the No Build Alternative were implemented, the proposed improvements would not be constructed. Scheduled maintenance on the existing facility would continue and may result in limited maintenance related impacts, but there would be no project-related impacts.

4.14.2 Build Alternative – Utilities Consequences

Utilities such as water lines, sewer lines, gas lines, telephone cables, electrical lines, and other subterranean and aerial utilities would require adjustment. Aerial and/or underground utility construction would be adjusted and the required adjustments may or may not be provided for by the affected utility. The extent of utility adjustments is not known at this time and would be determined during final design. Coordination of any utility adjustments would take place during the design phase or before construction begins. All utility adjustments would be in accordance with TxDOT policies. The adjustment and relocation of any utilities would be handled so that no substantial interruptions in service would occur while these adjustments are being made. All transmission towers are located outside the required ROW and would not require relocation.

4.15 CONSTRUCTION IMPACTS

Throughout the project development, construction impacts have been noted and recorded. Potential construction impacts include items such as construction phasing/schedule/work hours, noise, air quality (dust), and construction related traffic disruption that may result from the US 77 Upgrade Project. As the proposed project would result in construction along US 77, this would be expected to be a notable discussion point with the public during all public meetings, public official meetings, and stakeholder meetings. Construction related impacts were considered in the evaluation of the alternatives.

4.15.1 No Build Alternative – Construction Consequences

If the No Build Alternative were implemented, no improvements or new construction or excavation would occur. Scheduled maintenance on the existing facility would continue and may result in limited maintenance related impacts. The No Build Alternative would not require any coordination or mitigation for project-related issues related to construction.

4.15.2 Build Alternative – Construction Consequences

The Build Alternative would entail limited disruption to traffic and would include various construction activities over the build-out period. To alleviate this disruption, the proposed project would be constructed in phases, and a detailed traffic control plan would be developed and implemented for each of the construction phases. The potential phasing for construction was developed based on the Texas State Legislative cycle through which potential funding could reasonably be anticipated to advance the completion of the US 77 Upgrade project. The construction phasing would be revisited as funding is committed for the project (e.g. after Texas State Legislative session). Furthermore, if federal funding becomes available the letting date could be accelerated. The section by estimated let date and county are presented in **Table 4.15-1** below:

Table 4.15-1 Potential Phases for Construction

County	Section/ Phase	Limits	Description	Estimated Let Date	Funding Status
Cameron	B	SH/107/FM 508 interchange in Combs, TX to 3.7 miles north of SH 107/Fm 508 interchange	Conversion of 2-way frontage road to 1-way frontage roads with ramp reconfiguration	Aug-12	Included in Development Plan
Cameron	C	3.7 miles north of SH 107/FM 508 interchange to Cameron.Willacy county line	Conversion of 2-way frontage road to 1-way frontage roads with ramp reconfiguration	Aug-12	Included in Development Plan
Nueces	Y	South of County Road 28 to FM 892	Construct main lanes and overpasses	Jul-13	Partially Funded
Nueces	W	FM 70 to County Road 16	Construct main lanes and overpasses	Feb-15	Included in Development Plan
Kleberg	U	FM 1898 to Kleberg/Nueces	Construct main lanes and partial frontage	Feb-15	Partially Funded

Table 4.15-1 Potential Phases for Construction

County	Section/ Phase	Limits	Description	Estimated Let Date	Funding Status
		county line	roads		
Kleberg	Q	County Road 2130 to FM 1356	Construct main lanes, frontage roads and structures	Feb-17	Included in Development Plan
Nueces	V	Kleberg/Nueces county line to FM 70	Construct main lanes and overpasses	Sep-19	Partially Funded
Nueces	X	County Road 16 to south of County Road 28	Construct relief route around Driscoll	Sep-21	Included in Development Plan
Kleberg	P	1.5 miles north of SH 285 to County Road 2130	Construct main lanes, frontage roads and structures	Feb-23	Partially Funded
Kleberg	N	Kenedy/Kleberg county line to SH 285	Construct relief route around Riviera	Sep-25	Included in Development Plan
Kleberg	O	SH 285 to 1.5 miles north of SH 285	Construct relief route around Riviera	Sep-25	Included in Development Plan
Kenedy	L	8 miles south of La Parra Ave. to Kenedy/Kleberg county line	Construct main lanes and overpasses	Jan-29	Included in Development Plan
Kenedy	K	9.6 miles north of Norias Road to 8 miles south of La Parra Ave.	Construct main lanes and overpasses	Jan-31	Included in Development Plan
Kenedy	J	Norias Road north 9.6 miles (Armstrong Ranch Gate)	Construct main lanes and overpasses	Jan-33	Included in Development Plan
Kenedy	I	Willacy/Kenedy county line north to Norias Road	Construct main lanes and overpasses	Jan-35	Included in Development Plan
Willacy	H	Business 77 to Willacy/Kenedy county line	Construct main lanes and overpass	Jan-37	Included in Development Plan

Source: TxDOT, Design and Construction Information System, November 2011.

Costs associated for the section/phases of the plan can be found in **Table 1.1-1**.

Disruptions would be minimized to the extent possible by the timely notification of affected residents and business owners through posted notices, personal contact, or other notification procedures. These procedures would include rerouting the traffic, barricading, using traffic cones, variable message signs or any other measures deemed necessary and prudent by TxDOT and the construction contractor to comply with all local, state, and federal traffic and safety regulations. Ingress and egress to any affected private, governmental, commercial, or retail establishments would be maintained throughout the construction period. Every effort would be made to preserve as much vegetation as possible within the ROW. During project development, TxDOT would design, use, and promote construction practices that minimize

adverse affects on both regulated and unregulated wildlife habitat. Existing vegetation, especially native trees, would be avoided and preserved wherever practicable.

Construction methods, sequencing, and duration have not been specified to date. During the construction phase, motorists may seek alternative travel routes to avoid construction-related traffic congestion and delays. However, the proposed roadway expansion would increase mobility and safety in the area overall, which would benefit local residents and businesses as well as through-travelers.

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise 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 long durations; 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.

Construction may temporarily cause an increase in dust and exhaust gases associated with construction equipment. Measures to control dust would be considered and incorporated into the final design and construction specifications.

Reasonable measures would be taken to minimize the inconvenience to vehicles using the roadway during the construction phase. Residential and business properties would be accessible during and after construction, and visibility to businesses would be unchanged.

4.16 TRAFFIC OPERATION IMPACTS

Throughout project development, traffic operation impacts have been noted and recorded. Potential traffic operation impacts include items such as permanent access issues (pedestrian, cyclists, equestrians, etc.), detours, and traffic delays that may result from the US 77 Upgrade Project. As the proposed project would change US 77 from open to controlled access, this would be expected to be a notable discussion point during meetings with the public, public officials, and stakeholders. The project team sought further input and coordinated with the project area's ISDs regarding bus routes and access. This coordination led to design changes to better facilitate bus operations. Interchange locations were adjusted based on public comment as noted in **Section 3.0**.

4.16.1 No Build Alternative – Traffic Operation Consequences

If the No Build Alternative were implemented, the proposed improvements would not be constructed. Scheduled maintenance on the existing facility would continue and may result in limited maintenance related impacts, but there would be no US 77 Upgrade Project project-related impacts.

4.16.2 Build Alternative – Traffic Operation Consequences

The US 77 Upgrade Project is expected to carry regional through-traffic and meet future traffic as well as local traffic demand. The presence of continuous access roads in the more urbanized southern and northern sections would allow for improved local circulation. Along the

relief routes in Driscoll and Riviera, the major county roads would experience additional access with the provided interchanges. However, the minor county roads may experience more limited access than currently is available.

The US 77 Upgrade Project would both provide additional access and further restrict access, affecting traffic patterns throughout the project area. However, most of the traffic impacts would be localized and would result from the elimination of several through streets in Driscoll and Riviera, and minimal impacts to some ranching activities due to the elimination of two-way access roads. At SH 107 in Combes, two-way access roads would be restriped and the gores at the ramps would be reconfigured to one-way. For approximately 15 miles, from Combes northward to FM 2629 in Sebastian at the Willacy/Cameron County line, existing US 77 main lanes would become the future access roads. The main lanes would be built with grade separations between the two existing at-grade access roads using diamond interchanges at FM 498, Bulldog Avenue, FM 490, Spur 56 and CR 3690 near the Raymondville relief route (existing US 77) split with Business US 77.

In the ranch area, from northern Willacy County to the Kenedy/Kleberg County line, US 77 traverses several large ranches and would be providing interchanges at main gates and half interchanges at intermediate or minor gates within existing ROW. At intermediate gates with the half interchanges, vehicles traveling in the opposing direction would be required to travel to the nearest interchange to make a U-turn. The access in the ranch area would change from the current direct main lanes and at-grade intersections. Users in this area could experience the most impact since the upgrade provides interchanges in place of the existing at-grade intersections throughout this area. The interchanges occur at less frequent intervals than the at-grade intersections. Coordination with stakeholders in this area resulted in the addition of interchanges and the shifting of interchange locations in the Revised Conceptual Design and Preliminary Schematic. These revisions would better accommodate the affected stakeholders' ranch operations, resulting in a minimization of impacts.

The maximum distance for indirect travel would be approximately seven miles. Sarita would have two full interchanges. Interchanges have also been provided at La Parra Ranch Road/Mallory Road and Armstrong Avenue. Although diamond Interchanges were first proposed for the Riviera and Driscoll relief route/business split, these were replaced by direct connectors as a result of the public involvement process. The direct connectors would provide direct access to and from the towns of Riviera and Driscoll without adding obstacles that would affect traffic flow. Since the relief routes would be tolled, continuous access roads are not provided.

In Riviera, CR 2310, CR 2300, CR 1070, and CR 2295 would no longer have direct access to US 77. More circuitous access to US 77 from these roads would be provided on other existing county roads, with a maximum additional distance to Business US 77 of approximately 1.5 miles. Southbound traffic from CR 1070, CR 2295, and CR 2290 would take CR 2290 to Business US 77. North of Riviera, access roads have been added with southbound lanes to the east and northbound lanes to the west of the proposed weigh station. At the weigh station, southbound traffic on CR 2230 would have to travel north to FM 772, approximately two miles to make a U-turn to travel south. Other roads between Riviera and Driscoll that would be restricted are CR 2180, CR 2170, CR 2150, CR 2155, CR 2230, CR 2215, CR 2210, CR 2205, CR 2130, and CR 1416. Redirection caused by adding access roads would range from 0.25 mile in the case of CR 2170 to approximately 1.0 mile to get southbound from westbound CR 2155.

In Kingsville, the US 77 Upgrade Project would upgrade the existing Kingsville relief route with the addition of access roads. In northern Kingsville, traffic on Sage Road would be redirected to FM 1898. One business, an automobile dealership located on the southbound access road of existing US 77 would be affected. Currently, northbound traffic can make a left turn into the dealership from an at-grade crossover. With the addition of the access road, northbound traffic from the dealership would travel south on the access road, approximately 0.25 mile and make a U-turn to go north. To enter the dealership from the south, one would travel northward, past the dealership approximately 0.6 mile and make a U-turn at a proposed interchange onto the southbound access road.

In Bishop, grade-separated interchanges would be added at CR 4, East 6th Street, FM 567 (East 4th Street), and CR 10 near the north end of town. Meadowbrook Drive, CR 14, and CR 16 would no longer have direct access to US 77, and traffic would be required to take circuitous routes ranging from 0.5 to 1.25 miles to regain direction.

Grade separations or interchanges would be constructed at county roads in Driscoll, so traffic would be minimally disrupted by the Driscoll relief route. North of Driscoll, northbound traffic on CR 28 would have to travel south approximately 1.25 miles to go north because it would be restricted by the direct connectors to and from US 77. CR 34 and CR 73 traffic would have to travel north to go south, adding as much as 0.5 mile to the trip.
In an effort to minimize this impact, the access roads in these areas were adjusted to provide easier access to these future interchanges. In many places, interchanges were added to reduce trip length to common destinations as identified during the community meetings.

Additionally, the ISDs in the communities along US 77 were contacted to coordinate bus routes to minimize the impacts to local communities' bus operations. Feedback from the ISDs resulted in revision and incorporation of additional access in the Revised Conceptual Design and Preliminary Schematic.

SECTION 5.0 - INDIRECT IMPACTS

This section describes the indirect impacts analysis prepared for the proposed US 77 Upgrade Project in Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties, Texas. This analysis was conducted in accordance with CEQ, FHWA, and TxDOT regulations and guidance documents. The CEQ (40 CFR 1508.8) defines indirect impacts as:

> "…effects, which are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Indirect effects may include growth inducing effects and other effects related to induced changes in the pattern of land use, population density or growth rate, and related effects on air and water and other natural systems, including ecosystems."

There are three general categories of indirect effects:

- Encroachment-Alteration Effects, which are those that alter the behavior and functioning of the physical environment and are related to project design features, but are separated from the project by time and/or distance. An example of this type of effect would be a change in habitat regime and nesting patterns of a bird species due to the installation of a bridge.
- Access-Alteration Effects or induced growth effects are also known as Project-Influenced Effects or the Land Use Effect and involve changes in land use resulting from changes in traffic, access, and mobility. Also referred to as induced growth, Access-Alteration Effects can result from highway projects that may promote an increased rate of development. An example would be development (i.e. new subdivision) in an area that was previously inaccessible prior to construction of a new road.
- Effects Related to Project-Influenced Development, or Induced Growth-Related Effects, are those effects that are attributable to the induced growth itself.

The methodology for the indirect impact analysis is based on the findings in the NCHRP Report 466, *Desk Reference for Estimating Indirect Effects of Proposed Transportation Projects* and the TxDOT *Guidance on Preparing Indirect and Cumulative Analyses* (revised September 2010). For this analysis, TxDOT methodology was employed, which has been adapted from that set forth in NCHRP Report 466. **Table 5.1-1** shows the seven-step approach that is used to analyze indirect impacts in this section.

Table 5.1-1 Seven-Step Approach to Estimate Indirect Impacts

Step	Description
1	Scoping: The basic approach, effort required, and geographical boundaries of the study area are determined.
2	Identify the Study Area's Goals and Trends: Information regarding the study area is compiled with the goal of defining the context for assessment.
3	Inventory the Study Area's Notable Features: Additional data on environmental features are gathered and synthesized with a goal of identifying specific environmental features that are valued, vulnerable, or unique. This step also contributes to defining the context for the analysis.
4	Identify Impact-Causing Activities of Proposed Action and Alternatives: Fully describe the component activities of each project alternative.

Table 5.1-1 Seven-Step Approach to Estimate Indirect Impacts

Step	Description
5	Identify Potentially Substantial Indirect Effects for Analysis: Indirect effects associated with project activities and alternatives are cataloged, and potentially significant effects meriting further analysis are identified.
6	Analyze Indirect Effects: Qualitative and quantitative techniques are employed to estimate the magnitude of the potentially significant effects identified in Step 5 and describe future conditions with and without the proposed transportation improvement. Evaluate Analysis Results: The uncertainty of the results of the indirect effects analysis is evaluated for its ramification on the overall assessment.
7	Assess Consequences and Develop Mitigation: The consequences of indirect effects are evaluated against the context of the project to determine their importance. Strategies to avoid or lessen any effects found to be unacceptable are developed. Effects are reevaluated in the context of those mitigation strategies.

Source: NCHRP Report 466, *Desk Reference for Estimating Indirect Effects of Proposed Transportation Projects* and the TxDOT *Guidance on Preparing Indirect and Cumulative Analyses* (revised June 2009)

Below is the seven-step approach to estimate indirect impacts and a discussion of the analysis for each:

5.1 STEP 1 - SCOPING

The proposed Build Alternative consists of the completion of upgrading US 77 to Interstate highway standards, including potentially two highway relocations around Driscoll and Riviera. The typical section is anticipated to remain a four-lane divided roadway for the entire project length. However, in certain locations, the four main lanes would be supplemented by access roads and interchanges to facilitate local access.

The proposed project is approximately 122 miles in length and is defined by its northern logical terminus at the interchange of US 77 and IH 37 in Corpus Christi, Texas and the interchange of US 77 and US 83 in Harlingen, Texas at the southern terminus. A total of approximately 689.74 acres (440.43 acres in Nueces County and 249.31 acres in Kleberg County) of additional ROW would be required for the proposed construction of the Build Alternative, with the primary component being the main lane upgrade improvements within existing and proposed ROW. The secondary component consists of relief routes for Driscoll and Riviera. Some of the upgrading to US 77 has been completed at the northern terminus and southern terminus by TxDOT's Corpus Christi and Pharr Districts under separate projects.

As discussed in **Section 3.2.2**, a total of 27.3 miles of the US 77 Upgrade Project have already been completed or are underway. Subsequently, the following sections of US 77 are excluded from this project and include:

- A 5.9 mile section at the north logical terminus of IH 37 to Industrial Boulevard in Robstown in Nueces County. No construction would be anticipated in this section under this project, and no additional ROW is required in this section.
- A 1.6 mile section from Industrial Boulevard to CR 36 has upgrades already underway and will be completed by a separate Corpus Christi District project. No construction would be anticipated in this section. Therefore, no additional ROW is required in this section under this project.

- No construction is anticipated from US 83 in Harlingen to north of the recently complete relief route around Raymondville with the exception of two areas where the main lane improvements have not been completed in the vicinity of Lyford. This section is approximately 19.8 miles. No additional ROW would be required.

The geographical boundaries of the indirect effects study area (Area of Influence or AOI) would include the area in which the proposed Build Alternative could potentially influence local conditions such as traffic patterns, socioeconomic conditions, and land use changes, as well as biological and water resources. The appropriate study area and timeframe for analyzing changes to land use, air quality, and biological and water resources in an area surrounding the proposed US 77 Upgrade Project would be the area where, based on interviews with city officials and stakeholders, induced growth is expected or not expected to occur in cities or towns. None of the persons interviewed foresee potential induced growth occurring outside of city or town limits (see **Table 5.1-2** for a list of interview participants). Therefore, cities along the US 77 corridor where construction is proposed or is partially complete and/or underway were wholly included within the geographical boundaries of the indirect effects study area. Most areas along the corridor are private rural ranch and agricultural lands where development is not anticipated nor desired in the foreseeable future as a result of the proposed upgrades to US 77 (also discussed in Step 5). In addition, most commuters travel from town to town and make brief stops at gas stations/convenient stores and restaurants, or are trucks carrying goods from Mexico to various cities along the corridor, designating US 77 as a mainly through-traffic roadway. This roadway has a small commutershed between cities and towns. Therefore, the limit of the geographical boundaries of the indirect effects study area in these locations is up to 0.5 mile from the existing and proposed ROW. This distance takes into account any indirect impacts (i.e., encroachment alteration, induced growth effects, and effects related to induced growth) that may occur to ecological conditions and air quality. It was determined that the appropriate geographic study area for indirect impacts identified as the AOI and encompasses approximately 82,800 acres or approximately 129 square miles of land. **Figure A.5.1-1** depicts the AOI for the proposed project.

The temporal boundary for the indirect impacts analysis was determined to be through the horizon year of 2030, consistent with other Texas regional transportation and planning organizations and planning horizons. However, it is also appropriate to include historical demographic information in order to ascertain population trends, which is presented in Step 2.

Table 5.1-2 Local Interview Participants

Community	Persons Interviewed
CCMPO	Tom Niskala – Transportation Planning Director Corpus Christi MPO
Corpus Christi	Greg Brubeck – Port of Corpus Christi
Corpus Christi	E. Ray Covey – Manager Economic Development AEP Texas
Robstown	Ken Faughn – Executive Director, Robstown Area Development Commission
Driscoll	Mayor Pro Tem John Aguilar – City of Driscoll
Driscoll	City Administrator Sandra Martinez – City of Driscoll
Driscoll	Cynthia M. Garcia – Superintendent – Driscoll ISD
Nueces County	Glenn Sullivan – Nueces County Engineer
Nueces County	Eddie Eubanks – Nueces County Assistant Engineer
Kingsville	Carolo G. Serrato – Executive Director, South Texas Water Authority (STWA)

Table 5.1-2 Local Interview Participants

Community	Persons Interviewed
Kingsville	Dick Messbarger – Executive Director, Economic Development Council (EDC)
Kingsville	Bob Kinnan – EDC
Kingsville	Robert Carter – EDC, Kingsville State Bank
Kingsville	Joe Henkel – Kleberg National Bank
King Ranch	Douglas L. Beveridge – Vice President – King Ranch Minerals, Inc.
Kleberg County	Roy Cantu – Kleberg County Commissioner District 3
Ricardo	Mando Hinejosa – Operations Manager – Ricardo ISD
Ricardo	Dr. Vita Canales – Superintendent – Ricardo ISD
Riviera	Ernest Havner – Superintendent – Riviera ISD
Riviera	Dana Hickey – Riviera ISD
Riviera	Vern Crocker – Community of Riviera citizen
Riviera	Bill Colston – President – Riviera Telephone Company
Riviera	Bill Colston Jr. III – Vice President – Riviera Telephone Company
Sarita	Patty and Mike Fain – Community of Sarita
Sarita	Jana Norrell –Justice of the Peace – Sarita
Kenedy County	Sarita Hixon – Kenedy County Commissioner
Armstrong Ranch	Anne Armstrong and Sarita Armstrong Hixon
Lyford	Henry De La Paz – Mayor of Lyford
Combes	Lonnie Bearden – Town Administrator – Combes
Cameron County	Edna Tamayo – Cameron County Commissioner (Precinct 4)

Source: Jacobs Engineering Group, Inc., January 2010

5.2 STEP 2 - IDENTIFY THE STUDY AREA'S GOALS AND TRENDS

Goals

Within the AOI, all of the cities and towns along the proposed project corridor do not have comprehensive or city plans and/or plans are not available with the exception of Kingsville. Where information was not readily available, as it relates to the goals and trends of the AOI, the results of interviewed local officials and business leaders (see **Table 5.1-2** for a complete list) were used. The goals presented are listed as they occur from north to south within the corridor.

The City of Robstown is located in the northernmost region of the AOI, near the start of the proposed project's upgrades. The city's progress and economic development is directed by the Robstown Area Development Commission (RADC). The Commission was formed as a consolidation of the Chamber of Commerce and the Robstown Economic Development Commission. The RADC has 12 directors, which includes city and county officials, as well as business and school representatives. Through the RADC, Robstown is touted as the "transportation crossroads of South Texas and World Trade offering excellent access to highway and rail corridors". Moreover, Robstown is "ideally located" for trade opportunities due to its location at the intersection of US 77. The RADC includes the proposed upgrades in its economic development plans. According to RADC, the stated goal or future vision for Robstown is to utilize the developed infrastructure for the city as a foundation for private investment to grow the economy.

The City of Driscoll is the next town along the alignment to the south of Robstown and is included in the AOI. Interviews with Driscoll officials were conducted in order to ascertain the goals of the city for the foreseeable future, as there is no stated city plan. Driscoll would like economic development and yet retain its small-town feel. One of the future goals is to maintain the Driscoll ISD and foster economic development with education. Detailed future development and utility expansion plans have not been developed. However, there are plans for an Emergency Management Command Center and recently the city received grant money for a wastewater treatment facility, which would provide adequate utilities within the city limits.

The City of Bishop is approximately six miles south of Driscoll. According to the Bishop Chamber of Commerce, Bishop has a "solid industrial and agricultural base" and is strategically located along US 77. Bishop's goal in the foreseeable future is to continue providing an enhanced residential community by assisting businesses to develop and thrive "as they provide economic and commercial services to the citizens of Bishop and the surrounding area." Bishop does not have a city plan.

Kingsville is located approximately seven miles to the south of Bishop. Kingsville has implemented the Kingsville Master Plan which is "designed as a framework for guiding future development, redevelopment, and community enhancement in the city and its surrounding planning area over the next 20 years and beyond." The purpose of this Plan is to "establish a vision, along with realistic goals and achievable strategies, that residents, business and land owners, major institutions, civic groups, members of advisory committees, and public officials prefer – and will support with action in the years ahead." The Plan focuses on the city's growth capacity, transportation and economic development. The growth capacity goal is to provide "adequate and efficient provision of infrastructure including water/wastewater facilities to accommodate growth and economic development objectives to the community over the next 20 years." As well as provide "logical sequencing and timely provision of adequate public facilities and services." There are three economic development goals:

1. Develop, retain, and attract talent
2. Stimulate the economy through business development and industry attraction
3. Promote and enhance Kingsville's quality of place.

Economic development in Kingsville is directed by the Greater Kingsville EDC with the goal to "create new jobs through acquisition, expansion, and retention of primary income-producing industries, and to enhance diverse investment opportunities which expand the Kingsville and Kleberg County tax base."

According to the Kingsville Master Plan, the transportation goals include a local transportation system that moves people through the community in a safe and convenient manner and is integrated with and complements neighborhood and community character, and; a system that is commensurate with the type, pattern, and density of land use. The Plan also has goals for a regional transportation network which include moving people and goods to, from and through the community in an efficient and effective manner and an improved appearance of major transportation corridors in Kingsville. The Plan takes into account the proposed upgrades to US 77.

The unincorporated communities of Ricardo, Riviera, and Sarita do not have established community plans available. Therefore, the goals below are based on conversations with local officials and business leaders. The future goals of the unincorporated community of Riviera include maintaining the current economic baseline and possibly expanding and improving sewer

and water utilities. Sarita has the present and future goals of rehabilitating the courthouse and maintaining Sarita Elementary School (Kenedy County Wide ISD).

Lyford, Sebastian, and Combes do not have established community or comprehensive plans. However, each community has established goals to upgrade its utilities to provide better service to their residents and for possible future growth. Regardless of the proposed US 77 Upgrade Project, Lyford, Sebastian, and Combes have plans for growth.

Trends

Historically, Nueces and Willacy Counties have seen a steady growth in population, and Kleberg's population has remained steady (**Table 5.2-1**). Kenedy and Cameron Counties have had the largest changes in population in the AOI, with Kenedy County showing a steady decline in population and Cameron County increasing in population. The most populous counties in the AOI have remained Nueces and Cameron Counties, which are located at the proposed project's start and end, respectively.

Table 5.2-1 Historical Population

Year	Nueces County	Percent Change	Kleberg County	Percent Change	Kenedy County	Percent Change	Willacy County	Percent Change	Cameron County	Percent Change
1970	237,544	-	33,166	-	678	-	15,570	-	140,368	-
1980	268,215	12.9	33,358	0.5	543	-19.9	17,495	12.3	209,727	49.4
1990	291,145	8.5	30,274	-9.2	460	-15.2	17,705	1.2	260,120	24.0
2000	313,645	7.7	31,549	4.2	414	-10.0	20,082	13.4	335,227	28.8

Source: The Handbook of Texas Online and US Census Bureau, January 2010

Table 5.2-2 depicts the AOI population growth during the decade from 1990 to 2000 for the ten towns and cities located along existing US 77. The City of Robstown and Bishop experienced a slight decline in population with a -0.9 percent change. The City of Kingsville population experienced a very slight increase of 1.1 percent. Two of the towns located in the corridor experienced dramatic increases in population. Ricardo experienced an increase of 1,267.5 percent with growth from 120 to 1,641. Riviera also experienced a 93.4 percent increase with growth from 550 to 1,064. The City of Driscoll (19.9 percent), Sarita (35.1 percent), Lyford (17.8 percent), Sebastian (16.6 percent), and Combes (25.0 percent) all experienced increases during the 1990 to 2000 decade.

Table 5.2-2 AOI Historical Population Growth

City/Town	1990	2000	Percent Growth
Robstown	12,849	12,727	-0.9
Driscoll	688	825	19.9
Bishop	3,337	3,305	-0.9
Kingsville	25,276	25,575	1.1
Ricardo	120	1,641	1,267.5
Riviera	550	1,064	93.4
Sarita	185	250	35.1
Lyford	1,674	1,973	17.8
Sebastian	1,598	1,864	16.6
Combes	2,042	2,553	25.0

Source: The Handbook of Texas Online and US Census Bureau, January 2010

Based on the TWDB projections, most cities and towns within the AOI are projected to increase in population by the year 2030. Of those that are forecasted to increase in population, Driscoll

is projected to change the most with a 94.3 percent increase. The City of Combes, the most southern city along the proposed project and within the AOI, is projected to increase in population by 66.0 percent by 2030. Kingsville and Lyford are also forecasted to increase in population by 10.8 percent and 17.2 percent, respectively. The populations of Robstown and Bishop (both are located in Nueces County) are not projected to change from 2000 to 2030 as shown in **Table 5.2-3**.

Table 5.2-3 AOI Population Projection 2000-2030

City/Town*	2000	2030	Percent Projected Change
Robstown	12,727	12,727	--
Driscoll	825	1,603	94.3
Bishop	3,305	3,305	--
Kingsville	25,575	28,347	10.8
Lyford	1,973	2,313	17.2
Combes	2,553	4,240	66.0

Source: TWDB, http://www.twdb.state.tx.us/wrpi/data/proj/popproj.htm, January 2010

* The following cities/towns do not have projections available through TWDB: Ricardo, Riviera, Sarita, and Sebastian

Land use in the AOI is primarily agricultural, ranchlands and residential as shown in **Table 5.2-4**. In 2008, a majority of residential and commercial land uses were contained in cities and towns and comprised 5.8 percent and 1.0 percent, respectively, of the AOI. As land use plans for the area do not exist except for Kingsville, existing land use was compiled from field investigations that were then transposed into GIS mapping software. Land use within the corridor is predominantly unchanged from its historical use. Employing both qualitative and quantitative approaches, projected land use was calculated based on discussions with city officials and stakeholders in conjunction with current land use data, as well as economic and population forecasts. It is projected that development in the AOI would continue to increase modestly over the next 20 years (forecasted to 2030). Agricultural and ranchlands will continue to comprise a vast majority of land uses in the AOI, comprising approximately 88.5 percent. A projected 2.3 percent decrease from the agricultural/ranchland use category would result from agricultural land loss. Most of the available land for residential, industrial, and commercial development comprises agricultural lands. Overall, residential and commercial uses within the AOI are projected to modestly increase and would comprise approximately 7.2 percent and approximately 1.3 percent, respectively. If current trends continue, the cities of Lyford, Combes, and possibly Sebastian would exhibit the greatest growth in residential land uses. These cities are nearest the largest population centers (such as Harlingen and Brownsville) and, according to the TWC, employment is projected to increase by 23.2 percent from 2006 to 2016 in Cameron County alone. Conversely, employment is forecasted to grow by 17.7 percent in Nueces, Kleberg, and Kenedy Counties combined. These employment forecasts may be extrapolated out to 2030 based on projections for increased trade between Mexico and the US.

Table 5.2-4 Area of Influence – Current and Projected Land Use[1]

Land Use	2008 Land Use (acres)	2008 Land Use (percent)	2030 Land Use (acres)	2030 Land Use (percent)	% Change in acres from 2008 to 2030
Commercial	836	1.0	1,100	1.3	31.5
Industrial	288	0.3	400	0.4	38.8
Other[2]	150	0.1	250	0.3	66.6
Parks	189	0.2	300	0.3	58.7
Agricultural/Ranch	75,095	90.6	73,350	88.5	-2.3
Residential Use	4,820	5.8	6,000	7.2	24.4
Vacant	1,422	1.7	1,400	1.6	-1.5
Total Area	**82,800**	**100.0**	**82,800**	**100.0**	

Source: Jacobs Engineering Group, Inc., January 2010
1. Current and projected land use calculations were completed by Jacobs Engineering Group, Inc., January 2010 Projections are estimates based on population and economic forecasts (which include employment projections), as well local official interviews,
2. Other land use comprises Hospital, Public, School, and Utilities

Single-family building permit information from 1980 to 2007 was collected for counties in the AOI, which includes Nueces, Kleberg, Willacy, and Cameron Counties. Data for Kenedy County was not available. **Table 5.2-5** shows the annual number of building permits and the fluctuation during the 27-year time period. As a whole, the four-county area showed an average two percent annual change from 1980 to 2007. For the majority of the years, Cameron County issued the highest numbers of new single-family building permits as well as issuing 62.5 percent of all building permits from 1980 to 2007. Nueces County issued 37.2 percent during the same period. Kleberg and Willacy Counties have shown a slow growth rate, as reflected in building permits, with only 1.58 percent in Willacy County and 0.68 percent of the permits in Kleberg County.

Table 5.2-5 Study Area Counties Single-Family Building Permits (1990 – 2007)

Year	Nueces County		Kleberg County		Willacy County		Cameron County		4-County Area Total	
	Number of Permits	Percent Change	Number of Permits	Percent Change	Number of Permits	Percent Change	Number of Permits	Percent Change	Total Number of Permits	Percent Change
1990	435	-	6	-	38	-	641	-	1,120	-
1991	451	4	28	367	11	-71	1,009	57	1,499	34
1992	669	48	6	-79	17	55	1,308	30	2,000	33
1993	880	32	15	150	12	-29	1,486	14	2,393	20
1994	891	1	18	20	53	342	1,694	14	2,656	11
1995	795	-11	32	78	67	26	1,642	-3	2,536	-5
1996	1,087	37	20	-38	66	-1	1,729	5	2,902	14
1997	889	-18	11	-45	48	-27	1,602	-7	2,550	-12
1998	991	11	11	0	19	-60	1,926	20	2,947	16
1999	694	-30	12	9	57	200	2,017	5	2,780	-6
2000	737	6	11	-8	42	-26	2,706	34	3,496	26

Table 5.2-5 Study Area Counties Single-Family Building Permits (1990 – 2007)

Year	Nueces County		Kleberg County		Willacy County		Cameron County		4-County Area Total	
	Number of Permits	Percent Change	Number of Permits	Percent Change	Number of Permits	Percent Change	Number of Permits	Percent Change	Total Number of Permits	Percent Change
2001	945	28	11	0	49	17	2,713	0	3,718	6
2002	1,079	14	8	-27	86	76	3,178	17	4,351	17
2003	1,362	26	9	12	64	-26	3,132	-1	4,567	5
2004	1,448	6	6	-33	33	-48	3,070	-2	4,557	0
2005	1,553	7	7	17	36	9	3,069	0	4,665	2
2006	1,543	-1	40	471	42	17	2,852	-7	4,477	-4
2007	1,337	-13	33	-18	30	-29	1,728	-39	3,128	-30

Source: Texas A&M Real Estate Center, http://recenter.tamu.edu/data/databp.html, accessed April 2009. Data for Kenedy County not reported.

Eight ISDs are located within the AOI. Overall, there was very little change in enrollment over the two-year period (2005-2007). The largest difference was the Robstown ISD with a seven percent decrease in enrollment. Kenedy County and Ricardo school districts showed a one percent increase. **Table 5.2-6** lists the eight school districts located within the geographical boundaries of the indirect effects study area and their associated enrollment totals.

Table 5.2-6 School District Enrollment Totals

District Name	2005-2006 Enrollment	2007-2008 Enrollment	2-year Growth	Percent Growth
Robstown ISD	3,822	3,559	-263	-7
Driscoll ISD	277	275	-2	-1
Bishop Consolidated ISD	1,200	1,192	-8	-1
Riviera ISD	499	492	-7	-2
Kingsville ISD	4,246	4,125	-121	-3
Ricardo ISD	579	610	31	1
Kenedy County Wide ISD	77	86	9	1
Lyford Consolidated ISD	1,541	1,522	-19	-2

Source: Texas Education Agency, *http://www.tea.state.tx.us/*, January 2010

Based on the goals and trends, the AOI is maintaining a mostly rural context with a majority of the land use being ranch and agricultural lands. The northern portion of the AOI has maintained a mixture of a moderate urban (Robstown and Kingsville) and rural (Driscoll and Bishop) character with overall slow growth. The communities of this region of the AOI desire to maintain and grow the economy, through development and redevelopment (industry), to meet the current and future needs of their populations. The region south of Kingsville is defined by agricultural and ranchlands, which represents the majority of the AOI; although population increases in

Ricardo and Riviera occurred between 1990 and 2000, the towns remain rural in nature. Between Riviera and just north of Raymondville, the region is dominated by large ranching operations, namely the King and Kenedy Ranches. Both ranches have expressed no interest in pursuing development of their lands. The region of the AOI that has the most potential for future growth is in the cities of Lyford and Combes. Both cities are in close proximity to large population centers (Harlingen and Brownsville) and are projected to increase in population by 2030 and employment through 2016.

5.3 STEP 3 - INVENTORY OF STUDY AREA'S NOTABLE FEATURES

Information has been collected for the notable human and natural environmental features in the study area and includes:

- King Ranch – One of the world's largest ranches, King Ranch currently comprises approximately 825,000 acres in Nueces, Kleberg, Kenedy, Willacy, Jim Wells, and Brooks Counties. The ranch is an integral part of the economy in these Texas counties via raising livestock (Santa Gertrudis cattle and horses), cultivating crops, hunting, and large oil and gas holdings. The King Ranch has long held significant banking and mercantile interests in Kingsville, a town located in the heart of the ranch. In addition, the ranch has long supported the agricultural educational programs of Texas A&M University, both at College Station and Kingsville. The ranch was designated a National Historic Landmark in 1961 and is protected under Section 106 of the NHPA. The location of the King Ranch is shown on **Figure A.5.1-1.** http://www.tshaonline.org/handbook/online/articles/KK/apk1.html - January 2010.
- 10 water crossings – The AOI comprises 10 water crossings that are all designated waters of the US. Los Olmos Creek (Crossing 1) forms the line between Kleberg and Kenedy Counties and flows into the Laguna Salado, an inlet of Baffin Bay; an unnamed tributary of Escondido Creek (Crossing 2) and Escondido Creek (Crossing 3), which runs southeast for 26 miles to its mouth on Santa Gertrudis Creek (Crossing 4), two miles south of Kingsville in central Kleberg County; Santa Gertrudis Creek runs southeast for 61 miles to its mouth on San Fernando Creek (Crossing 6), four miles southeast of NAS Kingsville in north central Kleberg County; Tranquitas Creek (Crossing 5) runs southeast for 25 miles to its mouth on San Fernando Creek, two miles east of Kingsville in northern Kleberg County; unnamed tributaries of Carreta Creek (Crossings 7 and 9) and Carreta Creek (Crossing 8); and finally, Petronila Creek (Crossing 10) runs southeast for 44 miles to its mouth on Cayo del Mazón, 16 miles northeast of Riviera Beach, in eastern Kleberg County. The last six miles of the streambed lie near tidal flats surfaced by blue-green algal mats and crustaceans. Locations of the water crossings are shown on **Figures A.4.10-1** through **A.4.10-8**. A number of potentially non-jurisdictional water resources are also present in the project area and include manmade irrigation/drainage ditches, canals, and stock ponds that were excavated in uplands, drainage features that consist of broad low swales and do not exhibit an ordinary high water mark (OHWM) or continuous wetland vegetation, and a number of isolated wetlands.
- Federally Endangered Wildlife Species – Ocelot. There are an estimated 100 ocelots that remain in Texas. Two breeding populations are known to occur east of US 77 and represent an estimated one-third of the total ocelot population. One population numbering six to 12 ocelots is located on two USFWS conservation easements totaling 2,240 acres within a private ranch in northern Willacy County. This population is located approximately seven miles east of US 77. The second population, numbering 10 to 20

ocelots, occurs in the 45,000-acre Laguna Atascosa National Wildlife Refuge (LANWR) located approximately 20 miles east of US 77 in Cameron County.

- Federally Endangered Plant Species – Slender rush-pea and South Texas ambrosia. Several populations of slender rush-pea have been previously recorded in the AOI. The endangered plant surveys conducted for this project confirmed the presence of slender rush-pea in four previously recorded locations in the existing ROW, as well as identified a single plant in a fifth location (**Table 4.7-3**). These five areas are located within a 1.4 mile stretch of roadway located just south of the Nueces/Kleberg County line (**Figures A.4.5-18, A.4.7-1** and **A.4.7-2**). Within all five areas, slender rush-pea plants are growing within the existing maintained ROW. Several populations of South Texas ambrosia have been previously recorded in the AOI, including two records within existing US 77 ROW. The endangered plant surveys conducted for this project confirmed the presence of South Texas ambrosia in two previously recorded locations in the existing ROW (both listed as NDD Element of Occurrence ID No. 4752 in **Table 4.7-2**), as well as identified a third population in the existing ROW (**Table 4.7-4**). These three areas are located in a 2.1 mile stretch of roadway from Carreta Creek southward to near San Fernando Creek (southern Nueces County and northern Kleberg County), in the same vicinity as the slender rush-pea populations (**Figures A.4.5-18, A.4.7-1** and **A.4.7-2**). Within all three areas, South Texas ambrosia plants are growing within the existing maintained ROW.
- State Listed Threatened and Endangered Species – There are a number of state listed threatened and endangered species that may utilize habitats in and adjacent to the project area. The Texas Natural Diversity Database includes records of several of these species in and near the project area, and several of the species were observed during various field investigations conducted for this project.
- Naval Air Station (NAS) Kingsville – Located three miles east of Kingsville, this NAS is one of the US Navy's premier locations for jet aviation training. When it was commissioned in July 1942, it was one of three advanced air-training bases of the Naval Air Training Command. NAS Kingsville is home to Training Air Wing Two and several tenant commands, military as well as civilian, with a total complement of approximately 300 officers, 200 enlisted, 350 civilian personnel, and 625 contract maintenance personnel. The location of the Kingsville NAS is shown on **Figure A.5.1-2**.
  http://www.tshaonline.org/handbook/online/articles/NN/qbn3.html - January 2010.
  http://www.globalsecurity.org/military/facility/kingsville.htm - January 2010.
- Kenedy Ranch – A 235,000-acre ranch located near Sarita, the Kenedy Ranch is considered the last large tract of native coastal prairie habitat in Texas and for over a century it has been a highly protected game preserve. The location of the Kenedy Ranch is shown on **Figure A.5.1-1.**
  http://www.kenedy.org/KenedyRanch/tabid/1093/Default.aspx - January 2010.
- Armstrong Ranch – A 50,000-acre ranch located in Kenedy County between the Kenedy and King Ranches whose primary focus is wildlife and cattle ranching. TxDOT has determined that the Armstrong Ranch is eligible for inclusion in the NRHP and direct impacts to the ranch have been avoided. The location of the Armstrong Ranch is shown on **Figure A.5.1-1.**
  http://www.nytimes.com/2006/02/19/weekinreview/19kornblut.html - January 2010.
- Yturria Ranch – An originally 150,000-acre ranch just north of Harlingen, Yturria Ranch has maintained its identity through various changes that have taken place in South Texas. The ranch was originally established near present-day Raymondville in the 1870s. Farming has taken over some of the acres formerly grazed by livestock. Today, Yturria Ranch raises Santa Gertrudis cattle and horses and has become a vast game

preserve and a site for the preservation of numerous species of wildlife, such as the ocelot. The location of the Yturria Ranch is shown on **Figure A.5.1-1.** http://books.google.com/books?id=BVYLrXGCJYIC&pg=PA85&lpg=PA85&dq=yturria+ranch+texas&source=bl&ots=W9WGKpaMeV&sig=UcTNH6FS55-FH45bvYifUof7fgo&hl=en&ei=4dqGS-jJGI7KjAejxai-Dw&sa=X&oi=book_result&ct=result&resnum=8&ved=0CB0Q6AEwBw – January 2010.

- TAMUK – Founded in 1925 as the South Texas State Teachers College, the university's name changed in 1929 to Texas College of Arts and Industries (A&I). In 1967, the name changed to Texas A&I University and the university became a member of the Texas A&M University System in 1989 and changed names in September 1993. TAMUK has 56 undergraduate degree programs, 61 master's programs and six doctoral degrees in the Colleges of Agriculture, Natural Resources and Human Sciences, Arts and Sciences, Business Administration, Education, Engineering and Graduate Studies. The university has approximately 6,200 students. The location of TAMUK is shown on **Figure A.5.1-2**. http://www.tshaonline.org/handbook/online/articles/TT/kct10.html - January 2010. http://www.tamuk.edu/about/ - January 2010.
- Union Pacific Railroad (UPRR) – Formerly the Missouri-Pacific Railroad, Union Pacific is the largest railroad in North America, covering 23 states across the western two-thirds of the US. The railway extends the length of and is parallel to the proposed project. The railroad has been integral in the development and expansion of the project corridor and within the AOI.
- El Mesquite Dance Hall – Located in Riviera, El Mesquite Dance Hall was built in the 1920s and relocated in the 1960s. It serves as a community/recreational resource. It was possibly moved from another location. Direct impacts to the Dance Hall will be avoided. The location of the El Mesquite Dance Hall is shown on **Figure A.3.1-12**.
- US Customs and Border Protection (CBP) Border Patrol Traffic Checkpoint - Located just north of Sarita on US 77, this checkpoint is integral in detecting illegal activities and preventing entrance the interior the US. The location of the checkpoint is located **Appendix G - Sheet 24 of 50**. http://www.cbp.gov/xp/cgov/newsroom/news_releases/archives/2004_press_releases/072004/07122004_3.xml - January 2010.
- Armstrong Post Office – As of October 2003, there were 12 box holders at Armstrong – most, if not all, employees of the Armstrong Ranch. This facility is approximately 60 square feet in size. http://www.texasescapes.com/SouthTexasTowns/ArmstrongTx/Armstrong-Texas-Post-Office.htm - January 2010.
- Pan American School – Located south of Kingsville at the intersection of FM 772 and BUS 77, the Pan American School was originally established in 1911 and the current campus was designed by renowned Texas architect O'Neil Ford in the 1950s. TxDOT determined the school is eligible for inclusion in the NRHP and that direct impacts to the school have been avoided by the proposed project.
- Delta Lake Irrigation District – Located in northern Willacy County and Raymondville, the Delta Lake Irrigation District is an above-ground irrigation system completed around 1940. The system is approximately 135 linear miles, encompasses approximately 70,000 acres, and is the largest irrigation district in the Lower Rio Grande Valley. For the purposes of the proposed project, TxDOT has determined the irrigation district eligible for inclusion in the NRHP and that direct impacts to the irrigation system and its features have been avoided by the proposed project.

5.4 STEP 4 - IDENTIFY IMPACT-CAUSING ACTIVITIES OF THE PROPOSED PROJECT

The proposed Build Alternative (also described in **Section 3.2.2**) would consist of the completion of upgrading US 77 to Interstate highway standards, including potentially two highway relocations around Driscoll and Riviera. The typical section is anticipated to remain a four-lane divided roadway for the entire project length. NCHRP Report 466 identifies 10 general categories of impact-causing activities, and what follows is a description of the impact-causing activities and includes all of the activities involved in the proposed project.

Modification of Regime

- Modification of Habitat – possible habitat of 8 of the 10 crossings of waters of the US (see **Figures A.4.10-1** through **A.4.10-8** and **Table 4.10-5**) would be either temporarily or permanently altered, with bridge expansions at Crossings 1, 4, and 8; construction of new bridges at Crossings 2, 3, 4, 6, 9, and 10 and culvert extensions at Crossing 2. Impacts also include drill shafts in stream channels, embankments, and retaining walls.
- Alteration of Ground Cover – where new ROW is proposed, clearing of grasses, shrubs, and trees would occur.

- Alteration of Drainage – new drainage structures (concrete pipes or box culverts) would be placed in necessary subgrade locations along the Driscoll and Riviera relief routes.

Land Transformation and Construction

- Expanded Transportation Facility – construction of new northbound main lanes in new ROW to the east of the existing facility; construction of relief routes in Driscoll and Riviera to the east of the existing facility; and construction of new interchanges at select farm-to-market and county roads, as well as several ranch gates within existing ROW.
- New Access Roads – construction of new northbound access roads in proposed ROW and the conversion of existing southbound main lanes to southbound access roads in existing ROW.
- Existing Access Roads – Conversion of existing two-way access roads to one-way operation in Cameron County.
- Barriers, including fencing – in conjunction with three proposed ocelot/jaguarundi (and other species) crossings in Willacy and Kenedy Counties, fencing is proposed to position animals to use the proposed wildlife crossings.
- Cut and fill – cuts would be made where subgrading would be prepared to facilitate new pavement for interchanges, bridges, culverts, new main lanes, as well as utility relocation. Fill would occur in areas where grading is necessary and in locations where bridges are constructed/widened and culverts are added/extended.

Resource Extraction

- Surface excavation – proposed excavation in areas where grading cuts will be made in conjunction with minor shifts in alignment to conform to existing topography.

Land Alteration

- Erosion Control – in areas (i.e., jurisdictional waters) where construction is proposed, BMPs would be utilized to minimize sediment events into sensitive environmental areas and may include sand bags, silt fence, and sediment traps.

Resource Renewal Activities

- Revegetation – in areas where vegetation is cleared during construction and there is no new pavement, efforts would be made to revegetate/reseed these areas with native plants and seed stock.

Changes in Traffic

- Automobiles and Trucks – the Build Alternative would entail limited disruption to traffic and would include various construction activities over the build-out period. To alleviate this disruption, the proposed project would be constructed in phases, and a detailed traffic control plan would be developed and implemented for each of the construction phases. It is anticipated that once the proposed improvements to US 77 are complete, the facility may experience an increase in car and truck traffic through the horizon year of 2030.

Access Alteration

- New Access to Undeveloped Land – the construction of the proposed Driscoll and Riviera relief routes would be on new location. The relief routes would provide access to land where there was limited access prior to construction.
- Alter Travel Times – the construction of the proposed relief routes would provide a faster route for regional travelers by avoiding the through-town option with slower speed limits and traffic lights.
- Alter Travel Costs – Regional and local travelers who opt to use the proposed relief routes would have to use an electronic toll tag affixed to a vehicle or would be billed by mail resulting in higher travel costs.

5.5 STEP 5 - IDENTIFY POTENTIALLY SUBSTANTIAL INDIRECT EFFECTS FOR ANALYSIS

Based on the comparison of previously described impact-causing actions with the goals and trends and notable features found within the AOI, what follows results from the compilation and exploration of potentially substantial indirect impacts. Potential impacts found to merit further analysis will be discussed in detail in subsequent steps; whereas impacts found not to be substantial will not require further assessment.

Encroachment-Alteration Effects

- The Build Alternative would increase impervious cover. The increase in impermeable surfaces (i.e., construction of main lanes within existing and proposed ROW) may indirectly lead to non-point source pollution (i.e., vehicle residues) due to runoff during rain events and flooding. This non-point source pollution may have the potential to decrease the water quality of the 10 jurisdictional streams that traverse the AOI. Of particular concern are the four stream segments listed on the 2010 303(d) list of threatened/impaired waters (see **Table 4.10-2**). According to the Preliminary Hydraulic Impact Analysis Report for the proposed project, any flooding that may take place, especially in cities and towns, would be due to the configuration of the UPRR west of the proposed project and the relatively flat topography of the AOI. The UPRR acts as a berm or dam and prevents runoff and sheet flow from draining. The design of the new main lanes and relief routes would minimize potential impacts from flood events; therefore, any flooding that takes place would not be due to the proposed project. Even though impermeable surfaces would be increased, it is not anticipated that non-point source pollution would be a substantial indirect impact. Therefore, it was determined

that this type of possible effect does not require further study.

- The Build Alternative would introduce new pavement in existing ROW and in areas where there is proposed ROW to the east of the existing US 77 facility. In some cases, the introduction of new pavement would widen the distance this species would have to travel to cross the roadway. However, based on habitat assessments for the proposed project, there are limited areas of optimal or suboptimal ocelot habitat along US 77. Furthermore, the pavement that would be added near existing ocelot populations is associated with ranch access roads and would receive low volume of primarily ranch-related traffic. The proposed project would not add capacity, increase speed limits, or increase traffic volumes on the roadway; therefore, the potential for collisions between ocelots and vehicles under the Build Alternative would be similar to the potential under existing conditions and the No Build Alternative. There has been a concerted effort by federal and state regulators (i.e. USFWS and TPWD), as well as privately-held ranches located along the proposed project corridor, to set aside sizable amounts of acres of land in order for the ocelot to have enough protected habitat to thrive. The populations remaining in Texas are noted to be seven miles or more to the east of US 77. In order to minimize potential effects of the proposed improvements on the ocelot, clearing of wooded areas in the existing ROW would be minimized. Additionally, to provide a potential safe crossing of US 77 for wildlife, TxDOT proposes to install three wildlife crossings near the Yturria population in Willacy County and near Rudolph and Norias in Kenedy County. TxDOT has coordinated the locations and design of the proposed wildlife crossings with the USFWS, and the USFWS has approved the locations and design. No work would occur at the East Main Drain Canal, which provides another potential travel corridor travel across US 77. Therefore, it is anticipated that this potential indirect impact would not be substantial and does not require further analysis.

- TxDOT's Roadside Pest Management Program's has a management plan regarding the use of herbicides to manage and control undesirable pest species. The purpose of the program is to establish and manage desirable vegetation. This program may have the potential to impact both the slender rush-pea and South Texas ambrosia through the project corridor. TxDOT's Maintenance Division (MNT) maintains the responsibility for implementing and managing the program. However, many of TxDOT's pest management decisions occur more locally within each of TxDOT's 25 districts' local maintenance sections. Decision making at the local level allows TxDOT to better address local concerns and maintenance issues since the local maintenance personnel are most familiar with the maintenance needs, environment, and people within their respective county. TxDOT's Corpus Christi District maintains the area where the slender rush-pea and South Texas ambrosia are known to occur within US 77 ROW. The District is aware of the location of these endangered populations and has implemented a designated no-spray area in these locations. Therefore, it is unlikely that these species would be indirectly impacted by the use of herbicides and does not require further study.

- In terms of socioeconomic effects, the proposed relief routes in Driscoll and Riviera have the potential to divert some traffic from local businesses. Cars and trucks traveling on US 77 may utilize the relief routes to bypass speed zones and to decrease the commute time between cities and towns along the proposed project corridor. The potential indirect impact to local businesses may be a decrease in commuters patronizing restaurants and gas stations/convenient stores, leading to a potential loss in revenue. However, it is anticipated that most commuters will continue to utilize the existing US 77 facility for the

following reasons: in Driscoll, to save time residents who commute to Corpus Christi often travel on FM 665 rather than drive north to IH 37. In addition, convenient store/gas stations (i.e., Stripes) serve as the only grocery stores for local residents and are readily patronized by the community (i.e., during school traffic). In Riviera, restaurants and gas stations are the first and last places to rest between Riviera and Raymondville, which is approximately an hour to the south. Northbound trucks may utilize the parking area at the Stripes gas station, other gas stations, motels, and various restaurants to stop and prepare compliance paperwork and pre-inspection of their vehicles and equipment before heading north to the planned truck weigh station just north of Riviera. As discussed in Section 3.2.2, businesses along the existing US 77 would still be directly on route for traffic traveling between SH 285 and US 77 if the Riviera east relief route were built. For these reasons, it is not anticipated that the proposed relief routes (Build Alternative) would result in potentially substantial indirect impacts to businesses on the existing US 77. Therefore, no further study is merited.

- The AOI is located in Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties, which are in attainment for all NAAQS. Nueces County is part of the Corpus Christi Ozone Flex Plan area. Based on the results of Steps 1 through 4 that evaluated the possible project-related actions that can indirectly impact air, it was determined that the proposed US 77 Upgrade Project would not be anticipated to cause indirect air quality impacts in the AOI. No change in attainment status is anticipated within the AOI as the result of emissions associated with the proposed project. Indirect air quality impacts from MSATs are unquantifiable due to existing limitations to determine pollutant emissions, dispersion, and impacts to human health. Emissions would likely be lower than present levels in future years as a result of the EPA's national control regulations (i.e., new light-duty and heavy duty on road fuel and vehicle rules, the use of low sulfur diesel fuel). Even with an increase in VMT and possible temporary emission increases related to construction activities, the EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions of on road emissions, MSATs, and the ozone precursors volatile organic compounds (VOC) and nitrous oxide (Nox). As the US 77 Upgrade Project is not anticipated to result in indirect air quality impacts, further discussion in Steps 6-7 is not necessary.

<u>Induced Growth Effects</u>

The Build Alternative, as with most transportation projects, may have the potential to induce development or increase the rate of planned development in select locations along the proposed project corridor. These locations would include communities where there is available land and the economic conditions to foster development (and redevelopment) in the foreseeable future. However, based on questionnaires and interviews with local officials and business leaders it has been determined that communities along the proposed project corridor do not foresee a substantial potential for induced development or an increase in the rate of planned development to occur as a result of the Build Alternative. Nonetheless, it is necessary to explore the process of assessing potential induced growth effects within the AOI. Each community has a certain character and leadership regime that may desire to develop certain areas within their jurisdictions, but certain constraints (i.e., economic) dictate what may or may not be possible or probable within a set timeframe. Therefore, a more detailed analysis of induced growth effects will be discussed in Step 6.

Effects Related to Induced Growth
The potential for substantial induced growth effects have been determined to be minimal. Therefore, it is unlikely that the potential for effects related to induced growth would be substantial. Further discussion of potential induced growth effects in Step 6 was used as a baseline to determine potential effects related to induced growth.

5.6 STEP 6 – ANALYZE INDIRECT EFFECTS AND EVALUATE THE RESULTS

In order to more accurately assess induced growth effects, as it relates to the Build Alternative, the project study team conducted interviews with local officials and other persons in the US 77 corridor who are knowledgeable about local land development plans, policies, activities, and trends (see **Table 5.6-1** for a list of interview participants). During the interviews, the project study team explored the demand for new development, local and regional economic conditions, availability of utilities, and local land development regulations and policies. Specifically, the participants were asked how development would occur if US 77 were upgraded (including construction of the proposed Driscoll and Riviera relief routes) compared to how it would occur if US 77 were not upgraded (and the relief routes were not constructed).

Projected growth within the AOI is indicated by both planned development and infrastructure projects. Interviews described above identified a wide range of future development from fast-food restaurants, to a prospective outlet mall, south of Robstown, a new “travel plaza” in Driscoll, a recreational vehicle park near Baffin Bay east of Riviera (outside the AOI) and an Emergency Management Command Center on CR 665 in Driscoll. Potential development was reported by Driscoll officials regarding the purchase of a plot of land along existing US 77 by a developer with the intent of constructing a travel plaza. There is reportedly a new electrical substation planned for the wind farms on the Kenedy Ranch, a proposed water line in Ricardo, and Bishop is constructing a new high school.

In order to ascertain the potential for growth in Robstown, officials with Nueces County and the Corpus Christi area were interviewed. The growth of Robstown has historically been tied to the growth of Corpus Christi. However, in recent years, Robstown has an active economic development board that has been promoting growth independent of Corpus Christi. The City of Corpus Christi is currently planning the Southside Mobility Corridor project, which is envisioned as a fully tolled facility that promises to provide an alternative bridge from South Padre Island to the mainland and provide a connection to US 77. The City of Robstown, which is presently served by three Class I railroads and is located along US 77, is planning to build a multimodal cargo transport facility to support supply chain integration, and international trade. This development was planned independently of the proposed upgrades to US 77. However, there is a potential for the planned developments to be expedited via the perception of improved economic conditions facilitated by the highway improvements and increased mobility offered by the US 77 Upgrade Project. However, based on interviews and current and projected trends in the Robstown area, it is not anticipated that growth (commercial and residential land uses) will be substantial as a result of the proposed project.

According to the interviews with local planners, other commercial properties may desire to relocate to the proposed Driscoll relief route. However, due to the current and forecasted economic conditions, it is unlikely that utilities will be readily available for future residential and/or commercial development within the AOI. The City of Bishop, which currently has an existing relief route adjacent to US 77, has seen some commercial growth along the route subsequent to its construction. However, the population has remained steady and is not

forecasted to grow in the foreseeable future. Although the three main companies of Celanese, Ticona, and BASF that provide employment to Bishop residents continue to thrive, there are no plans for future development as a result of the US 77 Upgrade Project for these companies.

Although Kingsville has recently improved their wastewater utilities and has access to groundwater, substantial induced development and/or redevelopment in Kingsville is unlikely to occur as a result of the proposed project. Since the departure of the Exxon district office in 1985, there has not been a demand for development in the Kingsville area, which depressed the economic conditions and has hindered population growth. Additionally, policies from NAS Kingsville restrict development east of US 77. Development is restricted to the west as the King Ranch borders Kingsville. According to the Kingsville Master Plan, without an economic incentive for future development, any development is unlikely to occur. Public infrastructure for future growth (to 2030 and beyond) "should not be extended to areas of available agricultural land until there is a net fiscal benefit for doing so." If any induced development does occur, the Kingsville Master Plan has a Future Land Use Plan (see **Figure A.5.1-2**) that limits growth to the city limits and to areas where infrastructure is readily available.

In the unincorporated community of Ricardo, it is forecasted that commercial and residential development would stay the same and not increase subsequent to the proposed upgrades to US 77. There are adequate electrical services available. Most residences use septic systems in the absence of available community sewer utilities. Most commercial properties are primarily connected to a STWA waterline from Kingsville. The main focus in Ricardo is to increase safety. Once the upgrades are complete, it is anticipated that safety for school buses may increase with the new access roads and interchanges.

The unincorporated community of Riviera, like Driscoll, lacks the utility infrastructure needed to accommodate development along the proposed relief route. There are no future plans for development. Economic conditions in the foreseeable future would not foster the needed drive for commercial and residential development to take place subsequent to the construction of the proposed relief route. However, if additional development were to take place within the AOI, it would most likely be geared towards the trucking industry (i.e., truck stop). Overall, if any new development occurs, it is not anticipated that it would be substantial.

In the community of Sarita, there are no plans for future development and if development occurs, it will be very slow. Like the community of Ricardo, officials in Sarita are focused on the need of increasing the safety of US 77 for local residents. Any future growth and any resulting potential traffic volume increase would likely be based on coastal area expansion (outside the boundaries of the AOI).

Representatives for the King, Armstrong, and Kenedy Ranches have no desire for development (residential and/or commercial) on their lands. From a land use standpoint, the ranches located in the AOI have not changed substantially in many decades, although there have been notable changes in vegetation management, oil and gas production, and wind farm development within the past 30 years. All of these activities are compatible with ranching. The ranch owners focus is to maintain the current land usage, being ranching operations (cattle and horses) agricultural, oil and gas exploration and production, hunting, wind farm (Kenedy), as well as wildlife sanctuaries. Therefore, it is not anticipated that there would be any induced growth effects on ranchlands due to the proposed project.

The City of Lyford desires to grow economically and upgrade their existing utilities for their residents. Based on interviews with Lyford's mayor, if development occurs in the foreseeable future, it would most likely be to the north of the city on available agricultural lands. However, the development would not be considered to be induced as a result of the US 77 Upgrade Project. Rather, there are preliminary plans to possibly develop residences to the north. Combes, the most southern community in the AOI, is in close proximity to large population centers and is within the 3.5 square mile City of Harlingen's ETJ. The July 2001 Harlingen Future Land Use Plan (see **Figure A.5.1-3**) calls for residential growth to occur to the northeast of Combes and takes into account upgrades to US 77. However, if current trends continue (increase in population and employment), development would most likely occur, regardless of the proposed upgrades to US 77. As such, Combes desires to grow in accordance with the future needs of its residents; especially those that commute to nearby cities where job growth is projected to increase. There are plans for development to occur in the city. However, like Lyford, any future development that occurs is not dependent upon and would not be considered induced by the proposed upgrades to US 77.

Based on interviews with local officials (see **Table 5.6-1** for a complete list) in conjunction with current and projected community goals and trends, and notable features, it is unlikely that the the proposed upgrades to US 77 (as described in **Section 3.2.2)** would result in potentially substantial induced growth effects., For the reasons discussed in previous steps, the US 77 Upgrade Project is not anticipated to result in potentially substantial indirect impacts (encroachment-alteration effects, induced growth effects and effects related to induced growth); therefore, further discussion in Step 7 is not necessary.

SECTION 6.0 - CUMULATIVE IMPACTS

The cumulative impact assessment prepared for the US 77 Upgrade Project was conducted in accordance with CEQ, FHWA, and TxDOT regulations and guidance documents. The CEQ regulations (40 CFR 1508.7) define cumulative impacts as:

> "…the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time."

The analysis considers the magnitude of the cumulative impact on the resource health. Health refers to the general overall condition, stability, or vitality of the resource and the trend of that condition. Therefore, the resource health and trend are key components of the cumulative impacts analysis. Laws, regulations, policies, or other factors that may change or sustain the resource trend will be considered to determine if more or less stress on the resource is likely in the foreseeable future. Opportunities to mitigate adverse cumulative impacts will be described.

The methodology for the analysis of potential cumulative impacts follows the process recommended in the TxDOT *Guidance on Preparing Indirect and Cumulative Impact Analyses* (revised June 2009). TxDOT developed an eight-step approach to evaluate cumulative impacts. These steps include:

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

The TxDOT eight-step process is intended to provide an efficient, consistent, and logical method of evaluating cumulative impacts of a project. The following describes each of the steps used in this cumulative impacts analysis.

6.1 STEP 1: IDENTIFY RESOURCES TO CONSIDER

The first step in conducting a cumulative impacts analysis, according to the current TxDOT guidance, is to identify impacted environmental resources and determine the stability and health of those resources. A review of the direct and indirect effects sections above was undertaken to identify:

1. Resources that are substantially impacted by the proposed project.
2. Resources that are impacted to some degree but are in poor or declining health or are at risk, even if project impacts (either direct or indirect) are relatively small.

As per the current TxDOT guidance, if the proposed project is determined to not have a substantial direct or indirect impact on a resource, it will not contribute to a cumulative impact on the resource. However, impacts may potentially be substantial even if the direct or indirect impact of the proposed action is minimal.

Given these criteria, the resources deemed appropriate to analyze in the cumulative impacts analysis for the US 77 Upgrade Project will include:

- Cumulative changes to land uses in an appropriate study area and timeframe. This study area and timeframe should include an area and timeframe that has data available.
- Potential cumulative impacts to water quality to the drainage areas of the 10 water crossings listed in **Table 4.10-5**. These drainage areas have the potential to influence the northern portion and southernmost extent of the Nueces-Rio Grande Coastal Basin.
- Potential cumulative impacts to the endangered species identified in the project corridor: ocelot, slender rush-pea, and South Texas ambrosia.
- Air quality and factors that influence the health thereof. Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties are currently in attainment for all NAAQS. However, it is necessary to evaluate possible cumulative impacts to air quality in terms of ozone, carbon monoxide and MSATs.

6.2 STEP 2: DEFINE THE STUDY AREA FOR EACH RESOURCE

The cumulative impacts analysis considered both geographic and temporal study limits. A resource study area (RSA) was established for each resource, which is used for characterization of the health condition, trend(s) of the resource and to determine the potential cumulative impacts on a resource when quantitative information is not available.

The RSA for the potential cumulative impacts to land use was determined to include the same area as the AOI for indirect impacts, with the addition of areas surrounding Baffin Bay (see **Figure A.5.1-1**). This determination was based on the presence of political boundaries (i.e. city limits) and boundaries of large private ranches that comprise a substantial portion of the area surrounding the US 77 corridor. The potential cumulative impacts resulting from the proposed project would most likely not extend past these boundaries due to city and/or community growth policies, as well as economic and infrastructure constraints (i.e. utility expansion). The RSA for potential cumulative impacts to water quality was determined to be the northern portion of the Nueces-Rio Grande Coastal Basin from northern Kenedy County to Nueces County and a small portion of the Arroyo Colorado watershed in Cameron County. All of the streams in the proposed project location and surrounding study area drain into Nueces-Rio Grande Coastal Basin. The RSA for potential cumulative impacts to endangered species (ocelot, slender rush-pea and South Texas ambrosia) include Nueces, Kleberg, Kenedy, Willacy and Cameron Counties. These counties are where these species are known to inhabit. The RSAs for Water Quality, Endangered Species, and Air Quality are shown in **Figure A.6.2-1**.

The RSA for cumulative impacts to air quality requires evaluating air quality in relation to cumulative impacts looking at three distinct RSAs, as described below:

- **Ozone** – The RSA for evaluating the ozone NAAQS was designated as Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties, which are designated by EPA as attainment of all NAAQS. The NAAQS criteria pollutants include ozone, CO, PM, nitrogen dioxide, sulfur dioxide, and lead.

- **CO** – The RSA for CO was based on the ROW line, which represents the locations with the highest potential for CO concentrations.
- **MSATs** – Unlike the other resources evaluated, air quality impacts from MSATs have been evaluated qualitatively in this proposed project by TxDOT and FHWA. MSATs are regulated by EPA on a national basis through requirements for fuels and vehicle technology. The MSAT RSA qualitatively evaluated emission changes based upon the proposed project.

The air quality model area was derived from the 2030 No Build Alternative compared to the 2030 Build Alternative to determine which roadway links in the model achieved a ± five percent volume change. These links were then compared to the 2009 model in order to extrapolate a baseline traffic network. The application was adopted as the basis to determine the model area RSA located within the Corpus Christi and the HSBMPO.

For all resources analyzed, the temporal resource study area boundary was set at a horizon date of 2030, which is consistent with other Texas regional transportation and planning organizations study timeframes and traffic studies. The historical date of the temporal boundary was set around 1980. This date was chosen because this was a time period when population and economic conditions in the study region were relatively stable and growing.

6.3 STEP 3: DESCRIBE THE CURRENT HEALTH AND HISTORICAL CONTEXT FOR EACH RESOURCE

As background, the five counties through which the proposed US 77 Upgrade Project traverses are steeped in early Texas history and continue to be important to the Gulf Coast. The Coastal Prairie and Rio Grande Plain regions are known for agribusiness, ranching (including the 825,000-acre King Ranch, although the King Ranch NHL designation is over 1.2 million acres) and oil and gas production. Nueces County, where the proposed project begins, was an important livestock and military hub during the mid and late 1800s. Subsequent to the 1930s, the county became a leading producer of cotton and other cash crops. Today, Corpus Christi, the Nueces County seat, is a major commercial port for the US and is the commercial hub of the county. Kleberg County, where the King Ranch started around 1850, began as a ranching hub, which later shifted to farming and dairy farming. Kingsville, the county seat, and founded by the owners of the King Ranch, was a major petroleum center for the Gulf Coast and is home to the Training Air Wing Two at the NAS Kingsville. Kenedy County, one of the last Texas counties formed, remains an important ranching center for Texas and has changed little since the early to mid twentieth century, being one of the most sparsely populated counties in Texas. The county seat is Sarita, the only founded community within the county. To the south of Kenedy County is Willacy County, whose county seat is Raymondville. Willacy County is another county founded in ranching operations that later turned to crops such as citrus (oranges and grapefruits); today, Raymondville is a major year-round recreation center. Finally, at the terminus of the proposed project and at the southernmost tip of Texas is Cameron County, with the city of Brownsville being the county seat. Cameron County has long been an important center of agriculture and tourism and is a major port of entry for the US and Mexico.

<u>Current Health - Land Use</u>
The proposed project is located along the existing US 77 corridor and traverses the five counties of Nueces, Kleberg, Kenedy, Willacy and Cameron, in addition to numerous communities, which include Robstown, Driscoll, Bishop, Kingsville, Ricardo, Riviera, Sarita, Armstrong, Raymondville, Lyford, Sebastian, and Combes. The Land Use RSA is characterized

as mostly rural, with ranch and agricultural lands comprising a large majority of the study area. The most urban and developed areas within the RSA are contained in the northern (Robstown and Kingsville) and southern extent (Lyford and Combes) of the proposed project location. Current land use is stable in the RSA. Recent trends, extrapolated from land use data analysis (see **Table 5.2-5**), and questionnaires and interviews with local officials and business owners (see **Table 5.6-1**), show minimal change in development intensity or in the location of development. Some residential development has occurred east of Driscoll off of FM 665 and east of Riviera off of FM 771, but it has been minimal. Other developments, such an outlet mall along US 77 in Nueces County and several fast food restaurants, gas stations and a motel have been built within the RSA in the past 10 years. No major development has occurred outside community boundaries, except for wind farm on the Kenedy Ranch in Kenedy County.

Historical Context – Land Use

US 77 was originally constructed during the 1920s and 1930s as a two-lane undivided highway adjacent to the St. Louis, Brownsville, and Mexico railroad (now the UPRR) that traversed the corridor. In the 1950s, TxDOT began adding two lanes to the facility from the Rio Grande Valley north to Corpus Christi converting the facility to a four-lane divided highway. From the 1960s through 2009, TxDOT began converting small sections of US 77 to freeway standards from at-grade intersections to grade-separated overpasses at major cross streets at various locations throughout the corridor. Land uses have changed little since the original construction of US 77. Communities such as Robstown and Kingsville grew from 1960 to the late 1980s due to the relocation of large petroleum businesses (i.e., Exxon) to the area. During this time residential and commercial development increased to accommodate the influx of people employed by industry. Subsequent to the 1980s, development in the RSA has remained slow and retained a mostly rural character, with ranches and agricultural lands comprising over 90 percent of land uses.

Current Health – Water Quality

The RSA for water quality resources is the Nueces-Rio Grande Coastal basin (**Figure A.6.1-1**), comprising three of the 12 counties in the basin. The basin, as a whole, is bordered by the Nueces River Basin and the San-Antonio-Nueces Coastal Basin to the north, bays and estuaries and the Gulf of Mexico to the east, and the Rio Grande basin to the south and southwest. The inland area of the drainage basin is dominated by large ranches. State-operated recreational areas are located primarily along the coast, and within the RSA, irrigated production of fruit and vegetables is a prominent industry. There are 10 stream crossings and one reservoir in the basin. The basin has four stream segments or sub-segments designated as impaired under Section 303(d). There are two streams within the RSA listed as impaired under Section 303(d), Petronila Creek above tidal and the Arroyo Colorado above tidal. In the northern portion of the RSA, Petronila Creek (Crossing 10) above tidal has had elevated chloride, sulfate, and total dissolved solids; however, aquatic life and contact recreation uses are fully supported. Today, the TCEQ, along with University of Texas Bureau of Economic Geology, monitor Petronila Creek and have initiated a recovery program to decrease pollutants in the creek.

In the southernmost portion of the RSA, the Arroyo Colorado above tidal serves primarily as a floodway, an inland waterway, and a recreational area for boating and fishing. The stream has had high levels of bacteria, depressed dissolved oxygen, mercury, and PCBs in edible tissue. In conjunction with the TCEQ, the Arroyo Colorado Watershed Partnership (Texas A&M) have implemented numerous initiatives to improve the water quality of the Arroyo Colorado by working to decrease known primary pollutants (nitrogen, phosphorous, ammonia, sediment,

bacteria, and biochemical oxygen demanding substances) by 10 to 20 percent over the next 15 years.

Historical Context – Water Quality

Historically, and according to Texas State University (Report: From Neglect to Recovery) "The portion of Petronila Creek above tidal influence, Segment 2204, was once a pristine coastal stream, abundant with aquatic life that discharged to an estuary typical of the Central Texas Gulf Coast. Over the last 50 years, the former oil industry practice of discharging highly saline water produced by oil and gas exploration into drainage ditches, pits, and the creek itself has degraded surface water quality and negatively affected aquatic species." In 1969, the Texas Legislature passed the RRC's "no-pit" order, a law prohibiting disposal of brine into open pits. Direct discharges of brine, or produced water, continued until January of 1987, when it, too, was prohibited by the RRC. However, by that time, Petronila Creek had been reduced to a slough.

Originally a distributary channel of the Rio Grande, the Arroyo Colorado above tidal (Segment 2202), has been extensively modified to carry flood water overflows to the Laguna Madre. The stream lies in an extensive agricultural belt, where numerous crops are grown year-round, and where heavy pesticide applications are frequent. Runoff was mostly associated with agricultural land uses until 20-30 years ago, when urbanization and associated population increase began to occur in the region; the population in Cameron County nearly doubled between 1970 and 1990. Perennial flow in the Arroyo Colorado is sustained mainly by municipal discharges, with irrigation return flows and urban runoff supplementing the flow on a seasonal basis. A 1987 intensive priority monitoring of the Arroyo Colorado by the TCEQ concluded that non-point sources, primarily agriculture, contribute the majority of the toxic pollutants to the Arroyo Colorado. In 2002, the TCEQ determined in a Total Maximum Daily Load study that a 90 percent reduction of nutrients and biochemical oxygen demand (BOD) was needed to achieve healthy waters.

Current Health – Endangered Ocelot, Slender Rush-Pea and South Texas Ambrosia

As discussed in **Section 4.7.1.1**, it is estimated that fewer than 100 ocelots remain in Texas. Two breeding populations are known to occur east of US 77 and represent an estimated one-third of the total ocelot population. One population numbering six to 12 ocelots is located on two USFWS conservation easements totaling 2,240 acres on a private ranch in northern Willacy County. This population is located approximately seven miles east of US 77. The second population, numbering 10 to 20 ocelots, occurs in the 45,000-acre LANWR located approximately 20 miles east of US 77 in Cameron County.

According to the TPWD's NDD, the USFWS, and TAMUK several populations of slender rush-pea have been previously recorded in the RSA, including four records within the existing US 77 ROW between the proposed project limits. The endangered plant surveys conducted for this project confirmed the presence of slender rush-pea in four previously recorded locations in the existing ROW, as well as identified a single plant in a fifth location (**Table 4.7-3**). These five areas are located in a 1.4 mile stretch of roadway located just south of the Nueces/Kleberg County line (**Figures A.4.5-18, A.4.7-1** and **A.4.7-2**). Within all five areas, slender rush-pea plants are growing within the existing maintained ROW in areas generally dominated by King Ranch bluestem, Angleton bluestem, and Bermuda grass.

According to the TPWD's NDD, the USFWS, and TAMUK several populations of South Texas ambrosia have been previously recorded in the RSA, including two records within the existing US 77 ROW between the proposed project limits. The endangered plant surveys conducted for

this project confirmed the presence of South Texas ambrosia in two previously recorded locations in the existing ROW, as well as identified a third population in the existing ROW (**Table 4.7-4**). These three areas are located in a 2.1 mile stretch of roadway from Carreta Creek southward to near San Fernando Creek (southern Nueces County and northern Kleberg County), in the same vicinity as the slender rush-pea populations (**Figures A.4.5-18, A.4.7-1** and **A.4.7-2**). Within all three areas, South Texas ambrosia plants are growing within the existing maintained ROW in areas generally dominated by King Ranch bluestem, Angleton bluestem, and Bermuda grass.

Historical Context - Endangered Ocelot, Slender Rush-Pea and South Texas Ambrosia

The ocelot has been designated an endangered species since 1972. The species once ranged through South, Central, and East Texas and into Louisiana and Arkansas, and in Mexico from the foothills of the Sierra Madre Oriental in Coahuila through Nuevo Leon and Tamaulipas to the Gulf Coast. In terms of habitat, over 95 percent of the thornscrub in the Tamaulipan Biotic Province, the area straddling the Texas/Mexico, border has been removed. The major cause for decline in the ocelot population in South Texas is large-scale brush clearing that allowed for conversion to row cropland in the 1930s. In 1999, Congress approved a plan for the acquisition of enough land to more than double the size of the LANWR by buying and acquiring easements on more than a hundred acres of farmland over the next 20 years, restoring it to its natural state. Recently, Yturria Ranch set aside 1,300 acres for the ocelot via a conservation easement with The Nature Conservancy, in addition to the 940 acres that were dedicated several years ago.
http://www.all-creatures.org/articles/ar-southtexas.html - January 2010.
http://www.statesman.com/news/texas/rancher-sets-aside-1-300-acres-for-ocelot-153636.html - January 2010.

Slender rush-pea was listed as endangered on November 1, 1985. Historically, this species is known only from Nueces and Kleberg Counties, Texas. Its tiny blooms are produced between early March and June, and sporadically thereafter depending on rainfall. It sometimes occurs in association with another endangered species, South Texas ambrosia. The use of herbicides for ROW maintenance poses a potential threat to this species. Conversion of native habitats to other land uses is likely the most important factor contributing to the decline of slender rush-pea. Today, this plant occurs in four populations in Nueces and Kleberg Counties. One large population, discovered in 1985, consists of about 10,000 plants in a rural cemetery in southern Nueces County, just south of Bishop.

South Texas ambrosia was listed as an endangered species in 1976. Historically, South Texas ambrosia was known from Cameron, Jim Wells, Kleberg, and Nueces Counties in South Texas, and the State of Tamaulipas in Mexico. Today, the species occurs at six locations in Nueces and Kleberg Counties. According to Texas A&M, one of the main factors involved in South Texas ambrosia becoming endangered is habitat destruction. Its native habitats have continuously been converted to agricultural fields, improved pastures, or urban areas. These areas have also been cleared for urban water development, industrial development, and flood control. Remaining populations along roads have also suffered from blading, plowing, and seeding with other more exotic plants. Another factor affecting South Texas ambrosia is lowered genetic variability. Its populations are clonal, and their reduced numbers have caused them to be more vulnerable to the detrimental effects of lowered genetic diversity.

Current Health – Air Quality

The EPA establishes limits on atmospheric pollutant concentrations through enactment of the NAAQS for six principal, or criteria, pollutants. The RSA is located within the Counties of

Nueces, Kleberg, Kenedy, Willacy, and Cameron which are designated areas in attainment of all NAAQS. However, the Corpus Christi area is near nonattainment for ozone. Potential emission increases due to growth in traffic and industrial activity have been reduced by improved emission control technologies and a regional commitment to reduce overall emissions by the government, community, and industry. Nonetheless, continued improvement in air quality is required by both federal statute and state regulation.

The EPA and TCEQ are mandated to ensure that such growth would not prevent compliance with the ozone standard or threaten the maintenance of other air quality standards. If the TCEQ and EPA determine that an air quality standard is being exceeded, the agencies are responsible for implementing regulations and control strategies that would facilitate attainment of the standard. For example, the TCEQ is required by the CAA to develop a plan that shows how the ozone ambient air quality standard would be met by the attainment year while accommodating foreseeable growth.

Although no NAAQS for MSAT exist, EPA has certain responsibilities regarding the health effects of MSATs. The EPA controls emissions of air pollutants through one of two major strategies: NAAQS or regulatory controls that result in specific emissions reductions. Both strategies provide for increased protection of human health and the environment. For MSATs, to more quickly implement emission reductions, the EPA has focused on efforts on nationwide regulatory controls.

Historical Context – Air Quality

The only area within the RSA that has historically (in 1995) approached violating attainment of federal national ambient air quality standards is Corpus Christi. Local groups such as the Pollution Prevention Partnership and the TAMUK are spearheading outreach and educational efforts to maintain Corpus Christi's attainment status. The TCEQ, EPA, and local authorities signed the Ozone Flex (or O3 Flex) Plan on September 18, 2002. O3 Flex is a voluntary local approach that encourages emission reductions to keep an area in attainment of the one-hour ozone standard, while providing the health benefits envisioned under the eight-hour ozone standard.

On March 29, 2001, the EPA issued a Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources, 66 *Federal Register* 17229. This rule was issued under the authority in Section 202 of the CAA. 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 VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadine, acrolein, and acetaldehyde between 57 percent and 65 percent, and will reduce on-highway diesel particulate matter and diesel organic gas emissions by 87 percent.

On February 26, 2007, the EPA finalized additional rules under the authority of CAA Section 202(1) to further reduce MSAT emissions. The EPA issued Final Rules on Control of Hazardous Air Pollutants from Mobile Sources (72 *Federal Register* 8427) under Title 40 CFR Parts 59, 80, 85, and 86. EPA adopted the following new requirement to substantially lower emissions of benzene and other MSATs by 1) lowering the benzene content in gasoline, 2) reducing non-methane hydrocarbon exhaust emissions from passenger vehicles operated at

cold temperatures (under 75 degrees), and 3) reducing evaporative emissions that permeate through portable fuel containers.

6.4 STEP 4: IDENTIFY THE DIRECT AND INDIRECT IMPACTS OF THE PROJECT

This section will identify direct and indirect impacts that may contribute to potential cumulative effects for the designated resources in each resource study area. The factors that have been identified as having a reasonable possibility of causing direct or indirect impacts and which may contribute to cumulative effects includes:

Direct Impacts: Approximately 689.74 acres (440.43 acres in Nueces County and 249.31 acres in Kleberg County) of existing land use will be converted to ROW and transportation uses and the proposed project would increase impervious cover by adding two relief routes around Driscoll and Riviera and northbound main lanes and access roads (discussed in detail in **Section 3.2.2**). In addition, the proposed project would increase the width of pavement in areas within Kenedy County and northern Willacy County where ocelots would most likely cross US 77.

Direct impacts on air quality and MSATs from the project are primarily those associated with the increased traffic, accessibility, and the resulting projected increases in VMT. Emission reductions as a result of EPA's new fuel and vehicle standards would offset impacts associated with these increases.

Indirect Impacts: As stated in Step 5 of the indirect impact analysis, the proposed project would increase impervious cover, which would increase in impermeable surfaces (i.e., construction of main lanes within existing and proposed ROW) and may indirectly lead to non-point source pollution (i.e., vehicle residues) due to runoff during rain events and flooding. The proposed project would introduce new pavement in existing ROW and in areas where there is proposed ROW to the east of the existing US 77 facility. In some instances, the introduction of new pavement would widen the distance that ocelots would have to travel to cross the roadway. However, the pavement that would be added near existing ocelot populations is associated would receive low volume of primarily ranch-related traffic. As with most transportation projects, the Build Alternative may have the potential to induce development or increase the rate of planned development in select locations along the proposed project corridor. These locations would include communities where there is available land and the economic conditions to foster development (and redevelopment) in the foreseeable future.

Indirect impacts on air quality and MSATs are primarily related to any potential development resulting from the project. Any increased air pollutant or MSAT emissions resulting from the potential development of the AOI must meet regulatory emissions limits established by the TCEQ and EPA as well as obtain appropriate authorization from the TCEQ and therefore are not expected to result in any degradation of air quality or MSAT levels.

All described indirect impacts were analyzed and were determined to not be potentially substantial as a result of the Build Alternative.

6.5 STEP 5: IDENTIFY OTHER REASONABLY FORESEEABLE FUTURE ACTIONS

Other reasonably foreseeable actions include additional transportation projects within Nueces, Kleberg, Kenedy, Willacy, and Cameron Counties through TxDOT's Corpus Christi and Pharr

Districts and each county's roadway projects lists (**Table 6.1-1**). Database searches (internet) and discussion with community and county officials identified two major and foreseeable non-transportation projects within the area and include an outlet mall located along US 77 near the Richard M. Borchard Fair Grounds in Robstown (located within the Air Quality RSA) and a travel plaza to be built north of CR 18 in Driscoll (located within the Land Use RSA). Increases in development and urbanization have the potential to result in increased air pollutant or MSAT emissions and must meet regulatory emissions limits established by the TCEQ and EPA, as well as obtain appropriate authorization from the TCEQ. Therefore, it is not anticipated that these proposed non-transportation developments would result in any degradation of air quality or MSAT levels. Reasonably foreseeable future actions that could impact air quality within the RSA include the following transportation projects:

Table 6.1-1 Proposed Transportation Projects

Roadway	From Location	To Location	Project Description	Project Sponsor
US 77	FM 892	SH 44	Construct New Roadway Lanes (correct curve in Robstown)	TxDOT-CRP
US 77	FM 425	SH 141	Construct New Roadway Lanes and Overpass	TxDOT-CRP
IH 37	Carbon Plant Rd	McKinzie Rd.	Construct Access Roads	TxDOT-CRP
SH 44	0.19 mile E. of FM 1694	0.16 mile W. of CR 67	Construct New Road	TxDOT-CRP
SH 44	0.93 mile E. of FM 3386	0.19 mile E. of FM 1694	Construct Overpass/Underpass	TxDOT-CRP
FM 43	SH 286	Oso Creek Bridge	Construct New Roadway Lanes	TxDOT-CRP
SH 357	FM 665	Cuernavaca Street	Widen Roadway	TxDOT-CRP
SH 44	SH 44	US 77	Construct New Roadway Lanes	TxDOT-CRP
SH 358	Nile Drive	Staples Street	Construct New Roadway Lanes	TxDOT-CRP
SH 358	Airline Road	Everhart Road	Construct New Roadway Lanes	TxDOT-CRP
SH 358	Staples Street	Ayers Street	Construct New Roadway Lanes	TxDOT-CRP
SH 286	SH 358	SH 357	Construct New Roadway Lanes	TxDOT-CRP
SH 286	SH 357	1.0 mile S. of FM 43	Construct New Roadway Lanes	TxDOT-CRP
SH 2444	SH 286	Oso Creek	Construct New Roadway Lanes	TxDOT-CRP
SH 361	Ave. G in Port Aransas	Beach Access 1	Construct New Roadway Lanes	TxDOT-CRP
FM 3088	1.1 mile N. of FM 666	FM 666	Widen Roadway	TxDOT-CRP
FM 3088	FM 70	1.026 mile S. of FM 70	Widen Roadway	TxDOT-CRP
FM 3388	End FM 3386	Haven Drive	Construct New Roadway Lanes	TxDOT-CRP
FM 732	FM 732	US 77/83 Expwy	Construct New Road	TxDOT-PHR
FM 732	US 77/83	Business 77	Construct New Road	TxDOT-PHR
FM 1479	US/83	Thieme Road	Widen Roadway	TxDOT-PHR
FM 803	US 77/83	SH 100	Construct New Road	TxDOT-PHR
SH 550	0.70 mile N of FM 3248	Old Port Isabel Road	Construct New Tollroad	TxDOT-PHR
SH 550	Old Port Isabel Road	SH 48	Construct New Tollroad	TxDOT-PHR
CR	Dixieland Road	FM 1479	Construct New Road	TxDOT-PHR
CS	Morrison Road	FM 1847	Construct New Road	TxDOT-PHR
CS	Primera Road	US 77	Widen Roadway	TxDOT-PHR
CR	SH 550/SH 48	0.6 mile SE of SH 48	Construct New Road	TxDOT-PHR
CS	Stuart Pl. Road	0.07 mile S of US 83	Widen Roadway	TxDOT-PHR
US 281	FM 1421	0.4 mile W of FM 1577	Widen Roadway	TxDOT-PHR
US 281	FM 3248	FM 1421	Widen Roadway	TxDOT-PHR
US 77	0.87 miles south of La Parra Avenue	0.71 miles north of La Parra Avenue	Construct overpass in Sarita	TxDOT-PHR
US 77	FM 1018	0.3 miles north of FM 498	Construct New Road	TxDOT-PHR
US 77	0.03 miles north of FM 498	FM 3168	Construct New Road	TxDOT-PHR
US 77	SH 107/FM 508 Interchange	3.7 miles north of SH 107/FM 508	Conversion of 2-way frontage road to 1-way frontage road	TxDOT-PHR
US 77	3.7 miles north of SH 107/FM 508 Interchange	Cameron/Willacy county line	Conversion of 2-way frontage road to 1-way frontage road	TxDOT-PHR

Source: Texas Department of Transportation, November 2010

6.6 STEP 6: ASSESS POTENTIAL CUMULATIVE IMPACTS TO EACH RESOURCE

Taking into consideration the RSA, the current health and historical context of the resource, the direct and indirect impacts of the proposed project and other reasonably foreseeable future actions, it has been determined that the proposed upgrading to US 77 would not have a substantial cumulative impact to current and future land uses. The RSA has remained mostly rural with a large majority (over 90 percent) of land uses remaining ranching (i.e. livestock) and agricultural (i.e. cotton and citrus). Past trends (land uses and employment) in the RSA show a relatively slow-growing area with some residential and commercial development in the cities of Robstown and Kingsville in the northern RSA and in the cities of Lyford, Sebastian, and Combes in the southern extent of the RSA.

Currently and based on interviews with community officials, residents and business owners, no major development projects are planned in the RSA other than an outlet mall located along US 77 near the Richard M. Borchard Fair Grounds in Robstown and a travel plaza to be built north of CR 18 in Driscoll. Additionally, economic conditions necessary for future growth and expansion have not been favorable. For instance, the proposed Driscoll and Riviera relief routes would provide new access to undeveloped land. However, a lack of utilities within the area may slow expansion of prospective new developments. This is assuming that economic conditions do not substantially improve for these two areas through the horizon year of 2030. As the majority of the RSA is not within boundaries of an MPO, it is difficult to predict land use changes past the year 2030, as needed data is either missing or is not available. The assumptions above are based mainly on local official and business owner input, which provided the best available data.

Potential cumulative impacts to water quality may include an increase in pollutant loading into the existing receiving waters associated with increased runoff from additional impervious surfaces. The potential impact may be compounded over time by pollutant residues generated by vehicles using the proposed relief routes and additional main lanes/access roads and increased sedimentation transport to water bodies during construction of residential and/or commercial property in the RSA. However, as previously mentioned, it is unlikely substantial development would occur in the RSA.

As stated in **Section 4.10.3.2**, BMPs would be employed during construction to minimize the adverse impacts of erosion and sedimentation on surface water resources. Once the project is completed, rainfall runoff rates may increase slightly due to the increase in impervious cover. This runoff from the completed facility could contain pollutants that have long-term effects on the quality of surface water.

Potential cumulative impacts to water quality would likely be contained in the northern portion of the Nueces-Rio Grande Coastal Basin, where the 10 water crossings are and in areas with new pavement; specifically, where the Driscoll relief route would be constructed. The Driscoll relief route would traverse Petronila Creek (above tidal), which is listed as impaired under Section 303(d). Although, it is was determined that induced development would not be substantial in the area surrounding both proposed relief routes, impacts to Petronila Creek may occur with increases in impervious cover from development, over time. As such, it is likely the potential indirect and cumulative impacts to streams are an overestimate, as the quantifications are based on a total impact of the resources within the RSA. However, existing regulations (e.g., Section 404 and 401 of the CWA) govern impacts to streams and would likely minimize impacts.

The potential cumulative impact is not anticipated to affect the resource trend and, therefore, is not considered to be substantial.

The potential for substantial cumulative impacts to occur for the ocelot is minimal given that the RSA for the endangered ocelot would most likely not see any changes in terms of land use or wildlife sanctuary status due to this project, and the health of the RSA has remained stable. However, there is a potential for a minimal cumulative impact, which may be in the form of a decrease in breeding males as they search for mates and breeding grounds in new territory. This potential would be directly related to an increase in pavement width and indirectly related to vehicles colliding with roaming males. This assumption is based on previous data for mortality via collisions with vehicles, as well as population numbers and available habitat.

Based on records from the USFWS, TPWD, NDD, and TAMUK, both the slender rush-pea and South Texas ambrosia populations have remained stable and currently exist in proposed project existing ROW. Although both species' habitat has historically been degraded, it is not anticipated that the proposed project would further destroy habitat, as the design features are such that current populations in the ROW would remain intact. In addition, though herbicide use has posed a danger in the past to both plant species, TxDOT's Corpus Christi District is aware of these endangered populations and has implemented a designated no-spray area where these populations occur. Therefore, it is not likely that substantial cumulative impacts to the slender rush-pea and South Texas ambrosia would occur as a result of the proposed project or other reasonably foreseeable future transportation and non-transportation projects.

As discussed in **Section 4.11.2**, MSATs for the entire air RSA are expected to decrease due to improved vehicle technology, changes in fuel (gasoline and diesel), and other regulatory controls of air toxics that are currently in place or will be phased in to reduce MSATs in the future.

Any increased air pollutant or MSAT emissions resulting from increased capacity, accessibility, and development are projected to be more than offset by emissions reductions from EPA's new fuel and vehicle standards or addressed by EPA's and TCEQ's regulatory emissions limits programs. Projected traffic volumes are expected to result in minimal or no impacts on air quality; improved mobility and circulation may benefit air quality. Increases in urbanization would likely have a negative impact on air quality. However, planned transportation improvements in the project area as listed in the 2035 MTPs and 2011-2014 TIP of the Corpus Christi MPO and the HSBMPO and the FY 2011-2014 STIP are anticipated to have a cumulatively beneficial impact on air quality.

6.7 STEP 7: REPORT THE RESULTS

Taking into consideration the direct and indirect effects, when added to past, present, and future actions, the potential for the proposed project to contribute to substantial cumulative impacts to land use, water quality, the ocelot, slender rush-pea, and South Texas ambrosia, and air quality is minimal.

In terms of potential cumulative impacts to land uses, the RSA has remained relatively stable with slow growth trends. There have not been any major developments (residential or commercial) within the RSA in the past 10 years, and there are no specific plans for major development in the future. Therefore, based on the current health and historical context of the resource, the direct and indirect impacts of the proposed project and other reasonably

foreseeable future actions, as well as interviews of local officials and business owners, it has been determined that the proposed upgrading to US 77 would not have a substantial cumulative impact to current and future land uses.

Cumulative impacts to water quality may occur due to an increase in impervious cover both from the proposed relief routes and new main lanes and access roads. Potential impacts to water quality would likely be contained in the northern portion of the Nueces-Rio Grande Coastal Basin, specifically, where the Driscoll relief route would be constructed. If cumulative impacts occur, it may be in the form of an increase in pollutant loading into the existing receiving waters (Petronila Creek, above tidal) associated with increased runoff from additional impervious surfaces. Based on interviews with local officials and business owners, it is unlikely economic conditions would permit major utility expansion in this area. Therefore, it is not anticipated that additional impervious cover would occur in the foreseeable future. This, in turn, would minimize the likelihood of substantial cumulative impacts.

With a direct impact of an increase in pavement width (within existing ROW) and a potential indirect impact of a possible increase in mortality rate due to collisions with automobiles, there is a potential for these impacts, although not substantial, to compound over time and cumulatively affect the endangered ocelot. This potential impact may be in the form of a decrease in breeding males as they search for mates and breeding grounds in new territory. However, this potential cumulative impact would most likely not be substantial. The USFWS and TPWD have determined that known ocelot breeding populations (an estimated one-third of the total population) occur between seven and 20 miles to the east of US 77. As discussed in **Section 4.7.1.1**, a habitat assessment conducted for the proposed project identified that, besides a few small, scattered and isolated patches, there are no areas of optimal or suboptimal ocelot habitat along US 77, and there are no obvious corridors that ocelots would use to cross US 77. Although there are no clear, heavily vegetated corridors along the US 77 area, there are corridors that are characterized as disjointed connections of moderately dense brush that may provide a potential dispersal route west towards areas of dense brush located several miles west of US 77. The USFWS has plans to provide a continuous habitat corridor between habitats east and west of US 77. As part of the US 77 Upgrade Project, TxDOT is working with the USFWS to provide three bridge structures for the ocelots to pass under US 77 within the construction limits, including one structure near the Yturria population in Willacy County and two structures near Rudolph and Norias in Kenedy County. The existing East Main Drain is located approximately 5.5 miles south of the Kenedy/Willacy County line and currently provides a potential corridor.

The cumulative impact on air quality from the proposed project and other reasonably foreseeable transportation projects are addressed at the regional level by analyzing the air quality impacts of transportation projects in the 2035 MTP and 2011-2014 TIP of the Corpus Christi MPO and the HSBMPO, and FY 2011-2014 STIP. The proposed project and the other reasonably foreseeable transportation projects were included in the 2035 MTP and 2011-2014 TIP of the Corpus Christi MPO and the HSBMPO and FY 2011-2014 STIP. Planned transportation improvements are intended to cumulatively reduce congestion on a regional scale, with a resultant decrease in pollutant emissions. Therefore, when combined, the proposed transportation improvements in the project area are anticipated to have a cumulatively beneficial impact on air quality.

6.8 STEP 8: ASSESS THE NEED FOR MITIGATION

Even though it was determined no potentially substantial adverse cumulative impacts would occur as a result of the proposed upgrade to US 77, it may be necessary to consider ways to provide additional mitigation to further offset any unforeseen cumulative effects to certain resources: specifically, water quality, the ocelot and air quality.

In addition to project-specific mitigation measures, there are existing programs that would help to reduce the potential cumulative impacts of the proposed project and other future projects on water quality in the Nueces-Rio Grande Coastal Basin. For instance, the Texas Clean Rivers Act, as enacted with Senate Bill 818 by the 72nd Texas Legislature in 1991, requires the TCEQ to ensure the performance of regional assessments of water quality on a watershed basis through the Clean Rivers Program (CRP). The CRP is a statewide program to collect and assess water quality data throughout the river basins. The CRP program addresses both basin and state monitoring objectives through collaboration and coordination with the TCEQ State Water Quality Monitoring (SWQM) program, other governmental agencies, and the private and public sectors. The CRP conducts routine, periodic, and targeted monitoring activity comparable to the SWQM program. The compatibility of monitoring efforts facilitates collaboration between these programs to assess, manage, and disseminate water quality data used in developing basin-specific monitoring plans.

In order to minimize potential cumulative impacts on the ocelot, the clearing of wooded areas in the existing ROW would be minimized. In addition, in order to provide a potential safe crossing of US 77, TxDOT proposes to install three wildlife crossings under the new roadway. One crossing would be located near the Yturria population in Willacy County, and the other two would be located in the Rudolph and Norias areas in southern Kenedy County. These crossings would allow for safe crossing away from vehicles traveling on the facility. Moreover, no work would occur at the East Main Drain canal, which provides another potential travel corridor travel across US 77.

A variety of federal, state, and local regulatory controls as well as local plans and projects have had a beneficial impact on regional air quality. The CAA, as amended, provides the framework for federal, state, tribal, and local rules and regulations to protect air quality. The CAA required the EPA to establish NAAQS for pollutants considered harmful to public health and the environment. In Texas, the TCEQ has the legal authority to implement, maintain, and enforce the NAAQS. The TCEQ establishes the level of quality to be maintained in the state's air and to control the quality of the state's air by preparing and developing a general comprehensive plan. Authorization in the Texas Clean Air Act (TCAA) allows the TCEQ to do the following: collect information and develop an inventory of emissions; conduct research and investigations; prescribe monitoring requirements; institute enforcement; formulate rules to control and reduce emissions; establish air quality control regions; encourage cooperation with citizens' groups and other agencies and political subdivisions of the state as well as with industries and the federal government; and to establish and operate a system of permits for construction or modification of facilities. Local governments having some of the same powers as the TCEQ can make recommendations to the commission concerning any action of the TCEQ that may affect their territorial jurisdiction, and can execute cooperative agreements with the TCEQ or other local governments. In addition, a city or town may enact and enforce ordinances for the control and abatement of air pollution not inconsistent with the provisions of the TCAA or the rules or orders of the TCEQ.

TxDOT's Corpus Christi District maintenance division maintains the area where the slender rush-pea and South Texas Ambrosia are known to occur, has implemented a designated no-spray area in and around US 77 ROW to minimize the potential cumulative impact of herbicide use to the endangered plant species,

The cumulative impact of reasonably foreseeable future transportation projects on air quality within the RSA would be minimized by enforcement of federal and state regulations, including the EPA and TCEQ, which are mandated to ensure that such projects would not prevent compliance with the ozone standard or threaten the maintenance of the other air quality standards.

Conclusion

Based on the relative current health and stability of the affected environmental resources in the study areas, as well as the direct and analyzed potential indirect effects, the proposed project would most likely not contribute to substantial cumulative impacts. Appropriate implementation and compliance with applicable local, state, and federal laws and regulations would likely offset any potential unforeseen cumulative effects of the proposed project.

SECTION 7.0 - COMMENTS AND COORDINATION

This section describes the types of opportunities for public involvement, when and where public meetings were held, how the public was notified of public meetings, the types of public comments submitted, and what communication tools were utilized. The project team worked closely with the Corpus Christi and Pharr Districts, which are the two TxDOT Districts that oversee the counties where this project is located. The Corpus Christi District assisted with Kenedy, Kleberg, and Nueces Counties. The Pharr District assisted with Cameron and Willacy Counties.

Public involvement activities were developed to create opportunities for public officials and the public to learn about the project as it progressed and provide input so that the alternatives reflected the needs of the community to the greatest extent possible. Public input was used in determining the project Need and Purpose, developing options for upgrading the highway, and evaluating the best options for improvements. Public involvement was conducted in three stages:

- Early Public/Agency Outreach
- Development of Preliminary Alignment Options
- Public Hearings for Preferred Alternative

Each stage involved a round of four public officials' briefings followed by a round of five public information meetings. The third stage has not yet occurred, but it will also involve a round of four public officials' briefings followed by a round of five location public hearings. A total of 12 public officials' briefings and 10 public information meetings were conducted during the environmental process in communities along the project corridor. Multiple meetings with individuals were conducted as needed or requested to discuss and evaluate specific impacts and needs. Additionally, the TxDOT Corpus Christi District Engineer and project team were invited to make a presentation and answer community questions at an independent community meeting in Riviera hosted by a County Commissioner. Meetings were also held with representatives of government agencies. Federal and state resource agency coordination began in April 2008.

Information was provided to the public through media releases, legal notices, display advertisements, mailed notices, bulletin notices, electronic messaging signs, informational handouts, a webpage, and a toll-free telephone hotline. The public provided input through comment forms and a court reporter. Comment forms were provided at meetings and available on the webpage. Completed comment forms were either mailed to the public involvement team's office or turned in at the meetings. A court reporter was available at all public information meetings to transcribe verbal comments.

7.1 COMMUNICATION TOOLS

Contact Database

A mailing list originally produced by TxDOT for the I-69 project served as the starting point for the project's contact database. The database was compiled, maintained, and updated to include the most current contact information for federal, state, county, and city elected and public officials; local regulatory agencies; area transportation and planning agencies; business and environmental organizations; civic associations; community leaders; media; stakeholders; and individuals interested in the project. As available through Internet resources or other supplied information, the database included landowners abutting the roadway. Individuals

receiving ROE letters were also added to the database. The contact database was not only a mailing list but also served as a system for tracking public comments, persons who received notices, persons who attended meetings, hotline phone calls, and other information specific to individuals. After each briefing and public meeting, sign-in sheets and completed comment forms were used to update the database with all who attended the meetings and anyone who submitted comments.

Webpage

The Corpus Christi MPO hosted a webpage to post project information. The webpage is located at http://www.corpuschristi-mpo.org/Projects_US77Upgrade.html. The HSBMPO (http://www.myharlingen.us/default.aspx?name=pd.mpo.77upgrade) and the Brownsville MPO (http://planning.cob.us/mpo/index.asp) provided links to the project webpage on their websites. Project information, such as contact information, meeting notices, and media releases, were posted on the webpage and updated as new information became available. Public meeting materials, exhibits, and PowerPoint presentations were made available on the webpage.

Project Telephone Hotline

A toll-free telephone hotline, 1-800-490-9933, or local number, 361-884-2626, was established prior to the first round of public information meetings to field public inquiries about the US 77 Upgrade Project. Calls were answered by a member of the project's public involvement team or directed to a voicemail message system when no one was available to answer. The callers' contact information and questions were recorded in the project database and in contact reports. Callers generally requested information about the public meetings, project status, potential impacts to private property, or the ROW acquisition process. Callers were often mailed a copy of the informational handouts and comment form or directed to the project webpage where additional materials could be downloaded. As necessary, a member of the project team or TxDOT returned calls to provide additional information or answer questions.

Media Releases

Media releases were used as a method to inform the public about the project and upcoming public meetings. TxDOT District Public Information Officers distributed media releases to media outlets prior to each round of public meetings.

Informational Handouts

Informational handouts were produced for each stage of public involvement. The handouts provided information about the proposed improvements for upgrades to US 77, need and purpose for the project, project schedule, contact information, and other project details. A two-page handout was prepared for the first round of briefings/public meetings and was available in English and Spanish versions. A four-page handout was prepared for the second round of briefings/public meetings. Most of the content of this handout was in English and Spanish, but people needing information about the proposed typical sections and impacts of the relief route options were asked to call the project hotline. All informational handouts were available on the project webpage.

7.2 AGENCY COORDINATION

Coordination meetings were held with several agencies: the THC on April 1, 2008, USFWS along with the TPWD on June 25, 2008, Homeland Security and US Border Patrol on September 4, 2008, DPS on September 29, 2008 and USFWS on October 27, 2009, February 25, 2010, June 20, 2011, and January 24, 2012. **Table 7.2-1** describes the agency coordination meetings, the date and topic of discussion.

Table 7.2-1 Agency Coordination

Date	Agency	Topic of Discussion
April 1, 2008	Texas Historical Commission	Briefing/Coordination
June 25, 2008	US Fish and Wildlife Service, Texas Parks and Wildlife Department	Briefing/Coordination
September 4, 2008	Homeland Security, US Border Patrol	Location of Border Patrol Station in Kenedy County
September 29, 2008	Department of Public Safety	Location of Weigh Station in Kleberg County
October 27, 2009	US Fish and Wildlife Service	Threatened and Endangered Species
February 25, 2010	US Fish and Wildlife Service	Ocelot Crossings
June 20, 2011	US Fish and Wildlife Service	Ocelot Crossings
January 24, 2012	US Fish and Wildlife Service	Ocelot Crossings

Source: Jacobs Engineering Group, Inc., January 2010, updated March 2012

Section 106 coordination with the SHPO regarding historic resources began in December 2010 and was completed in April 2011. SHPO coordination for archeological resources where right-of-entry has been obtained and survey has been conducted was completed in August 2010. Tribal consultation with six tribes was coordinated by letters dated January 30, 2008, and September 23, 2010. In areas where right-of-entry has not been obtained and archeological investigations have not been conducted, the proposed undertaking may proceed with further project development, including completion of the environmental process and ROW acquisition, without further SHPO concurrence pursuant to Stipulation IX.B.3 of the PA. After obtaining access to the proposed ROW, TxDOT will complete the archeological inventory on unsurveyed properties and conclude any additional work and SHPO coordination that may be required under the terms of the PA and MOU.

The USFWS has reviewed the results of the habitat assessments and presence/absence surveys conducted for threatened and endangered species listed under the Endangered Species Act and, by letter dated June 5, 2011, stated that the project may adversely affect the ocelot and jaguarundi and recommended formal Section 7 consultation. As a result, FHWA has initiated formal Section 7 consultation with the USFWS, and the USFWS is currently preparing the Biological Opinion for the project. After obtaining access to areas of the proposed ROW where right-of-entry has not been granted, TxDOT will conduct surveys for endangered plant species and will coordinate the discovery of any new individuals or populations with the USFWS as needed.

7.3 EARLY PUBLIC/AGENCY OUTREACH

7.3.1 First Round of Public Officials Briefings

Approximately two weeks prior to the first round of public information meetings, four public officials briefings were held along the project corridor to provide elected and local officials information that would be presented at the public meetings and to seek their input. Approximately 63 people attended the four briefings. The briefings were held between February 19, 2008 and February 21, 2008, in Harlingen, Kingsville, Robstown, and Raymondville. (See **Table 7.3-1** for a list of dates, locations, and attendance counts.)

Table 7.3-1 First Round of Public Officials Briefings and Attendance

DATE	CITY/TOWN	FACILITY	ADDRESS	ATTENDANCE
Feb. 19, 2008	Harlingen	Harlingen Area Chamber of Commerce	311 E. Tyler St.	Approx. 26
Feb. 20, 2008	Kingsville	Greater Kingsville EDC	635 E. King Ave.	Approx. 25
Feb. 20, 2008	Robstown	Richard M. Borchard Regional Fairgrounds	1213 Terry Shamsie Blvd.	8
Feb. 21, 2008	Raymondville	L.E. Franks Tourist Center	501 S. 7th St.	4
			TOTAL ATTENDANCE:	Approx. 63

Source: Jacobs Engineering Group, Inc., January 2010

The briefings were coordinated with and hosted by the following organizations:

- US 77 Coalition and the Harlingen Area Chamber of Commerce (in Harlingen for Cameron County officials)
- Greater Kingsville EDC (in Kingsville for Kenedy and Kleberg County officials)
- Robstown Area Development Commission (in Robstown for Nueces County officials)
- Development Corporation of Raymondville and the Raymondville Chamber of Commerce (in Raymondville for Willacy County officials)

Notification

Invitations were mailed to a total of 336 officials and stakeholders, which included city and county officials, certain state officials, development councils, chambers of commerce, business members of the organizations hosting the meetings, and others. The public involvement team helped with the development of the mailing lists, but ultimately the hosts determined who was invited.

Meeting Format

A TxDOT District Engineer or designated representative was available at each briefing to introduce the project and answer questions. The consultant Project Manager delivered a presentation about the project details. Attendees were provided with an informational handout, comment form, and additional notice of the upcoming first round of public information meetings.

7.3.2 First Round of Public Information Meetings

A round of five public information meetings was held between March 3, 2008 and March 11, 2008, in Raymondville, Kingsville, Riviera, Driscoll, and Sarita. (See **Table 7.3-2** for a list of dates, locations, and attendance counts.) The purpose of these meetings was to introduce the project to the public, identify environmental features to be evaluated, and collect public input. As determined by the signatures on sign-in sheets, 250 members of the public attended, including elected and public officials, property owners, local residents, and media. (This total does not include TxDOT staff or project team members who attended the meetings.) The public was asked to submit formal comments by March 24, 2008.

Table 7.3-2 First Round of Public Information Meetings and Attendance

DATE	CITY/TOWN	FACILITY	ADDRESS	ATTENDANCE
March 3, 2008	Raymondville	L.E. Franks Tourist Center	501 S. 7th St.	43
March 4, 2008	Kingsville	Rodeway Inn	3430 US 77 South	43
March 5, 2008	Riviera	Riviera ISD Cafeteria	203 Seahawk Dr.	84
March 10, 2008	Driscoll	Driscoll ISD Cafeteria	410 W. Ave. D	49
March 11, 2008	Sarita	Sarita Elementary School Cafeteria	300 E. La Parra Ave.	31
			TOTAL ATTENDANCE:	*250*

Source: Jacobs Engineering Group, Inc., January 2010

Notification

Several methods were employed to inform the public about the first round of public information meetings. These methods included the use of mailed notices, legal notices, and display ads in newspapers covering the project area, project webpage, bulletin notices posted in public locations, a media release, and electronic messaging signs. Except for the electronic messaging signs, all forms of notification provided information on all five meetings.

Notices: English/Spanish notices were mailed to approximately 1,275 affected stakeholders, businesses, and elected and public officials. The English/Spanish notice was also distributed at an I-69/TTA Town Hall meeting hosted by TxDOT on February 6, 2008, in Robstown at the Richard M. Borchard Regional Fairgrounds.

Legal Notices: Legal notices in English and Spanish announcing the public meetings were published in the *Corpus Christi Caller-Times, Kingsville Record and Bishop News,* and *The Raymondville Chronicle/News* at least 30 and 10 days prior to the first public meeting of this round.

Display Advertisements: In addition to legal notice publication, display advertisements in English and Spanish were published in the same newspapers as the legal notices with the addition of the *Valley Morning Star* and *El Nuevo Heraldo.* Display ads were published approximately 15 and five days prior to the first public meeting of this round.

Webpage: The meeting notice and media release were posted on the project webpage a few weeks prior to the meetings. Meeting materials including the environmental features aerial maps, project location map, environmental process description, PowerPoint presentation, comment form in English and Spanish, and informational handout in English and Spanish were posted to the webpage after the round of public meetings was completed.

Bulletin Notices: English/Spanish bulletin notices were posted in locations along the project corridor. Bulletin notices were posted at Riviera ISD schools, a restaurant in Raymondville, the Willacy County Co-Op, two convenience stores/gas stations in Riviera, and one convenience store between Riviera and Ricardo. Bulletin notices for posting were delivered to the Sarita Elementary School Principal, Kenedy County Court House, Kenedy County Sheriff's office, Kenedy Ranch Museum, Americas Best Value Inn in Riviera, and Taqueria Jalisco restaurant in Bishop. Four bulletin notices were mailed to the superintendent of Ricardo ISD for posting in schools. During the public officials briefings at the end of February 2008, TxDOT staff, elected officials, and others also took bulletin notices to post in their communities.

Media Release: A media release was sent to TxDOT's Corpus Christi and Pharr District Public Information Officers for distribution to the media prior to the public meetings. News stories were published after the public meetings in the *Valley Morning Star* on March 3, 2007, and in *The Raymondville Chronicle/News* on March 12, 2008.

Electronic Messaging Signs: A few days prior to each meeting, TxDOT placed electronic messaging signs on US 77 or roads near the meeting locations. Signs indicated the meeting location, date, and time.

Meeting Format

All five meetings followed the same format. An open house was conducted from 4-7 p.m. for the public to review exhibits and speak with TxDOT staff or the project team. A presentation was given at 6 p.m. The respective District Engineer for the area or a Pharr or Corpus Christi district representative opened the presentations, welcomed the public, and introduced the project team. The consultant Project Manager then proceeded with a project presentation. The open house resumed after the presentation and continued until 7 p.m. to allow the public to continue to review the exhibits and ask additional questions. Exhibits consisted of aerial maps of the study area, and attendees were asked to identify important environmental features not already indicated on the maps. Other exhibits included the project location map and a description of the environmental process.

A court reporter was available at each meeting to produce a transcript of the presentation portion of the meetings and to record verbal public comments. Attendees were provided with an agenda, a two-page informational handout, and a comment form. The informational handout and comment form were available in English and Spanish.

Eighty comments were formally submitted during the first round of public information meetings. Comments were input into the project's contact database. Comments are listed in the First Round Comment Summary located in the *US 77 First Round Meeting Summary Report* available at the TTA office, Corpus Christi District office, and Pharr District office. Comments generally regarded the following issues:

- Need for project and improvements
- Impacts to personal property
- Community impacts resulting from the relief routes
- Impacts to access
- Impacts to quality of life resulting from the relief routes
- Preferences for relief routes to the east, west, or through Driscoll and Riviera
- Economic impacts to communities
- Drainage
- Safety and mobility
- Environmental features in the study area
- Tolling.

7.4 DEVELOPMENT OF PRELIMINARY ALIGNMENT OPTIONS

7.4.1 Second Round of Public Officials Briefings

Approximately two weeks prior to the second round of public information meetings, four public officials briefings were held along the project corridor to provide elected and local officials information that would be presented at the public meetings and to seek their input. More than 35 people attended the four briefings (not all signed in). The briefings were held between August 19, 2008 and August 20, 2008, in Harlingen, Raymondville, Kingsville, and Robstown. (See **Table 7.4-1** for a list of dates, locations, and attendance counts.)

Table 7.4-1 Second Round of Public Officials Briefings and Attendance

DATE	CITY/TOWN	FACILITY	ADDRESS	ATTENDANCE
Aug. 19, 2008	Harlingen	Harlingen Area Chamber of Commerce	311 E. Tyler St.	13
Aug. 19, 2008	Raymondville	L.E. Franks Tourist Center	501 S. 7th St.	4
Aug. 20, 2008	Kingsville	Greater Kingsville EDC	635 E. King Ave.	Approx. 10
Aug. 20, 2008	Robstown	Richard M. Borchard Regional Fairgrounds	1213 Terry Shamsie Blvd.	8
			TOTAL ATTENDANCE:	Approx. 35

Source: Jacobs Engineering Group, Inc., January 2010

The briefings were coordinated with and hosted by the following organizations:

- US 77 Coalition and the Harlingen Area Chamber of Commerce
  (in Harlingen for Cameron County officials)
- Raymondville Chamber of Commerce (The Development Corporation of Raymondville did not host this briefing for the second round.)
  (in Raymondville for Willacy County officials)
- Greater Kingsville Economic Development Council
  (in Kingsville for Kenedy and Kleberg County officials)
- Robstown Area Development Commission
  (in Robstown for Nueces County officials)

Notification
Invitations were mailed to a total of 350 officials and stakeholders, which included city and county officials, certain state officials, development councils, chambers of commerce, business members of the organizations hosting the meetings, and others. The consultant team helped with development of the mailing lists, but ultimately the hosts determined who was invited.

Meeting Format
A TxDOT District Engineer or designated representative was available at each briefing to introduce the project and answer questions. The consultant project manager gave a presentation about the project details. Attendees were provided with an informational handout, comment form, and additional notice of the upcoming second round of public information meetings.

7.4.2 Second Round of Public Information Meetings

A second round of five public information meetings was conducted between September 2, 2008

and October 21, 2008, in Riviera, Raymondville, Driscoll, Sarita and Ricardo. (See **Table 7.4-2** for a list of dates, locations, and attendance counts.) The choice to hold a meeting in Ricardo instead of Kingsville was made because the locations are near each other and to allow Ricardo residents easier access to this round of meetings. The purpose of these meetings was to present the preliminary options for upgrading US 77 and to collect public input on the options. The upgrading of US 77 to Interstate standards was presented along with four options each for the relief routes in Riviera and Driscoll. The four relief route options were east, west, through elevated, and through at-grade. As determined by the signatures on sign-in sheets, 229 members of the public attended, including elected and public officials, property owners, local residents, and media. (This total does not include TxDOT staff or project team members who attended the meeting.)

Table 7.4-2 Second Round of Public Information Meetings and Attendance

DATE	CITY/TOWN	FACILITY	ADDRESS	ATTENDANCE
Sept. 2, 2008	Riviera	Riviera ISD Cafeteria	203 Seahawk Dr.	71
Sept. 3, 2008	Raymondville	L.E. Franks Tourist Center	501 S. 7th St.	9
Sept. 8, 2008	Driscoll	Driscoll ISD Cafeteria	410 W. Ave. D	53
Sept. 9, 2008	Sarita	Sarita Elementary School Cafeteria	300 E. La Parra Ave.	24
Oct. 21, 2008	Ricardo	Ricardo ISD Cafeteria	3430 US 77 South	72
			TOTAL ATTENDANCE:	229

Source: Jacobs Engineering Group, Inc., January 2010

The public meeting in Ricardo was originally scheduled for September 10, 2008, but due to a hurricane threat to the area (Hurricane Ike), the meeting was rescheduled for October 21, 2008. The public was asked to submit formal comments by October 31, 2008, 10 days after the rescheduled meeting in Ricardo.

Notification

The same methods of informing the public that were employed for the first round of public information meetings were repeated for the second round. Except for the electronic messaging signs, all forms of notification provided information on all five meetings.

Notices: English/Spanish notices were mailed to approximately 1,535 affected stakeholders, businesses, and elected and public officials. Those who provided their mailing information during the first round through sign-in sheets or comment forms, or through any other method, were included in this mailing.

Legal Notices: Legal notices in English and Spanish announcing the public meetings were published in the *Corpus Christi Caller-Times, Kingsville Record and Bishop News,* and *The Raymondville Chronicle/News* at least 30 and 10 days prior to the first public meeting of this round.

Display Advertisements: In addition to legal notice publication, display advertisements in English and Spanish were published in the same newspapers as the legal notices with the addition of the *Valley Morning Star* and *El Nuevo Heraldo.* Display ads were published approximately 15 and five days prior to the first public meeting of this round.

Webpage: The meeting notice and media release were posted on the project webpage a few weeks prior to the meetings. The meeting exhibits, PowerPoint presentation, comment forms in English and Spanish, and informational handout in English and Spanish were posted to the webpage after the round of meetings was completed.

Bulletin Notices: English/Spanish bulletin notices were posted in locations along the project corridor. Bulletin notices were posted at Mecca Restaurant and Willacy County Co-Op in Raymondville; Wright Stop convenience store, Kwik Pantry Food Store, and Dairy Queen restaurant in Riviera; and Taqueria Jalisco restaurant in Bishop. Bulletin notices were delivered to America's Best Value Inn, House of Prayer church, and Riviera Praise & Worship in Riviera. Bulletin notices were provided to attendees at the second round of public officials briefings and mailed to schools in Driscoll, Ricardo, Riviera, and Sarita for posting in their communities.

Media Release: A media release was sent to TxDOT's Corpus Christi and Pharr District Public Information Officers for distribution to the media prior to the public meetings. News stories were published after the public meetings in *The Raymondville Chronicle/News* on September 17, 2008, and the *Valley Morning Star* on October 14, 2008.

Electronic Messaging Signs: A few days prior to the meetings, TxDOT placed electronic messaging signs on US 77 or roads near the meeting locations. Signs indicated the meeting location, date, and time.

Notification of Rescheduled Public Information Meeting on October 21, 2008

Efforts were made to inform the public about the cancellation of the September 10, 2008 meeting in Ricardo due to a hurricane threat to the area. The TxDOT Corpus Christi District distributed a media release, bulletin notices were posted at the site of the meeting, and notice was posted on the project webpage. Notification for the rescheduled October 21, 2008 meeting in Ricardo was generally the same as described above. Notification for the rescheduled meeting, however, did not include publication of legal notices or distribution of bulletin notices. A news story about this public meeting was published in the *Kingsville Journal* on October 28, 2008.

Meeting Format

All meetings followed the same format and the same information was presented at each meeting. An open house was conducted from 4:30-5:30 p.m., during which TxDOT staff and the project team were available to answer questions and collect input as attendees reviewed exhibits. A presentation was given at 5:30 p.m. by a TxDOT representative and the consultant project manager. The respective District Engineer for the area or a Pharr or Corpus Christi district representative or the consultant project manager opened the presentations, welcomed the public, and introduced the project team. The consultant project manager then proceeded with a project presentation. The open house resumed after the presentation and continued until 7 p.m. to allow the public to ask additional questions of TxDOT staff and the project team and continue to review exhibits. Exhibits consisted of aerial photographs with the preliminary alignment options shown, schematics of various segments, a project location map, a description of the environmental process, a decision matrix for the relief route options, typical sections, and Conceptual Designs of relief route options.

A court reporter was available at each meeting to produce a transcript of the presentation portion of the meetings and to record verbal public comments. Attendees were provided with an agenda, a four-page informational handout, and a comment form. Comment forms and sections

of the informational handouts were provided in English and Spanish.

Forty-one comments were formally submitted during the second round of public information meetings. Comments were input into the project's contact database. Comments are listed in the Second Round Comment Summary located in located in the *US 77 Second Round Meeting Summary Report* available at the TTA office, Corpus Christi District office and Pharr District office. Comments generally regarded the following issues throughout all five location meetings:

- Need for project and improvements
- Impacts to personal property
- Economic impacts to communities
- Preferences for relief routes to the east, west, or through Driscoll and Riviera
- Impacts to access
- Safety and mobility
- Community impacts resulting from the relief routes
- Drainage
- Tolling
- Loss of tax revenue
- Impacts to environmental features

Revisions to the design resulting from the comments made are included in **Section 3.2**.

7.5 PUBLIC HEARINGS FOR PREFERRED ALTERNATIVE

7.5.1 Public Officals and Stakeholder Workshops

Following the publication of the Environmental Assessment for public review, TxDOT was invited to provide project briefings to area elected officials and project stakeholders. The workshops were coordinated with and hosted by the following organizations:

- US 77 Coalition and the Harlingen Area Chamber of Commerce
  (in Harlingen for Willacy and Cameron County officials)
- Greater Kingsville Economic Development Council
  (in Kingsville for Kenedy and Kleberg County officials)
- Port of Corpus Christi
  (in Corpus Christi for Nueces County officials)

Table 7.5-1 provides an overview of the date, location and attendance at these workshops.

Table 7.5-1 Public Official and Stakeholder Workshops Attendance

DATE	CITY/TOWN	FACILITY	ADDRESS	ATTENDANCE
Feb.1, 2012	Harlingen	Harlingen Area Chamber of Commerce	311 E. Tyler St.	16
Feb.2, 2012	Kingsville	Greater Kingsville EDC	635 E. King Ave.	7
Feb.2, 2012	Corpus Christi MPO	Port of Corpus Christi	.1374 Sandpiper Dr. Corpus Christi	18
			TOTAL ATTENDANCE:	41

Source: Jacobs Engineering Group, Inc., April, 2012

Notification
Letter invitations to the workshops were mailed to approximately 366 public officials and stakeholders, which included city and county officials, economic development councils, chambers of commerce, and others. The invitations also included a flyer about the upcoming Public Hearings.

Meeting Format
A TxDOT representative was available at each briefing to introduce the project and answer questions, the consulting project manager, gave an overview of the project and the recommended alternative. Attendees were provided an informational sheet with a map entitled "US 77 Development Plan US 83 – IH 37), a comment form, and notice for the upcoming Public Hearings. (The sign-in sheets, invitations, mailing lists, and handouts, are available in the project's technical files.) Extra hearing information flyers were also available for the attendees to take and distribute.

7.5.2 Public Hearings

As part of the Public Hearing process, five public hearings were held in February 2012 regarding the proposed upgrade of US 77 to a controlled access facility that meets interstate standards. The project area extends from the interchange of US 77 and I-37 in Corpus Christi to the interchange of US 77 and US 83 in Harlingen, with proposed improvements between Robstown and Combes. The Public Hearings were held in Raymondville on February 2, 2012; Sarita on February 6, 2012; Riviera on February 7, 2012; Kingsville on February 8, 2012; and Driscoll on February 9, 2012.

Notification
Notices providing information in English and Spanish about all five hearings were mailed to approximately 1,437 affected stakeholders, businesses, and elected and public officials. Copies of the draft Environmental Assessment were available for review at various locations along and near the project area (A full list of these locations is available in the project's technical files). Legal notices in English and Spanish were published in the *Valley Morning Star* and the *Corpus Christi Caller-Times* on December 29, 2011 and January 23, 2012 (approximately 30 and 10 days prior to the first public hearing). Display ads in English and Spanish were also published in these two publications *Valley Morning Star (January 18, 2012 and January 27, 2012)* and the *Corpus Christi Caller-Times* (February 3, 2012). In addition, display ads in English and Spanish also were published in the following publications: *Raymondville Chronicle* (January 18, 2012 and February 1, 2012)*, Kingsville Record* and *Bishop News* (January 18, 2012 and February 1, 2012)*, Nueces County Record Star* (January 19, 2012 and February 2, 2012) and *El Nuevo Heraldo* (January 18, 2012 and January 27, 2012). The latter is a Spanish language publication.

Information about the hearings and a copy the draft Environmental Asessment were available prior to hearings on the project webpage hosted by the Texas Department of Transportation (www.txdot.gov/project_information/projects/corpus_christi/). A link to the project webpage was also available on the websites of the Corpus Christi MPO, the Brownsville MPO and the Harlingen-San Benito MPO.

Bulletin flyers with information about the Public Hearings were provided to attendees at the Public Officials' Briefings and bulk copies were sent to the Riviera, Driscoll, Kenedy County, and Ricardo schools for students to take home to their households. Large yellow tabloid size posters or flyers were posted at various locations, including:

- Driscoll City Hall,
- Bishop City Hall,
- Bishop Chamber of Commerce,
- Kingsville City,
- Kleberg County Courthouse (County Judge's office),
- Kingsville EDC and Chamber offices,
- Kenedy County Court House,
- Kenedy County Sheriff's office,
- Kenedy Ranch Museum,
- U.S. Post Office in Sarita,
- Sarita Elementary School,
- County Commissioner's Office in Riviera,
- Riviera Independent School District,
- City Hall in Raymondville,
- Willacy County Courthouse (County Judge's office),
- Raymondville Area TxDOT Maintenance office
- County Co-op Store,
- Ricardo Independent School District,
- Texas Start in Riviera,
- Burger King in Riviera,
- Taqueria Jalisco in Riviera,
- Dairy Queen in Riviera,
- TxDOT offices in Corpus Christi,
- Dairy Queen in Bishop,
- Shell in Bishop,
- Taqueria Jalisco in Bishop,
- Kingsville Visitors Center,
- Valero in Kingsville,
- Big House Brunch Restaurant in Kingsville,
- Holiday Inn Express in Kingsville,
- La Quinta Inn in Raymondville,
- Lyford City Hall,
- Combes City Hall,
- Harlingen City Hall,
- Harlingen Area Chamber of Commerce,
- Texas Travel Information Center in Harlingen,
- Stripes in Riviera,
- Citgo in Driscoll,
- Valero in Driscoll.

A toll free 800 number and a toll number were provided in the hearing flyers and notices for questions regarding the hearings.

Prior to the hearings, TxDOT placed electronic messaging signs on northbound and southbound lanes of US 77 or roads near the hearing locations to advertise the hearings. A media release was sent by the TxDOT's Corpus Christi District Public Information Officer for distribution to the media throughout the project area and state prior to the public hearings. News stories were published prior to and after the public hearings in a number of papers and are contained in the project's technical files.

<u>Meeting Format</u>
Each hearing followed the same format and the same information was presented. An open house was conducted from 4:30-5:30 p.m., during which the TxDOT staff and the project team were available to answer questions as attendees reviewed exhibits. The presentation was given at 5:30 p.m. by a TxDOT District Engineers, TxDOT right of way specialists, and the consulting project manager. The presentation was followed by public testimony. The project team remained after the public testimony until approximately 7 p.m. to allow the public to ask additional questions of TxDOT staff and the project team and continue to review the exhibits. At each hearing, a court reporter and simultaneous Spanish translator with audio equipment were present (Transcripts of the presentations are available in the project's technical files). A right of way station was staffed at each hearing by TxDOT right of way agents. The right of way agents had English and Spanish booklets on the right of way acquisition process available as well as maps depicting potential right of way acquisition areas for the project.

Approximately 261 individuals signed in at the Public Hearings, including elected and public officials, property owners, residents, and media. Of the attendees, 5 signed in as media and 22 as elected officials (Two persons from the media signed in at Raymondville, 1 at Kingsville and 2 at Driscoll. Four elected officials signed in at Raymondville, 6 at Sarita, 4 at Riviera, 3 at Kingsville and 5 at Driscoll.) In addition, there were individuals representing elected officials who signed in as the general public. Project team members and TxDOT staff are not included in these attendee numbers.

Table 7.5-2 Public Hearing and Attendance

DATE	CITY/TOWN	FACILITY	ADDRESS	ATTENDANCE
Feb. 2, 2012	Raymondville	L.E. Franks Tourist Center	501 S. 7th St.	41
Feb. 6, 2012	Sarita	Sarita Elementary School Cafeteria	300 E La Para Ave.	37
Feb. 7, 2012	Riviera	Riviera ISD Cafeteria	203 Seahawk Drive	97
Feb. 8, 2012	Kingsville	Holiday Inn Express	2400 S. Hwy 77	50
Feb. 9, 2012	Driscoll	Driscoll ISD Cafeteria	410 W. Ave. D	36
			TOTAL ATTENDANCE:	261

Source: Jacobs Engineering Group, Inc., April 2012

Exhibits/Handouts

At each hearing, exhibits were posted providing information on the project including schematic drawings for the sections in the immediate vicinity of the hearing location. Handouts consisted of a “Project Development Plan” which included a detailed map of the project and recommended alternative, sheets called “Goals for Tonight” and “Need and Purpose”, a Glossary of Technical Terms and a list of the Environmental Document locations. Attendees were provided also with an agenda, speaker card and comment form. Following the public hearings, the Project Development Plan was available on the project webpage. A copy of the Environmental Assessment was available at each hearing. (Exhibits and handouts are available in the project’s technical files.)

Public Comments Forty-two comments were submitted during the Public Hearing comment period which ended February 21, 2012. To allow for mailing time, this includes mailed comments that were postmarked on or dated prior to February 21, 2012. In addition, six comments were dated or postmarked after the comment period ended. The majority of these comments were submitted in writing. A limited number of comments were made during the public hearings (12 in total) and are included in the certified transcripts. A comment database was established to track all public comments received. All public comments received during the Public Hearing process are recorded in the Public Hearing Summary available in the project’s technical files.

Comments generally regarded the following issues throughout all five location meetings:

- Need for project and improvements
- Impacts to personal property
- Economic impacts to communities
- Preferences for relief routes to the east, west, or through Driscoll and Riviera
- Impacts to access

- Safety and mobility
- Community impacts resulting from the relief routes
- Drainage
- Tolling
- Loss of tax revenue
- Impacts to environmental features

7.6 OTHER OUTREACH

During the environmental process, TxDOT and/or the project team held individual or small group meetings as necessary or as requested to discuss project details and collect input. Meetings were held with county officials, Homeland Security/Border Patrol, DPS, utility companies, water districts, school superintendents and staff, ranch owners/managers, property/business owners, and community members. Follow-up meetings and phone discussions were held with many of these individuals and organizations.

In addition, the project team and TxDOT officials attended a number of meetings hosted by Kleberg County officials in Riviera and Kingsville. Various members of the public attended these meetings. Project team members also met with officials and others to discuss potential indirect and cumulative impacts. The indirect and cumulative impact meetings are summarized in **Sections 5** and **6**, respectively.

7.7 AGENCY/GOVERNMENT RESOLUTIONS

The following agencies provided resolutions in support of the US 77 Upgrade Project and/or the goal to upgrade US 77 from IH 37 to the Rio Grande Valley to meet Interstate standards. Copies of these resolutions are provided in **Appendix B**.

- Corpus Christi MPO Transportation Policy Committee
- Brownsville Chamber of Commerce
- Brownsville/South Padre Island International Airport Advisory Board
- Brownsville MPO Transportation Policy Committee
- City of San Benito, Texas
- Commissioners' Court of Cameron County, Texas

In addition, the RISD provided a resolution expressing concern with the alignment location in the Riviera area.

- Riviera Independent School District - Riviera, Texas

7.8 DOCUMENTS IN PROJECT'S TECHNICAL FILES

Detailed summaries of each briefing and public meeting, transcripts of the presentation portions of the public meetings, transcripts of the public hearings, legal notices and publishers' affidavits, copies of display advertisements, mailing lists, mailed notices, briefing invitations, bulletin notices and posting locations, website postings, media releases, log of phone calls to the project hotline, news stories, meeting handouts, sign-in sheets, completed comment forms, transcripts of comments recorded by the court reporter, comment summaries, copies of exhibits, photographs, contact reports, and meeting summary reports are available in the projects technical files.

SECTION 8.0 - CONCLUSION

8.1 IDENTIFICATION & RATIONALE FOR THE PREFERRED ALTERNATIVE

8.1.1 Proposed Action

TxDOT recommends the Build Alternative as the Preferred Alternative.

8.1.2 Support Rationale

The Build Alternative is the recommended Preferred Alternative for the upgrading of US 77. Compared to the No Build Alternative, the Build Alternative minimizes impacts to the environment, community, and displacements. The No Build Alternative does not meet the need and purpose for the project. The grade separation interchanges, the upgrade of the roadway to current design standards, and addition of access roads would improve operating conditions, provide for a stable flow of traffic, reduce traffic congestion, and enhance mobility.

Improved freeway interchanges, limiting access, removal of all at-grade intersections, installation of access freeway standard ramps, and local street intersections with access roads throughout the corridor – all of which are included in the Build Alternative – would help to improve:

- safety primarily due to the elimination of at-grade intersections on a 70 mph facility
- regional mobility by lessening congestion levels
- increasing total average vehicle speeds.

Motorists would benefit by both the large-scale and small-scale improvements proposed throughout the corridor. Local intersecting streets would benefit from safety, design, and signalization enhancements.

The Build Alternative would complement other planned transportation facilities and programs in the region. The Build Alternative is consistent with the 2011-2014 TIP and included in the *Corpus Christi 2010-2035 MTP*, and as such, conforms to 8-03Flex Memorandum of Agreement Plan. The Build Alternative is also included within the HSBMPO boundaries and is covered in their transportation plan. **Table 8.1-1** summarizes the alternatives ability to satisfy the project objectives.

Table 8.1-1 Summary Comparison of the Build and No Build Alternatives

Project Objective	Build Alternative	No Build Alternative
Eliminate existing transportation system deficiencies in order to accommodate local, regional, and international traffic resulting in the improved system continuity	High probability	Very low probability
Improve traffic-related safety within communities located on US 77	High probability	Very low probability
Improve safety for through-traffic	High probability	Very low probability
Improve traffic mobility	High probability	Low probability
Avoid, minimize, or mitigate adverse social, economic, and environmental effects	High probability	Very low probability

Source: Jacobs Engineering Group, Inc., September 2009

8.1.3 Summary of Environmental Mitigation and Monitoring Commitments

Table 8.1-2 provides a list and brief explanation of the mitigation measures that are part of the Build Alternative and should be included in evolving EPIC sheets during design and construction. Additional features with any applicable notes, etc. identified in the field should be added to EPIC sheets throughout the project duration.

Table 8.1-2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
Business Displacements	18 businesses would be displaced.	Displaced businesses are eligible for assistance under the requirements of the Federal Uniform Relocation Act. The Build Alternative design for Driscoll and Riviera was optimized to avoid and minimize displacements. In Ricardo, the design was refined to minimize ROW width and avoid any potential displacements in response to public comment.
Residential Displacements	15 residences would be displaced.	Displaced residences are eligible for assistance under the requirements of the Federal Uniform Relocation Act. The Build Alternative design for Driscoll and Riviera was optimized to avoid and minimize displacements. In Ricardo, the design was refined to minimize ROW width and avoid any potential displacements in response to public comment.
Aesthetic Quality	None	TxDOT will consider including aesthetic treatments in structural components (retaining walls, bridges, signage) and architectural details (landscaping, lighting, colors, finishes, etc.). The implementation of some design elements would require participation and cost-sharing to fund the aesthetic improvements from local jurisdictions, property owners, or community-based organizations.
Environmental Justice	None	Continue to seek the meaningful involvement of low-income and minority communities in project development activities. Spanish language versions of the Public Hearing notice will be published in a locally circulated Spanish language newspaper and will be included with the notice to property owners. TxDOT will offer bilingual information at the public hearing and provide translators if requested. TxDOT will offer bilingual (English and Spanish) tolling information in both their websites and over the phone (Customer Service Center).
Vegetation	Up to 3,419.6 acres of vegetation	TxDOT has designed the project to maximize the use of the existing ROW and roadway. To further minimize impacts, TxDOT will include notes in the EPIC sheets for the developer/contractor to

Table 8.1-2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
		minimize clearing of and avoiding the placement of PSLs in or adjacent to higher quality habitats such as Live Oak Parks/Woods, mesquite-dominated areas within the Kenedy County sand sheet, and aquatic/semi-aquatic habitats. Disturbed areas will be reseeded with native plant species where possible. Current design plans indicate that the streams in the project area would be spanned, thereby minimizing impacts to streams and adjacent riparian areas. No compensatory mitigation is proposed.
Invasive Species and Beneficial Landscaping	Beneficial	The landscaping included with this project would be in compliance with the Executive Memorandum dated August 9, 1994 and the guidelines for environmentally and economically beneficial landscape practices. In accordance with E.O. 13112, which addresses invasive species, and the Executive Memorandum on beneficial landscaping, landscaping would be limited to seeding and replanting of the ROW with native species of plants where possible. Where project construction has removed existing vegetation, a mix of native grasses would be used to revegetate the ROW. As requested by public comment, these native grass seed mixes would exclude King Ranch bluestem and Kleberg bluestem. Soil disturbance would be minimized to avoid the introduction or spread of invasive species as a result of the proposed project.
Migratory Birds	Migration patterns would not be affected. Nests were observed on some bridge structures in the project area as well as in various habitats.	In the event that migratory birds are encountered on-site during project construction, every effort will be made to avoid take of protected birds, active nests, eggs, and/or young. The contractor would remove all old migratory bird nests between September 1st and the end of February from any structure where work would be done. In addition, the contractor would avoid or minimize clearing vegetation within the project area between March 1 and August 31.
Threatened and Endangered Species		To minimize potential effects of the proposed improvements on the ocelot and jaguarundi, clearing of wooded areas in the existing ROW would be minimized. To provide a potential safe crossing of US 77, TxDOT proposes to install three wildlife crossings under the new roadway: one near the Yturria population in Willacy County and two in Kenedy County (near Rudolph and

Table 8.1-2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
		Norias). In addition, no work would occur at the East Main Drain canal, which provides another potential travel corridor across US 77. The proposed project may affect, but is not likely to adversely affect slender rush-pea and South Texas ambrosia. The project has been designed and would be constructed to avoid populations of these species located within the ROW. The interchange for Sage Road, which is on the north edge of Kingsville, was moved approximately 0.75 mile to the south to avoid a population of slender rush-pea that was identified at the original planned interchange location.
Historic Resources	None	TxDOT took into consideration the eligible and recommended eligible historic properties during project design. As a result, the project would have No Adverse Effect on historic resources.
Archeological Resources	Accidental Disturbance of Buried Cultural Deposits during Construction	There are three documented Archeological sites just outside of the APE along Petronila Creek. During shovel testing no buried deposits related to these sites were identified or excavated. It is recommended that survey-level backhoe trenching occur to determine if buried deposits exist below the depth of the shovel tests. Currently, trenching along Petronila Creek has not been possible due to right-of-entry denial. If unanticipated archeological deposits are encountered during construction, work in the immediate area will cease, and TxDOT archeological staff will be contacted to initiate post-review discovery procedures under the provisions of the PA and MOU.
Parkland/Section 4(f)	None	In evaluating project alternatives and designing the recommended Build Alternative, TxDOT engineers avoided acquisition of ROW from the Driscoll City Park and historic resources/districts that are listed or are recommended eligible for listing on the NRHP including the King Ranch NHL. Therefore, the proposed Build Alternative would not result in the taking of any property protected under Section 4(f) of the Department of Transportation Act or Section 6(f) of the Land and Water Conservation Fund Act, and no coordination regarding Section 4(f) or Section 6(f) would be required.
Water Quality	Stormwater Runoff from Construction	The water quality of wetlands and waters in the state shall be maintained in accordance with all applicable provisions of the Texas Surface Water

Table 8.1-2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
		Quality Standards including the General, Narrative and Numerical Criteria. • BMPs will be implemented in accordance with the SW3P. • The contractor would take appropriate measures to prevent, minimize, and control the spill of fuels, lubricants, and hazardous materials in the construction staging area. • All spills, including those of less than 25 gallons shall be cleaned immediately and any contaminated soil shall be immediately removed from the site and be disposed of properly. • Designated areas shall be identified materials storage. These areas shall be protected from run-on and runoff. • The use of construction equipment within stream channels is not anticipated for this project. However, if work within a watercourse or wetland is unavoidable, heavy equipment shall be placed on mats, if necessary, to protect the substrate from gouging and rutting. • All construction equipment and materials used within stream channels and immediate vicinity would be removed as soon as the work schedule permits and/or when not in use and shall be stored in an area protected from run-on and runoff. • All materials being removed and/or disposed of by the contractor would be done in accordance with state and federal laws and by the approval of the Project Engineer. • Any changes to ambient water quality during construction of the proposed project shall be prohibited, may result in additional water quality control measures, and shall be mitigated as soon as possible. • The contractor would practice “good housekeeping” measures, as well as, “grade management” techniques to help ensure that proper precautions are in place throughout construction of the proposed project.

Table 8.1-2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
Wetlands and Waters of the US	Proposed improvements would result in the placement of minor amounts of fill into waters of the US. The proposed project area includes 10 single and complete crossings of waters of the US that are subject to regulation under Section 404 of the Clean Water Act. All of these crossings are located in the northern portion of the project, between the Kenedy-Kleberg County line and Robstown. The waters are not navigable. Therefore, neither a US Coast Guard Section 9 Permit nor a USACE Section 10 Permit would be required.	An Approved Jurisdictional Determination will be requested as necessary from the USACE for water features in the project area. All Section 404 permitting would be coordinated with the Regulatory Branch, Galveston District of the USACE. The Section 401 certification requirements would be met by implementing approved BMPs from the TCEQ's 401 Water Quality Certification Conditions for Nationwide Permits. These BMPs would address erosion control, sedimentation control, and post-construction total suspended solids.
Texas Pollutant Discharge Elimination System	No Long-Term Water Quality Impacts	TxDOT would comply with TCEQ – TPDES General Permit for Construction Activity. The project would disturb more than five acres; therefore, a NOI would be filed to comply with TCEQ stating that TxDOT would have a SW3P in place during construction of the proposed project. Erosion Control devices would be implemented and maintained until construction is complete. Sedimentation Control devices would be maintained and remain in place until completion of the project. Post-Construction TSS Control devices would be implemented upon completion of the project.
Air Quality	None	The proposed project is consistent with the 2035 MTP and 2011-2014 TIP of the Corpus Christi MPO and the HSBMPO. Traffic data for US 77 for the design year (2030) range from 48,900 vpd to 81,850 vpd. Traffic data for the cross-streets for the design year range from 50 vpd to 57,450 vpd. None of the traffic projections exceed 140,000 vpd. Therefore, this project is exempt from a TAQA because previous analyses of similar projects did not result in a violation of the

Table 8.1-2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
		NAAQS.
Airway/Highway Clearance	None	If a Federal Aviation Administration (FAA) Notice of Proposed Construction or Alteration form (Form AD-7460-1) is necessary, it will be completed during the design phase and submitted by TxDOT to the FAA for their approval prior to construction of the proposed improvements.
Noise	There are impacted receivers in every county except Cameron County.	Nueces County - Noise abatement measures were neither feasible nor reasonable. Therefore, no noise abatement measures are proposed for Nueces County. Kleberg County - One noise barrier with five sections is proposed for traffic noise impacts. The five sections total $250,794 and benefit 13 receivers. Kenedy County - Noise abatement measures were neither feasible nor reasonable. Therefore, no noise abatement measures are proposed for Kenedy County. Willacy County - Three noise barriers are proposed for traffic noise impacts. The three noise barriers total $54,108. Cameron County - No noise analysis required.
Hazardous Materials	Nine sites are considered to have high potential to impact the Build Alternative.	Additional investigation would be necessary, if; • contamination is discovered during construction • additional information becomes available regarding hazardous materials site • changes are made to the proposed ROW. If contamination were to be confirmed, TxDOT would develop appropriate soils and/or groundwater management plans for activities within these areas.
Construction	Access, Traffic Control, Temporary Noise and Dust, etc.	• Plans to ensure safe and efficient traffic flow during construction would be developed as part of the detailed construction plans for the proposed improvements. • Interruptions to public facilities and services during construction would be minimized through the use of appropriate traffic control and sequencing procedures. • Other construction-related impacts (such as temporary air and noise effects) would be addressed in compliance with standard TxDOT policies and procedures. • Provisions would be included in the plans

Table 8.1-2 Environmental Mitigation and Monitoring Commitments

Project Issues and Resources	Type of Impact	Mitigation and Monitoring Commitments
		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. • Access to businesses along the corridor would be maintained during construction.
Access	Entrance and Exit Ramp Modifications, Some Driveway Closures	Access to businesses would be maintained during construction. The proposed facility access would be controlled. However, properties located along the project facilities and currently having access to and from US 77 would continue to have access after the proposed improvements are constructed.

Source: Jacobs Engineering Group, July 2010

8.1.4 Recommendation for Alternative Selection

TxDOT recommends implementation of the Build Alternative based on the detailed study and information presented in this EA.

The engineering, social, economic, and environmental investigations conducted thus far on this proposed project indicate that it would not result in significant impacts on the quality of the human environment.

SECTION 9.0 - REFERENCES

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