ENVIRONMENTAL ASSESSMENT
RE-EVALUATION

STATE HIGHWAY 121
FROM FM 1187 to US 67

CSJ: 0504-04-001
CSJ: 0504-05-001

TARRANT AND JOHNSON COUNTIES, TEXAS

U.S. DEPARTMENT OF TRANSPORTATION,
FEDERAL HIGHWAY ADMINISTRATION,
AND
TEXAS DEPARTMENT OF TRANSPORTATION

APRIL 2010

Texas Department of Transportation

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ACRONYMS

ADT	average daily traffic
ac	acre
APE	Area of Potential Effect
BMP	best management practices
CAA	Clean Air Act
CDA	Comprehensive Development Agreement
CEQ	Council on Environmental Quality
CERCLIS	Comprehensive Environmental Response Compensation and Liability Information System
CFR	Code of Federal Regulations
CMP	Congestion Management Process
CMS	Congestion Management System
CO	carbon monoxide
CR	County Road
CWA	Clean Water Act
CZMP	Coastal Zone Management Plan
DART	Dallas Area Rapid Transit
dBA	A-weighted decibel
dbh	diameter at breast height
DOT	Department of Transportation
EPA	United States Environmental Protection Agency
ERNS	Emergency Response Notification System
ESA	Endangered Species Act of 1973
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FM	Farm-to-Market Road
FONSI	Finding of No Significant Impact
FPPA	Farmland Protection Policy Act
FR	Federal Register
FTA	Federal transit Authority
GIS	Geographic Information System
HDR	HDR Engineering, Inc.
HOV	High Occupancy Vehicle
HUD	Housing and Urban Development
IH	Interstate Highway
IHW	Industrial and Hazardous Waste
IRIS	Integrated Risk Information System
ISTEA	Intermodal Surface Transportation Efficiency Act
LEP	Limited English Proficiency
LF	linear feet
LOS	Level of Service
MBTA	Migratory Bird Treaty Act
MPA	Metropolitan Planning Area
MPO	Metropolitan Planning Organizations
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
MSA	Metropolitan Statistical Area
MSAT	mobile source air toxics
MSWLF	Municipal Solid Waste Landfills
NAAQS	National Ambient Air Quality Standards
NATA	National Air Toxics Assessment
NCHRP	National Cooperative Highway Research Program
NLEV	national low emission vehicle
NEPA	National Environmental Policy Act

NCTCOG	North Central Texas Council of Governments
NOI	Notice of Intent
NOT	Notice of Termination
NOx	Nitrogen Oxides
NPL	National Priorities List
NRCS	Natural Resources Conservation Service
NHPA	National Historic Preservation Act
NRHP	National Register of Historic Places
NTTA	North Texas Tollway Authority
PA-TU	Programmatic Agreement Regarding the Implementation of Transportation Undertakings
PCN	Pre-Construction Notification
PM	Particulate Matter
$PM_{2.5}$	fine particulate
RCCT	Rail with County Control Totals
RFG	reformulated gasoline
ROW	Right of Way
RPST	Registered Petroleum Storage Tanks
RSA	Resource Study Area
RTC	Regional Transportation Council
SALs	State Archeological Landmarks
SH	State Highway
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SMSA	State Metropolitan Statistical Area
STIP	State Transportation Improvement Program
TAC	Texas Antiquities Code
TCEQ	Texas Commission on Environmental Quality
TEA-21	Transportation Equity Act for the 21st Century
THC	Texas Historical Commission
TMA	Transportation Management Area
TMDL	total maximum daily load
TPDES	Texas Pollutant Discharge Elimination System
TPWD	Texas Parks and Wildlife Department
TRIS	Toxic Release Inventory System
TSSWCB	Texas State Soil and Water Conservation Board
TSZ	Traffic Survey Zone
TWDB	Texas Water Development Board
TxDOT	Texas Department of Transportation
TxDOT-ENV	Texas Department of Transportation Environmental Affairs Division
TXNDD	Texas Natural Diversity Database
US	United States Highway
USACE	United States Army Corps of Engineers
USFWS	U.S. Fish and Wildlife Service
USGS	United States Geological Survey
VCP	Voluntary Cleanup Program
VNT	Vision North Texas
VMT	vehicle miles traveled
VOC	volatile organic compounds

1.0 INTRODUCTION

The Texas Department of Transportation (TxDOT), in cooperation with the Federal Highway Administration (FHWA) as the lead federal agency, has prepared this Environmental Assessment (EA) Re-evaluation for a proposed divided four-lane toll road located in southern Tarrant County and in Johnson County, Texas. Based upon the EA submitted in 2003, this EA Re-evaluation presents any additional potential social, economic, and environmental impacts for the proposed project located between Farm-to-Market Road (FM) 1187 and United States Highway (US) 67. This EA complies with the National Environmental Policy Act (NEPA) of 1969 (as amended).

An EA for the State Highway (SH) 121 proposed project was published in November 2003. During the NEPA planning process, a preferred alternative for the SH 121 alignment was chosen, and this alternative was approved when the Finding of No Significant Impact (FONSI) was issued by the FHWA in 2004. This alignment is herein referred to as the 2004 FONSI Alignment. This EA originally referenced CSJ numbers, 2118-01-008 and 2118-02-008. These have been changed due to TxDOT roadway accounting systems to 0504-04-001 and 0504-05-001. Neither the project limits nor the concept of project have changed due to the required change for the roadway accounting system; rather the numbers just represent an identification of the roadway. The EA provided a general evaluation of anticipated impacts to waters of the U.S., and upon initiating the permitting process under Section 404 of the Clean Water Act (CWA), the 2004 FONSI Alignment was refined to further avoid and minimize impacts to waters of the U.S. Additionally, the decision to construct this facility as an electronic toll facility was made. The refined alignment is herein referred to as the Modified Alignment. The purpose of this EA Re-evaluation is to evaluate the potential effects associated with the change in project scope.

The FHWA has developed federal regulations (Title 23 of the Code of Federal Regulations [CFR], Part 771) to provide instructions for assessing environmental impacts specific to federally-funded transportation projects. Upon FHWA's approval of the EA Re-evaluation for further processing, this EA Re-evaluation would be made available for public review and comment. Additionally, TxDOT would conduct a public hearing for the EA Re-evaluation. The EA Re-evaluation would then be submitted to FHWA for approval.

2.0 PROJECT

2.1 Project History

An EA was submitted November 2003, and a FONSI was issued in 2004 for SH 121. The project was initially proposed as a two-lane interim facility to be ultimately improved to a divided four-lane toll road. The approximate 14-mile facility would be located in southern Tarrant County beginning near FM 1187 and going south through Johnson County terminating just north Cleburne at US 67 (General Location Map, **Figure 1**, **Appendix A**). The main intent of this project is to improve regional mobility, alleviate local congestion, and increase the carrying capacity of goods and people. Although numerous alternatives were reviewed, the 2004 FONSI specifically addressed the preferred alternative identified in the 2003 EA. Meetings were held May 9, 2000 and October 19, 2000 to allow the general public and stakeholders an opportunity to question and comment on the proposed project. A public hearing was later conducted on February 13, 2003. A FONSI was issued for this project on May 20, 2004 by the FHWA.

To comply with Section 404 of the CWA, a Pre-Construction Notification (PCN), including a proposed Jurisdictional Determination and Conceptual Mitigation Plan, were prepared for submittal to the U.S. Army Corps of Engineers (USACE) in December 2004; however, the project was put on hold pending further review of a toll road revenue evaluation and funding constraints. Later, as funding became available, the decision was made to forego the interim facility and move directly to the fully electronic four-lane divided toll road. Coordination for an EA Re-evaluation was determined to be necessary in order to evaluate the adjustments in project scope and to address the shift in the alignment (Modified Alignment) near the southern terminus of the project area.

Coordination of cultural resource and survey efforts on the Modified Alignment was reviewed and addressed. Consultation with federally-recognized tribes to determine the project's effects on cultural resources including historic sites was also carried out (**Appendix B**). Review and coordination of this project followed approved procedures for compliance with federal and state laws.

2.2 Need for and Purpose of Project

The need to provide access to and from southern Tarrant County and Johnson County has been identified by numerous studies conducted by TxDOT, the City of Fort Worth, and the North Central Texas Council of Governments (NCTCOG). These studies have long recognized the need to alleviate local congestion, improve regional mobility, and accommodate future traffic volumes and population demand within the area.

The *2030 Mobility: Metropolitan Transportation Plan* (*Mobility 2030 - 2009 Amendment*) identified the Metropolitan Statistical Area (MSA) of Dallas-Fort Worth-Arlington, to be among the fastest growing areas in the U.S., having the third largest increase in population among similar sized MSAs during the period from 1990 to 2000. Tarrant and Johnson Counties are included in the Dallas Fort Worth (DFW) MSA. This same report forecasts an increase in population and employment of 70 percent and 67 percent, respectively, for the MSA between 2000 and 2030. This pattern of growth further demonstrates the need for additional transportation system linkages which are critical to local infrastructure and regional mobility.

The legislative basis for this proposed facility comes in part from the "Intermodal Surface Transportation Efficiency Act of 1991" (ISTEA), which allows *Mobility 2030 - 2009 Amendment* to direct investments in the metropolitan transportation system. The "Transportation Equity Act for the 21st Century" (TEA-21) further refined this approach while allowing continuity between the two transportation acts. The "Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users" (SAFETEA-LU) approved funding for surface transportation projects such as the proposed project while maintaining the precepts of ISTEA and TEA-21. SAFETEA-LU created guidelines which metropolitan planning organizations (MPOs) follow. *Mobility 2030 - 2009 Amendment* meets all SAFETEA-LU planning requirements as provided by the Federal Transit Administration (FTA) and the FHWA.

The purpose of the SH 121 project is to provide safe and effective transportation while enhancing mobility for the growing population in southern Tarrant County and Johnson County. The proposed project would allow for a direct linkage between the transportation corridors in Tarrant County and Cleburne in Johnson County while increasing the carrying capacity of the area roadway network.

The SH 121 project would also relieve regional congestion primarily within the Interstate Highway 35 West (IH 35W) and US 67 corridors along with other major transportation facilities and provide improved mobility and increased accessibility to areas within Tarrant and Johnson Counties.

2.3 Project Description

The SH 121 project is approximately 14 miles long. The proposed project area extends from FM 1187 located just inside the southwestern border of Tarrant County to US 67, north of the City of Cleburne in Johnson County (**Figures 1 and 2, Appendix A**). From north to south, the project intersects or crosses over FM 1187, County Road (CR) 920, CR 1015, FM 1902, CR 1016, CR 913, FM 917, Don Lee Road, CR 904, SH 171, and CR 1125. Major intersections for the proposed SH 121 toll road would include FM 1187, CR 920, FM 1902, CR 913, FM 917, CR 904, SH 171, and US 67. An additional intersection not identified in the FONSI 2004 would be located approximately 1.25 miles north of the SH 171 intersection and west of West Vaughn Road. This intersection occurs within the Modified Alignment and has been included within the toll road design. This Intersection would be designated as Sparks Road.

SH 121 has been designed as a controlled-access, fully electronic tolled facility with no frontage roads; however, ramps would be provided at major intersections. The 2004 FONSI Alignment initially provided right of way (ROW) widths to be from 240 to 400 feet. To accommodate current design, construction of the toll road would require the typical ROW widths of approximately 220 to 600 feet. Those interchanges

requiring additional ROW would be FM 1187, FM 1902 (which also includes CR 915 access), and CR 904. The project design complies with the recommendations of *Mobility 2030 - 2009 Amendment*, which was approved August 31, 2009.

This EA Re-evaluation also takes into consideration the potential social, economic, and environmental impacts associated with portions of the intersection of the proposed SH 121 toll road and US 67. Although the intersection is located outside of the project limits (CSJ 0504-04-001 and 0504-05-001), the footprint areas of the Direct Connectors (ramps) for the east and west bound US 67 traffic entering onto and exiting off of the proposed SH 121 toll road were evaluated. Additionally, the transition (ramp) to US 67 from North Nolan River Road was included in this re-evaluation effort.

The total construction cost for this project as listed in the State Transportation Improvement Program (STIP) are estimated at $144,000,000, including $20,000,000 for the portion of the project in Tarrant County and $124,000,000 for the portion of the project in Johnson County.

2.4 Design Considerations

The proposed design of SH 121 facility has been modified in three ways from the design previously disclosed to the public upon approval of the 2004 FONSI, November 2003. These modifications are as follows:

- The design was modified to incorporate electronic tolling technology instead of using toll plazas.
- The interchange at FM 1187 was modified to use a longer bridge on SH 121 to span FM 1187 with the vertical profile of the elevated FM 1187 remaining the same. The previous schematic presented in the 2004 FONSI had a shorter SH 121 bridge and a depressed profile (10-15 feet) for FM 1187. **Figure 3**, **Sheets 1-2**, (**Appendix A**), shows the general structure design concept.
- The 2004 FONSI Alignment and associated drainage design were modified and shifted approximately 500 feet to the west over a distance of about 10,500 feet (2.05 miles). The shift to the west of the Modified Alignment begins near CR 902 and transitions back east to the 2004 FONSI Alignment approximately 300 feet north of SH 171. The shift from the 2004 FONSI Alignment was made to avoid and minimize impacts to waters of the U.S. along West Buffalo Creek. Additionally, the Modified Alignment would reduce the amount of fill being placed within the floodplain compared to the 2004 FONSI Alignment. The design concept of the transition structure for the Modified Alignment connecting to US 67 can be seen in **Figure 3**, **Sheet 3**, (**Appendix A**).

3.0 ENVIRONMENTAL EFFECTS

This section of the EA Re-evaluation discusses the social, economic, and environmental impacts of the direct effects from the construction and operation of SH 121 from FM 1187 to US 67. Within each resource section, the effects of the Modified Alignment are compared to the effects estimated during the analysis approved in the 2004 FONSI. **Figure 4, (Appendix A),** shows the change in ROW from the Modified Alignment compared to the 2004 FONSI Alignment approved when the FONSI was issued.

The proposed 14-mile facility would be located in southern Tarrant County just south and adjacent to FM 1187 moving south into Johnson County with a terminus immediately north of Cleburne and US 67. The project is located on the United States Geological Surveys (USGS) 7.5 Minute Quadrangle Maps of Primrose and Joshua. The project area is bounded by primarily rural undeveloped areas to the west and mixed land use areas to the east. The northern portion of the alignment, in Tarrant County, is relatively undeveloped, while the southern reaches of the alignment are adjacent to the City of Cleburne.

3.1 Land Use

Land use in the project area continues to be dominated by agricultural and undeveloped uses interspersed with low-density rural residential, farms and ranches, retail/commercial, and small

service/manufacturing facilities A comprehensive evaluation of land use by type in the project area was not addressed in the 2004 FONSI. For evaluation of the Modified Alignment, the NCTCOG land use spatial data was utilized to determine the acreage of existing land use in the Modified Alignment ROW. These acreages represent the land uses that would be converted to transportation use by the proposed action (**Table 1**). The limited field reconnaissance performed for the Modified Alignment revealed that the primary change in land use observed in the vicinity of the proposed project is the introduction of natural gas drilling and production sites and the construction of Caddo Grove Elementary. Although an industrial complex is currently planned near the southern end of the project area, this area had not been developed at the time of the limited field reconnaissance for the Modified Alignment. No other substantial land development appears to have occurred in the project vicinity.

Table 1. NCTCOG Land Use in the Project Area (acres)

Type	2004 FONSI Alignment	Modified Alignment
Single Family Residential	Not calculated	15.5
Mobile Home Parks	Not calculated	46.9
Retail	Not calculated	0.8
Institutional	Not calculated	0.4
Industrial	Not calculated	0.1
Utilities	Not calculated	1.1
Construction	Not calculated	5.9
Water	Not calculated	2.8
Vacant (Undeveloped)	Not calculated	561.3
*Transportation**	*Not calculated*	*8.8*
Total		**643.6**

Source: NCTCOG Land Use, 2005

* The 'Transportation' land use is not mapped by NCTCOG except by omission; therefore, the 'transportation' acreage was determined to be the difference between the NCTCOG mapped acreage in the Modified Alignment ROW and the total acreage of the Modified Alignment ROW. Also, the total conversion of non-transportation land uses excludes existing transportation land use.

The primary change in land use observed in the vicinity of the proposed project is the introduction of natural gas drilling and production sites (**Figure 5, Sheets 1-5, Appendix A**).

The 2004 FONSI indicated that the only municipality within the jurisdiction of the proposed project area was the City of Cleburne. Today, the most densely populated areas along the corridor include the cities of Burleson and Crowley, east of the corridor, and the City of Fort Worth, north of the corridor. Traveling south away from Tarrant County and into Johnson County, the project is primarily characterized as rural agricultural land mixed with scattered development. While the City of Fort Worth has yet to annex any of the proposed corridor into its extraterritorial jurisdiction area (ETJ), the project corridor traverses two other incorporated areas. The first is a more recent annexation by the City of Burleson which lies adjacent to and generally east of the Modified Alignment along the mid-section of the corridor south of CR 915 and north of FM 917. The second is near the southern terminus and traverses the northwestern boundary of the City of Cleburne. Development outside of the annexed areas of Fort Worth, Crowley, Burleson, Joshua, and Cleburne, is regulated by Tarrant and Johnson Counties. Although, there is generally no zoning in unincorporated areas, there are local ordinances which do provide for compliance with street, sewer and water lines.

The proposed corridor is consistent with land use plans and of the following municipalities or county governments:

- City of Fort Worth
- City of Burleson
- City of Joshua
- City of Cleburne
- Tarrant County
- Johnson County

The construction of the Modified Alignment would require the conversion of 644 acres of undeveloped land to transportation use. This represents an increase of 119 acres from the 2004 FONSI Alignment. While the methods used to calculate the acreage amounts for the 2004 FONSI Alignment are not available and cannot be verified, the increased area would not be unreasonable to expect given the variation and level of design detail. The initial design was to accommodate an interim two-lane highway, developing to a four-lane toll road as funding allowed. The current facility design was a departure from the original concept moving to a full electronic toll road. Further, additional design detail is known regarding interchanges and drainage easements. This increase of approximately 23 percent in ROW is due to the shift associated with the Modified Alignment. The change in land use is not considered to be a substantial adverse effect because the proposed project is consistent with land use plans in the vicinity of the proposed project. Potential impacts to resources associated with the conversion of these undeveloped lands to transportation use are discussed in the appropriate resource sections.

3.2 Community Resources

3.2.1 Socioeconomic Conditions

The evaluation of socioeconomic effects related to relocations, displacements, community cohesion, environmental justice, limited English proficiency (LEP), and tolling is based on 2000 Census data and other current and readily available data. Data were collected and analyzed at the block group level when not available at the block level. Block level data are used where possible, in order to include the areas with relatively small populations in the project area. The population, race, and age data are available at the block level, while LEP and economic data are available only at the block group level. Depending on the data availability, the study area includes either Census blocks or block groups within 200 feet of the proposed project area. The Census blocks, block groups, and tracts for the project area are included in **Appendix A, Figure 6**. This evaluation addresses the requirements of Executive Order 12898 "Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations" (1994) and Executive Order 13166 "Improving Access to Services for Persons with Limited English Proficiency" (2000).

Relocations

The shift from the 2004 FONSI Alignment to the Modified Alignment affected five parcels however; these were already designated as being included the 2004 FONSI Alignment. No additional parcel acquisitions were required along the route where the shift occurred, nor were any parcels eliminated. Modification of the facility alignment resulted only in the adjustment of acreages required from each of the five parcels and change with regard to the physical crossing by the ROW through the parcel. The information in **Table 2** provides the specific change associated with each parcel. These five parcels were acquired after the 2004 FONSI and prior to September 26, 2007.

Table 2. Changes in ROW Acreage by Parcel

Parcel Number	2004 FONSI Alignment Takings (ac)	Modified s (ac)	Changes In ROW Alignment (ac)
110	5.398	3.875	-1.523
112	1.153	1.655	+0.502
113	1.082	2.119	+1.037
114	39.620	30.759	-8.861
115	63.903	58.969	-4.934

Source: Email correspondence with Judy Anderson, District Environmental Engineer, Fort Worth District; April 23, 2010.

The 2004 FONSI stated that construction of the proposed facility would impact 127 properties, and estimated that there would be 31 residential relocations associated with the ROW. Additionally, it was determined that replacement housing and business property existed in the immediate area, and no detrimental effects were anticipated.

Recent parcel data received from TxDOT (property acquisition group) indicated that the Modified Alignment would impact 170 properties (**Table 3**). No relocations of residences are required and no businesses will be displaced. The increase in parcel number can be attributed to the subdivision of older parcels into smaller tracts since the approved 2004 FONSI; however, according to TxDOT property acquisition group no additional areas have been included in the facility ROW.

Table 3. Relocations/Displacements		
Type	**2004 FONSI Alignment**	**Modified Alignment**
All Properties Impacted	127	170
Business/commercial	0	0
Residential	31	31
Personal Property Only	0	0

Source: 2004 FONSI and email correspondence with Judy Anderson, District Environmental Engineer, Fort Worth District, April 23, 2010.

The residential relocations associated with the 2004 FONSI ROW have already taken place and all displacees successfully relocated to replacement housing within their financial means. No additional residential or business displacees were identified in the five parcel area of the Modified Alignment ROW.

Community Cohesion

Community cohesion is a term that refers to an aggregate quality of a residential area. Cohesion is a social attribute that indicates a sense of community, common responsibility, and social interaction within a limited geographic area. It is the degree to which residents have a sense of belonging to their neighborhood or community or a strong attachment to neighbors, groups, and institutions as continual association over time.

Although the proposed project is a new-location toll road, the existing core of the communities in the area (e.g., Burleson, Joshua, and Cleburne) is adjacent to SH 174, east of the proposed project area. The EA included an evaluation of existing communities and determined that adverse effects to community cohesion were not anticipated as a result of the SH 121 project. The additional relocations and displacements, summarized in **Table 3**, would not create any substantive change in the degree of community cohesion since the issuance of the FONSI. The areas of additional land incorporated by the cities of Burleson and Cleburne that would be traversed by the proposed project would not create a substantive change in the degree of community cohesion since the issuance of the FONSI because although the areas are incorporated they have not become more populated. The proposed project would not affect, separate, or isolate any distinct neighborhoods, ethnic groups, or other specific groups. As a result, the proposed project is not anticipated to adversely affect community cohesion.

Limited English Proficiency

Executive Order 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 Executive Order 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 provision under Title VI of the Civil Rights Restoration Act of 1987 and Title VI regulations.

Based on data from the 2000 Census, the majority of the population five years or older within the block groups that contain the study area classify their ability to speak English as "well" or "very well". There are 1,477 people (9.1 percent) within the block groups who speak a language other than English. Of the people who speak a language other than English, 327 (2.0 percent) speak English "Not Well" or "Not at All" (**Table 4**). Of those who speak a language other than English, the largest percent speak Spanish (78.5 percent); others speak Asian and Pacific languages (5.0 percent), other Indo-European languages (13.8 percent), and other languages (2.7 percent). A visual survey of the area adjacent to the proposed project was conducted on October 1, 2008. English was used on signs and billboards in the corridor.

Reasonable steps would be taken, such as providing interpreters upon request, should TxDOT hold a public meeting or if those individuals contact TxDOT independently. Any public notices or meetings would be made available in Spanish as well as English because the majority of those that speak a language other than English speak Spanish. These steps would be taken to ensure that all individuals would have meaningful access to the programs, services, and information that TxDOT provides. Through the aforementioned steps, the requirements of Executive Order 13166 appear to be satisfied for the proposed project.

Table 4. Ability to Speak English

Reference Area	Total Sample (Age 5+ Years)	Speaks a Language other than English			
		Speaks English "very well" or "well"		Speaks English "not well" or "not at all"	
		No.	%	No.	%
Block Group 1, Census Tract 1302.01	552	23	4.2	13	2.4
Block Group 2, Census Tract 1302.01	2,229	251	11.3	11	0.5
Block Group 4, Census Tract 1302.01	2,230	58	2.6	34	1.5
Block Group 5, Census Tract 1302.01	1,316	89	6.8	44	3.3
Block Group 1, Census Tract 1302.06	1,629	69	4.2	9	0.6
Block Group 2, Census Tract 1302.06	1,293	65	5.0	40	3.1
Block Group 3, Census Tract 1302.06	2,117	169	8.0	112	5.3
Block Group 1, Census Tract 1303.02	1,905	141	7.4	59	3.1
Block Group 1, Census Tract 1110.09	2,930	285	9.7	5	0.2
Study Area Total:	16,201	1,150	7.1	327	2.0

Source: U.S. Census Bureau (2000). Detailed Tables P19 from Summary File 3.

Environmental Justice

Executive Order 12898, "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations" provides guidance for addressing minority and low-income populations. Minority populations should be identified where either:

- The minority population of the affected area exceeds 50 percent of the total population, or
- The minority population percentage of the study area is meaningfully greater than the minority population percentage in the general population.

The race and ethnicity of the population of the study area were analyzed. According to FHWA Order 6640.23 (1998), "FHWA Actions to Address Environmental Justice in Minority Populations and Low-Income Populations", population groups defined as minorities include the following:

1. Black (having origins in any of the black racial groups of Africa);
2. Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture of origin, regardless of race) (In the 2000 U.S. Census, Hispanic is classified as an ethnicity, rather than a race, and is presented as such in this document);
3. Asian American (having origins in any of the original peoples of the Far East, Southeast Asia, the Indian subcontinent, or the Pacific Islands); or
4. American Indian and Alaskan Native (having origins in any of the original people of North America and who maintain cultural identification through tribal affiliation or community recognition).

According to the 2000 U.S. Census Bureau, Census blocks within the study area, 15.3 percent of the population is considered to be minority (**Table 5**). For comparison, minority persons comprise 19.0 percent of the population within the block groups in the study area. Approximately 22.1 percent of the population of Johnson County and 48.5 percent of the population of Tarrant County are considered to be a minority. Based on the census data, the study area contains a slightly smaller percentage of Hispanic people than the populations within the block groups intersecting the study area. The percentage of Hispanic people within the blocks adjacent to the proposed project is 9.1 percent, while the populations within the block groups are 9.7 percent Hispanic. For comparison, the population of Johnson County is 12.1 percent Hispanic and the population of Tarrant County is 19.7 percent Hispanic.

Table 5. Population by Race and Ethnicity										
Geography				Race						Ethnicity
Census Tract	Block Group	Block	Total Population	White	Black or African American	Asian American	American Indian and Alaska Native	Some other Race	Two or More Races	Hispanic Origin (Regardless of Race)
1302.01	1	1001	4	1	0	0	0	3	0	3
		1003	147	144	0	0	3	0	0	7
		1005	43	43	0	0	0	0	0	6
		1006	101	88	0	1	1	7	4	22
		1010	11	11	0	0	0	0	0	2
	2	2000	5	5	0	0	0	0	0	0
		2015	0	0	0	0	0	0	0	0
		2016	313	281	7	0	5	18	2	52
	4	4000	330	307	6	1	4	12	0	26
	5	5000	65	54	0	0	0	11	0	13
		5051	264	256	0	0	0	5	3	17
		5055	25	25	0	0	0	0	0	1
		5056	21	21	0	0	0	0	0	0
		5068	0	0	0	0	0	0	0	0
		5069	0	0	0	0	0	0	0	0
		5070	38	35	0	0	3	0	0	1
1302.06	1	1025	26	25	0	0	0	0	1	0
		1026	43	43	0	0	0	0	0	0
	2	2029	172	160	0	0	3	7	2	11
	3	3010	127	125	0	2	0	0	0	9
		3013	241	237	1	0	0	3	0	10
1303.02	1	1004	0	0	0	0	0	0	0	0
		1005	0	0	0	0	0	0	0	0
		1010	181	170	0	0	4	7	0	10
		1012	0	0	0	0	0	0	0	0
		1013	7	7	0	0	0	0	0	0
		1014	0	0	0	0	0	0	0	0
		1015	0	0	0	0	0	0	0	0
		1021	45	39	0	0	2	4	0	7
		1034	0	0	0	0	0	0	0	0
		1035	3	0	0	0	0	0	3	0
		1036	17	17	0	0	0	0	0	0

Table 5. Population by Race and Ethnicity										
Geography				Race						Ethnicity
Census Tract	Block Group	Block	Total Population	White	Black or African American	Asian American	American Indian and Alaska Native	Some other Race	Two or More Races	Hispanic Origin (Regardless of Race)
		1038	47	40	0	0	0	7	0	10
		1039	0	0	0	0	0	0	0	0
		1041	0	0	0	0	0	0	0	0
		1042	4	4	0	0	0	0	0	0
		1044	0	0	0	0	0	0	0	0
1110.09	1	1056	0	0	0	0	0	0	0	0
Total:			2,280	2,138	14	4	25	84	15	207
Percent of Total Population:			100.0	93.8	0.6	0.2	1.1	3.7	0.6	9.1

Source: U.S. Census Bureau (2000). Detailed Tables P3 and P4 from Summary File 1.

According to the Council on Environmental Quality (CEQ) (1997), low-income populations are those communities or sets of individuals whose median income is below the current poverty level of the general population. To investigate possible low-income populations, Census block group information for median household income was used. In the 2000 U.S. Census, 1999 income information is provided. In 1999, the median household income in the study area ranged from $28,551 to $82,785 (**Table 6**). All block groups within the project area had a median household income (1999) exceeding the 2009 poverty guideline of $22,050 for a family of four, according to the U.S. Department of Health and Human Services. As a result, there are no low-income populations within the study area. For comparison, the median household income for Census tracts encompassing the project area ranges from $31,747 to 82,785. The percentage of persons living below the poverty level in the study area ranged from 0 percent to 18.8 percent, while the percentage of persons living below the poverty level in the Census tracts ranges from 4.4 to 18.2 percent.

Table 6. Economic Characteristics

Reference Area	Median Household Income	Percent of Persons Below Poverty Level
Block Group 1, Census Tract 1302.01	$49,583	1.2
Block Group 2, Census Tract 1302.01	$41,552	8.4
Block Group 4, Census Tract 1302.01	$47,160	13.7
Block Group 5, Census Tract 1302.01	$44,596	7.0
Block Group 1, Census Tract 1302.06	$62,250	0.0
Block Group 2, Census Tract 1302.06	$54,196	1.5
Block Group 3, Census Tract 1302.06	$39,208	10.1
Block Group 1, Census Tract 1303.02	$28,551	18.8
Block Group 1, Census Tract 1110.09	$82,785	4.4
Johnson County	$44,621	8.8
Tarrant County	$46,179	10.6

Source: U.S. Census Bureau (2000), Detailed Tables P53 and P87 in Summary File 3.

Based on the Census data, there are no minority populations within the study area. Block 1001 of Block Group 1, Census Tract 1302.01 contains only 4 people, 3 of whom are Hispanic. The four people in this block constitute a small, isolated, population within the study area that are not representative of the larger surrounding populations. The blocks adjacent to Block 1001 do not contain high percentages of Hispanic persons. Within the study area, 9.1 percent of the population is Hispanic. This is slightly less diverse than the block groups containing the study area, within which 9.7 percent of the population is Hispanic. There are no additional relocations or displacements associated with the proposed project since the 2004 FONSI (**Table 3**) and there were no minority or low-income populations identified. As a result, no disproportionately high and adverse effects to minority or low-income populations are anticipated. A disproportionately high and adverse effect means the impact is appreciably more severe or greater in magnitude on minority or low-income populations than the adverse effect suffered by the non-minority or non-low-income populations after taking offsetting benefits into account. This finding is consistent with the analysis documented in the 2003 EA and approved in the 2004 FONSI. The requirements of Executive Order 12898 are satisfied for the proposed project.

Electronic Tolling

The proposed project is included in the region's long range transportation plan, *Mobility 2030 - 2009 Amendment* and, identified as a new toll road. No toll booths are planned for this facility; tolls on SH 121 would be collected electronically. Currently, main lane toll gantries are planned south of CR 904 and north of Vaughn Road. Of the seven entrance and exit ramps associated with the southbound lanes between FM 1187 and CR 1125, three ramp toll gantries are planned. Of the seven entrance and exit ramps associated with the northbound lanes between FM 1187 and CR 1125, three ramp toll gantries are planned. Individuals using the toll facility would have to acquire a transponder for their vehicle. The location for acquiring these transponders near the project area has not yet been identified.

Transponders for vehicles can currently be acquired for other toll facilities in the Dallas-Fort Worth area through North Texas Tollway Authority (NTTA). NTTA requires a credit card or debit card to acquire a transponder with a $40.00 starting balance. However, for those without credit cards, a cash option is available (NTTA, 2008). The toll amounts for the proposed facility have not been established.

TxDOT TxTag®, NTTA Toll Tag® (Dallas area), and Harris County Toll Road Authority (HCTRA) EZ TAG® (Houston area) transponders would be accepted on the proposed toll facility. Toll charges could be automatically deducted from a prepaid credit account or, if the video billing method is utilized, would be mailed as a monthly statement to the driver. If the driver has a TxTag® or other toll transponder account, the tolls would automatically be deducted from the account when the facility is used. To use a prepaid account, the driver must maintain sufficient funds in his/her account to cover incurred toll charges, such as for accounts currently in use for existing toll roads in Texas.

Information on the NTTA web page (www.ntta.org) states that customers with toll tags save up to approximately 45 percent compared to customers who pay cash. Cash payment options are available for each payment method. For those who choose to maintain a prepaid "cash user" account, an initial deposit of $25 would be required for the toll transponder as well as a $40 payment to establish the account. This automatic deposit is also required of "credit user" accounts. The "cash user" deposit can be refunded without interest if the user returns the transponder in good condition or if the "cash user" account is converted into a "credit user" account. The prepaid "cash user" account would require the driver to maintain sufficient funds in his/her account to cover incurred toll charges. Toll rates would be the same as "credit user" account toll rates. When passing through a toll lane equipped with a traffic signal, a yellow light on the traffic signal indicates that the account balance is at or below $10. A red light indicates that the account balance is $0. Payment at one of the TollTag® locations must be made before the account reaches $0 to avoid the incurrence of toll violations.

Only those users who maintain automatic and manual pay prepaid accounts would benefit from reduced toll rates compared to the video billing policy. The toll rates for drivers without a toll transponder would include an additional percentage premium plus a processing fee. Toll rates are generally 45 percent more for drivers who do not have an electronic toll transponder to offset the costs related to processing the license plate information associated with video billing. Although certain toll transponder account holders are required to pay up-front fees or deposits for toll transponders ($9.65 fee per transponder for TxTag® accounts and $25 deposit for TollTag® "cash users" accounts), the toll transponder account holders would benefit from lower toll rates compared to the total toll rates associated with video billing. In other words, the up-front fees associated with toll transponders may be offset through time when considering the premium and processing fees affiliated with the video billing method of payment.

Toll fee estimates provided by NTTA in the *Toll Rate Increase: Fact Sheet*, published July 16, 2009, indicate that tollway rates have recently been adjusted for the Dallas North Tollway and the George Bush Turnpike to $0.145 per mile. This aligns them with the Sam Rayburn Tollway and the regional toll rates. Although rates have not been set for this portion of the SH 121 tollway, it would be reasonably assumed that these rates or similar rate values would apply. NTTA indicated that rates

will would be compounded annually at 2.75 percent and reset every other year beginning July 2011. At that time the rate increases would be incremental and are estimated as:

- 2009 $0.01450 cents per mile
- 2011 $0.01531 cents per mile
- 2013 $0.01616 cents per mile
- 2015 $0.01706 cents per mile
- 2017 $0.01801 cents per mile

Origin-destination (O&D) data secured from the NCTCOG was used for further analysis of user impacts of the proposed Managed Express Lanes toll facility on low-income and minority populations. O&D data can estimate travel patterns of traffic along a transportation facility during a typical day. This form of analysis is useful in assessing user impacts as the number of trips associated with specific population characteristics can be studied to provide general travel assumptions of those specific populations. Trips are defined as a one-way movement from where a person starts (origin) to where the person is going (destination). Mapping is provided in **Appendix A** (**Figures 7 and 8**) that illustrates Environmental Justice Traffic Survey Zones (TSZ): 2030 Daily Trips. A more detailed description of the O&D analysis is provided in **Section 4.2.2**.

Assessing user impacts in the form of an O&D analysis is an integral component of the environmental justice analysis for the proposed project. As funding mechanisms evolve, the trend towards utilization of toll facilities in this region would, through time, create user impacts as access to highway systems becomes an issue to the economically disadvantaged. The O&D analysis estimated anticipated users and associated traffic patterns of the proposed project in 2030 and identified environmental justice populations to assess the intensity of use by those protected populations.

Based on the O&D information, it is not anticipated that there would be any disproportionate impacts to low-income or minority populations from the implementation of the proposed project due to the low distribution of trips between identified low-income and/or minority populations and the low percentage of these populations within the proposed project study area. In addition, the adjacent toll free main lanes would be available for use. The proposed Managed Express Lanes toll facility would benefit users and adjacent populations as a result of the improved system linkage and mobility within the study area and region.

Users of SH 121 would likely be residents living in Cleburne, Joshua, and Burleson commuting to the Fort Worth area for work, entertainment, or healthcare. Although there is one minority census block and no low-income block groups immediately adjacent to the project area, it is likely that minority and low-income persons could choose to use the tolled facility. To the extent that persons are unwilling or unable to pay the tolls, travel times along the regional non-tolled alternative roadways may be longer compared to the same trip along the tolled facility. SH 174 and IH 35W currently provide non-tolled thoroughfares from Cleburne, Joshua, and Burleson to the Dallas-Fort Worth area.

The following is an estimated example of the cost that may be incurred by an SOV opting to use the Managed Express Lanes toll facility. If a toll rate of 14.5 cents per mile is used (i.e., the same as the 2009 NTTA rates), the potential cost can be illustrated using the following scenario. For this example, it is assumed that the SOV user would make 250 round-trips per year through the Managed Express Lanes toll facility. Under this scenario, the annual cost for using the 14-mile Managed Express Lanes toll facility from FM 1187 to US 67 (28 miles per round trip), would be approximately $1,015 per year. An SOV user who opted to utilize the Managed Express Lanes toll facility with an annual household income equal to the median household income of Johnson County ($44,621) would spend about 2.3 percent of their household income on tolls. The SOV user in Tarrant County with an annual household income equal to the median household income of $46,179 would spend 2.2 percent of their household income on tolls. Those households living at the U.S. Department of Health and Human Services (HHS) 2009 poverty guideline level of $22,050 would spend about 4.6 percent of household income on tolls.

The intensity of adverse economic impact on low-income populations that would result from implementing the Managed Express Lanes toll facility is mitigated by the availability of regional non-tolled alternative roadways including SH 171, SH 174 and IH 35W, all currently provide non-tolled thoroughfares from Cleburne, Joshua, and Burleson to the Dallas-Fort Worth area. There are also potential benefits associated with the proposed Managed Express Lanes toll facility that must be considered when assessing the overall impact. Benefits include improved system linkage and mobility in the corridor, the acceleration of other infrastructure improvements in the region, potential reduction in congestion along regional non-tolled alternative roadways resulting from increased use of the proposed toll facility, and the potential use of toll revenues for other transportation projects including transit.

The proposed toll facility is neither removing a non-tolled alternative nor separating any low-income or minority populations. In addition, because of the nearby non-tolled roadways in place, the proposed toll facility is not likely to disproportionately adversely affect low-income or minority populations. Although electronic tolling was not covered in detail in the 2003 EA, this finding is consistent with the overall conclusion presented in the 2003 EA and approved in the 2004 FONSI.

3.2.2 Public Safety

Emergency vehicle routing would be possible at all times during construction and would be coordinated as needed with the proper local agencies. Disaster protection and other emergency services would likely be improved upon completion of the project, as it would alleviate local congestion and improve regional mobility. No adverse effects to public safety are anticipated. This finding is consistent with the analysis documented in the 2003 EA and approved in the 2004 FONSI.

3.2.3 Noise

In accordance with TxDOT's Guidelines for Analysis and Abatement of Highway Traffic Noise (TxDOT, 1997), a traffic noise analysis was prepared to evaluate traffic noise levels for the 2004 FONSI Alignment of the proposed SH 121. For this Re-evaluation, a new detailed noise analysis was not performed because no noise receptors are present in the location of the alignment shift associated with the Modified Alignment. Design modifications include changes in both vertical and horizontal alignment of the roadway where it crosses West Buffalo Creek.

The noise analysis for the 2004 FONSI included the modeling of 17 receivers along the 2004 FONSI Alignment. A traffic noise impact was documented at 13 receivers and various noise abatement measures were evaluated including traffic management, buffer zones, and noise barriers. In order for an abatement measure to be incorporated into a project, it must be both reasonable and feasible. In order to be feasible, the measure should reduce noise levels by at least five A-weighted decibels (dBA) at impacted receivers and to be reasonable it should not exceed $25,000 for each benefited receiver. The changes addressed in this Re-evaluation would not alter the conclusions or result in any new impacts for which any noise abatement would be feasible and reasonable; therefore, the original traffic noise analysis remains valid.

None of the measures evaluated were determined to be feasible and reasonable. Therefore, no noise abatement measures were included in the proposed project.

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

3.3 Detours

The proposed project would be constructed on new location where no roadway currently exists. During construction, cross traffic consisting primarily of local traffic would continue to use existing roadways as available. At various times during certain construction phases, particular cross roads may be temporarily closed for safety reasons. Construction of SH 121 would be performed in a manner so that the necessity for alternate route use for cross traffic would be kept to a minimum. If necessary, alternate routes for use by emergency and other public vehicles would be established and coordinated with the proper local agencies. This finding is consistent with the analysis documented in the 2003 EA and approved in the 2004 FONSI.

3.4 Utility Relocations/Adjustments

The adjustment and relocation of any utilities would be handled so that no large-scale interruptions would take place during construction of the proposed project. In all such cases, the appropriate authorities would perform the utility realignments, or adjustments. No schools, churches, hospitals, cemeteries, or other public facilities are within or adjacent to the ROW for the proposed project. Fire protection and other emergency services would be improved due to the ease of travel afforded by completion of the project. Although the Cleburne City Airport is in the vicinity of the proposed project, airway clearance coordination and/or associated permits are not required because the proposed project would not obstruct air navigation. This finding is consistent with the analysis documented in the 2003 EA and approved in the 2004 FONSI.

3.5 Pedestrian/Bicycle Facilities

The TEA-21 calls for the mainstreaming of bicycle and pedestrian projects into the planning, design and operation of our nation's transportation system. Bicycle and pedestrian projects and programs are eligible for but not guaranteed funding from almost all of the major federal-aid funding programs. Because of the nature of the proposed project, bicycle and pedestrian facilities do not constitute an integral part of SH 121. However, accommodation for bicycling and walking can be incorporated into the future planning, operations and maintenance activities of the proposed project based on funding capabilities and public support. There has been no change in the determination regarding pedestrian/bicycle facilities associated with SH 121 since issuance of the 2004 FONSI.

3.6 Farmland

The Farmland Protection Policy Act (FPPA) (7 USC.4201 et seq.) is implemented by federal regulations published in 7 CFR Part 658. The purpose of the FPPA is to minimize the contribution of federal programs to the unnecessary conversion of farmland (including prime farmland) to non-agricultural uses. Under the FPPA, coordination with the Natural Resources Conservation Service (NRCS) addressing consideration of alternative sites and/or protection measures is required for sites which receive a combined score of 160 or more in Part VII of Form AD-1006. Under FPPA, "sites that receive a Farmland Conversion Impact Rating combined score of less than 160 points would need no further consideration for protection against conversion activity. In addition, sites that receive a combined score of less than 160 points are considered as 'farmland committed to or already in urban development'."

As determined through the AD-1006 coordination with the NRCS in a letter dated June 7, 2002, the project area contains prime farmland. The 2004 FONSI Alignment would result in the conversion approximately 407 acres of prime farmland to transportation use, and the Modified Alignment would result in the conversion approximately 398 acres. The ROW required for the proposed project would not result in a substantive change to anticipated impacts to prime farmland soils since the issuance of the FONSI. As determined through the AD-1006 coordination, the project ROW received a rating of below 160; therefore, no further consideration of farmland impacts is required. For comparison, the 2004 FONSI Alignment and Modified Alignments received similar scores under Part IV, *Site Assessment Criteria*, with the 2004 FONSI Alignment receiving a score of 68 and the Modified

Alignment receiving a score of 66 out of a possible 160. This score was based on the proximity of the area to urban uses. As a result, any impacts to prime farmland would be considered negligible.

3.7 Air Quality

The Environmental Protection Agency (EPA) air quality criteria are defined by the National Ambient Air Quality Standards (NAAQS) promulgated by the Clean Air Act (CAA) Amendments of 1990. The State of Texas has adopted these standards.

The project is located within Tarrant and Johnson Counties and is therefore within the boundary of the NCTCOG Transportation Management Area (TMA). This area is designated as a moderate non-attainment area for eight-hour ozone. An area is designated as non-attainment when one or more of the NAAQS are not met. Because the project is located in a region that is in non-attainment of the NAAQS, the transportation conformity rule applies. Other air quality levels should continue to meet federal standards. Under the provisions of the CAA, states are required to develop and submit to the EPA a State Implementation Plan (SIP) for each non-attainment area.

The proposed SH 121 project is consistent with the region's financially constrained long-range plan, *Mobility 2030 - 2009 Amendment,* and the amended *2008-2011 Transportation Improvement Program* (TIP), as adopted by the NCTCOG. The US Department of Transportation [FHWA and Federal Transit Administration (FTA)] found the *Mobility 2030 - 2009 Amendment* to conform to the SIP on August 31, 2009, and the *2008-2011 TIP* was found to conform on June 12, 2007. All projects in the NCTCOG's TIP that are proposed for federal or state funds were initiated in a manner consistent with federal guidelines in Section 450, of Title 23 CFR and Section 613.200, Subpart B, of Title 49 CFR. Energy, environment, air quality, cost, and mobility considerations are addressed in the programming of the TIP. *Mobility 2030 - 2009 Amendment* and TIP pages depicting the proposed SH 121 project are included in **Appendix C**.

In the EA, the CALINE3/MOBILE6 computer program and traffic data for 2005 and 2025 were used to determine carbon monoxide (CO) concentrations in accordance with TxDOT requirements in the Air Quality Guidelines. The traffic data used in the analysis was obtained from NCTCOG. CO concentrations for the proposed action were modeled using 2025 levels for the most traveled section of SH 121, which is expected to occur between FM 1187 in Tarrant County and CR 920 in Johnson County. Topography and meteorology would not restrict dispersion of air pollutants. Local concentrations of CO are not expected to exceed national standards at any time. The air quality analysis revealed that the emissions from the use of the proposed SH 121 would not exceed any applicable NAAQS.

For this Re-evaluation, traffic data for the design year 2030 is 53,250 vehicles per day. A prior TxDOT modeling study demonstrated that it is unlikely that a carbon monoxide standard would ever be exceeded as a result of any project with an average daily traffic (ADT) below 140,000 vehicles per day, In addition, according to the NCTCOG *Mobility 2030 - 2009 Amendment* traffic data for SH 121, the traffic level for the most traveled section (between FM 1187 and CR 920) is predicted to be less than what was modeled and approved in the FONSI (68,500 ADT). Therefore, it was assumed that a decrease in traffic level would result in lower CO concentrations resulting from the proposed project. As a result of this and because the ADT projections for the project do not exceed 140,000 vehicles per day, a Traffic Air Quality Analysis was not required.

The congestion management process (CMP) is a systematic process for managing congestion that provides information on transportation system performance and on alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet state and local needs. The project was developed from NCTCOG, operational CMP, which meets all requirements of 23 CFR 500.109. The CMP was adopted by NCTCOG on April, 2008.

Operational improvements and travel demand reduction strategies are commitments made by the region at two levels: program level and project level implementation. Program level commitments

are inventoried in the regional CMP, which was adopted by NCTCOG; they are included in the financially constrained MTP, and future resources are reserved for their implementation.

Committed congestion reductions strategies and operational improvements within the study boundary will consist of signalization and intersection improvements. Individual projects are listed in **Table 7**.

Table 7. Congestion Management Process - SH 121

CSJ Number	Location	Implementing Agency	Project Type	Year of Implementation	Cost
0422-05-001	US 67; 0.6 mi East of FM 4 to SH 174	TxDOT	Widen from 2 lane arterial to 4 lane divided	2009	$15,315,345
0422-05-004	US 67; SH 174 to .9 mi east of SH 174	TxDOT	Construct ramp; add median barrier	2009	$4,684,655
0902-48-960	Fort Worth Intermodal Center to Tarrant County Line	TxDOT	New corridor	2010	$180,000,000
0902-48-927	BNSF at Dirks Road	TxDOT	Bridge reconstruction - widen road	2012	$8,000,000

Source: NCTCOG TIPINS September, 2009

In an effort to reduce congestion and the need for SOV lanes in the region, TxDOT and NCTCOG will continue to promote appropriate congestion reduction strategies through the CMAQ program, the CMP, and the MTP. The congestion reduction strategies considered for this project would help alleviate congestion in the SOV study boundary, but would not eliminate it. Therefore, the proposed project is justified. The CMP analysis for added SOV capacity projects in the TMA is on file and available for review at NCTCOG.

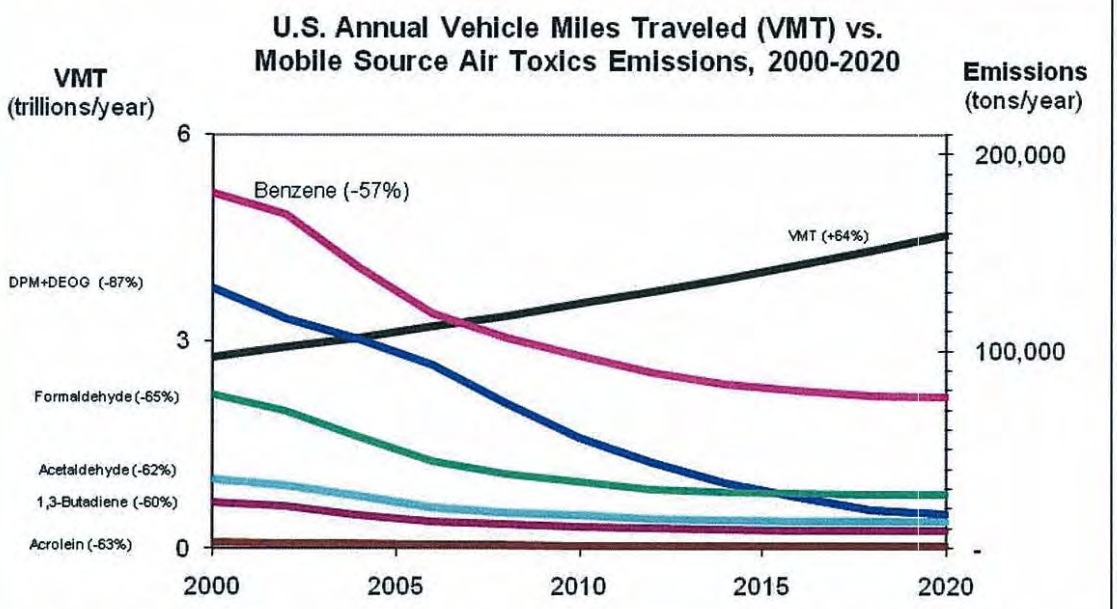
The control of particulate matter emanating from various construction activities would be in accordance with Texas Commission on Environmental Quality (TCEQ) Regulation 1. To minimize exhaust emissions, contractors would be required to use emission control devices and limit unnecessary idling of construction vehicles.

3.7.1 Mobile Source Air Toxics (MSATs)

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

The EPA is the lead federal agency for administering the CAA and has certain responsibilities regarding the health effects of MSATs. The EPA issued a "Final Rule on Controlling Emissions of Hazardous Air Pollutants from Mobile Sources 66", Federal Register (FR) 17229 (March 29, 2001). This rule was issued under the authority in Section 202 of the CAA. In its rule, EPA examined the impacts of existing and newly promulgated mobile source 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. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in vehicle miles traveled (VMT), these programs would reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and would reduce on-highway diesel PM emissions by 87 percent, as shown in the following graph.



Notes: For on-road mobile sources. Emissions factors were generated using MOBILE6.2. MTBE proportion of market for oxygenates is held constant, at 50%. Gasoline RVP and oxygenate content are held constant. VMT: *Highway Statistics 2000*, Table VM-2 for 2000, analysis assumes annual growth rate of 2.5%. "DPM + DEOG" is based on MOBILE6.2-generated factors for elemental carbon, organic carbon and SO4 from diesel-powered vehicles, with the particle size cutoff set at 10.0 microns.

In an ongoing review of MSATs, the EPA finalized additional rules under authority of CAA Section 202(l) to further reduce MSAT emissions that are not reflected in the above graph. The EPA issued Final Rules on Control of Hazardous Air Pollutants from Mobile Sources (72 FR 8427, February 26, 2007) under Title 40 CFR Parts 59, 80, 85 and 86. The rule changes were effective April 27, 2007. As a result of this review, EPA adopted the following 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); and (3) reducing evaporative emissions that permeate through portable fuel containers.

Beginning in 2011, petroleum refiners must meet an annual average gasoline benzene content standard of 0.62 percent by volume, for both reformulated and conventional gasoline, nationwide. The national benzene content of gasoline in 2007 is about 1.0 percent by volume. EPA standards to reduce NMHC exhaust emissions from new gasoline-fueled vehicles would become effective in phases. Standards for light-duty vehicles and trucks (equal to or less than 6,000 pounds [lbs]) become effective during the period of 2010 to 2013, and standards for heavy light-duty trucks (6,000 to 8,000 lbs) and medium-duty passenger vehicles (up to 10,000 lbs) become effective during the period of 2012 to 2015. Evaporative requirements for portable gas containers become effective with containers manufactured in 2009. Evaporative emissions must be limited to 0.3 grams of hydrocarbons per gallon per day.

EPA has also adopted more stringent evaporative emission standards (equivalent to current California standards) for new passenger vehicles. The new standards become effective in 2009 for light vehicles and in 2010 for heavy vehicles. In addition to the reductions from the 2001 rule, the new rules would significantly reduce annual national MSAT emissions. For example, EPA estimates that emissions in the year 2030, when compared to emissions in the base year prior to the rule, would show a reduction of 330,000 tons of MSATs (including 61,000 tons of benzene), reductions of more than 1,000,000 tons of volatile organic compounds (VOC), and reductions of more than 19,000 tons of $PM_{2.5}$.

Project Specific MSAT Information

Numerous technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project (see "Unavailable Information for Project Specific MSAT Impact Analysis" at the end of this section for more information). 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.

However, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative assessment cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by the FHWA titled *A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives*, found at:

www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm

It is anticipated that the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, assuming that other variables such as fleet mix are the same for each alternative. Because the VMT estimated for the No Build Alternative is higher than for any of the Build Alternatives, regional MSAT levels are expected to be higher for the No Build Alternative than for any of the Build Alternatives. Emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87% from 2000 to 2020. Even greater reductions are expected by 2030 from EPA's 2007 MSAT rule. 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.

Because of the specific characteristics of the project alternatives [i.e. SH 121 from FM 1187 to US 67], under each alternative there may be localized areas where VMT would increase, and other areas where VMT would decrease. Therefore, it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new roadway sections that would be built. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In sum, under any Build Alternatives in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSAT reduction programs. In comparing various project alternatives, MSAT levels could be higher in some locations than others, but current tools and science are not adequate to quantify them. However, on a regional basis, EPA's vehicle

and fuel regulations coupled with fleet turnover will cause region-wide MSAT levels to be significantly lower than today in almost all cases.

Sensitive Receptors

There may be localized areas where ambient concentrations of MSATs are slightly higher in the build scenario than in the No-Build scenario. Dispersion studies have shown that the "roadway" air toxics start to drop off at about 328 feet (100 meters). By 1,640 feet (500 meters), most studies have found it very difficult to distinguish the roadway emissions from background air toxic levels in any given area. Sensitive receptors include those facilities most likely to contain large concentrations of the more sensitive population (hospitals, schools, licensed daycare facilities, and elder care facilities).

One new sensitive receptor, Caddo Grove Elementary school, was constructed (since the issuance of the 2004 FONSI). The school is located within 328 feet (100 meters) of the proposed project. The location of this school is shown in **Appendix A**, **Figure 9**.

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

   These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE 6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects or to predict emissions near specific roadside locations. However, MOBILE 6.2 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 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 assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. These difficulties are magnified for 70-year cancer assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over a 70-year period. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts.

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

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

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

- Acetaldehyde (B2 Probable Human Carcinogen): Based on sufficient evidence of carcinogenicity in animals;
- Acrolein: Under the Draft Guidelines for Carcinogen Risk Assessment (EPA, 1999b), thepotential carcinogenicity of acrolein cannot be determined because the existing data areinadequate for an assessment of human carcinogenic potential for either the oral or inhalation route of exposure. There are no adequate human studies of the carcinogenic potential of acrolein. Collectively, experimental studies provide inadequate evidence that acrolein causes cancer in laboratory animals;
- Benzene: Under the Proposed Guidelines for Carcinogen Risk Assessment (EPA, 1996), benzene is characterized as a known human carcinogen for all routes of exposure based upon convincing human evidence as well as supporting evidence from animal studies (EPA, 1979,1985, 1998; Agency for Toxic Substances and Disease Registry [ATSDR], 1997);

- 1,3 Butadiene: Under the EPA's Draft Guidelines for Carcinogen Risk Assessment (EPA,1999b), 1,3-butadiene is characterized as carcinogenic to humans by inhalation. This characterization is supported by the total weight of evidence provided by the following: 1) sufficient evidence from epidemiologic studies of the majority of U.S. workers occupationally exposed to 1,3-butadiene, either to the monomer or to the polymer by inhalation, showing increased lymphohematopoietic cancers and a dose-response relationship for leukemia in polymer workers (EPA, 1999b, Section II.A.2), 2) sufficient evidence in laboratory animal studies showing that 1,3-butadiene causes tumors at multiple sites in mice and rats by inhalation (EPA, 1999b, Section II.A.3), and 3) numerous studies consistently demonstrating that 1,3-butadiene is metabolized into genotoxic metabolites by experimental animals and humans (EPA, 1999b, Section II.A.4). The specific mechanisms of 1,3-butadiene-induced arcinogenesis are unknown;
- Diesel Exhaust: Using the EPA's Draft Guidelines for Carcinogen Risk Assessment (EPA,1999b), diesel exhaust is likely to be carcinogenic to humans by inhalation from environmental exposures; and
- Formaldehyde (B1 Probable Human Carcinogen): The chronic health hazard assessment for formaldehyde is based on limited evidence in humans, and sufficient evidence in animals. Human data include nine studies that show statistically substantial associations between site specific respiratory neoplasms and exposure to formaldehyde or formaldehyde-containing products. An increased incidence of nasal squamous cell carcinomas was observed in long term inhalation studies in rats and in mice. The classification is supported by in vitro genotoxicity data and formaldehyde's structural relationships to other carcinogenic aldehydes such as acetaldehyde.

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 us to perform 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 to Evaluating Reasonably Foreseeable Significant Adverse Impacts on the Environment, and Evaluation of Impacts Based upon Theoretical Approaches or Research Methods Generally Accepted in the Scientific Community

While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from the 2004 FONSI Alignment and the Modified Alignment and MSAT concentrations or exposures created by the 2004 FONSI Alignment and Modified Alignment cannot be predicted with enough accuracy to be useful in estimating health impacts. 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."

3.7.2 Air Quality Construction Emissions

During the construction phase of this project there could be temporary increases in air pollutant emissions from construction activities, equipment, and related vehicles. The primary construction related emissions are particulate matter (fugitive dust) from site preparation and construction and non-road mobile source air toxics (MSAT) from construction equipment and vehicles. The primary MSAT emission related to construction is diesel particulate matter from diesel powered construction equipment and vehicles.

These emissions are temporary in nature (only occurring during actual construction) and it is not reasonably possible to estimate impacts from these emissions due to the limitations of the existing models. However, the potential impacts of particulate matter emissions would be minimized by using fugitive dust control measures such as covering or treating disturbed areas with dust suppression techniques, sprinkling, covering loaded trucks, and other dust abatement controls, as appropriate. The MSAT emissions would be minimized by encouraging use of EPA required cleaner diesel fuels, limits on idling, increasing use of cleaner burning diesel engines, and other emission limitation techniques, as appropriate.

However, considering the temporary and transient nature of construction related emissions as well as the mitigation actions to be utilized, it is not anticipated that emissions from construction of this project would not result in adverse impacts on air quality in the area.

3.8 Ecological Resources

3.8.1 Waters of the U.S. and Wetlands

The 2004 FONSI included an estimate of impacts to waters of the U.S., including wetlands, based on a determination and delineation of waters of the U.S., which was verified by the USACE. A Section 404 Pre-Construction Notification was submitted to the USACE December 22, 2005 and a project number was issued (2005-00058) by USACE, but was later put on hold due to funding constraints and a tolling evaluation. Due to changes in the alignment and USACE regulatory guidance since the 2004 FONSI, a revised PCN was submitted to the USACE December 2008, in accordance with the requirements for coverage under a Nationwide Permit (NWP) 14, Linear Transportation Projects. However, the final permit and mitigation plan coordination would be facilitated by NCTCOG, NTTA, and TxDOT as a part of the Chisholm Trail program efforts.

The determination and delineation of waters of the U.S., including wetlands, was performed along the 14-mile proposed project from FM 1187 to US 67 by qualified wetland biologists on January 26-28, 2004. On November 12, 2008, an additional delineation was preformed on West Buffalo Creek which was located outside the Modified Alignment but within the construction limits of the proposed road modification for CR 904, adjacent to SH 121. USGS topographic maps of the project area (Joshua and Primrose Quadrangles), one-meter Digital Ortho Quarter Quadrangles (DOQQs) (1995), and one-foot DOQQs (2004) were used to identify potential waters of the U.S. and areas prone to wetland development. Waters of the U.S., including wetlands, are shown on **Figure 10, Sheets 1–5** (**Appendix A**).

The 2004 FONSI Alignment, permitted under the existing SH 121 USACE Permit No. 200500058 (approved December 2004), would impact approximately 0.68 acre of waters of the U.S., including wetlands. Permanent impacts due to fill for culvert construction and/or relocations associated with roadway embankments would be 2,050 linear feet (LF) (0.43 acre) of streams and 0.25 acre of wetlands.

The Modified Alignment would impact a total of approximately 0.88 acre of waters of the U.S., including wetlands. Permanent impacts due to fill for culvert construction and/or relocations

associated with roadway embankments would be 2,503 LF (0.63 acre) of streams and 0.25 acre of wetlands. **Table 8** presents additional details regarding anticipated impacts to streams and wetlands.

Table 8. Impacts to Waters of the U.S.						
			Impacts Within Right of Way			
			2004 FONSI Alignment		Modified Alignment	
Permit	Type	OHWM	Length	Impacts	Length	Impacts
Crossing #		(ft)	(LF)	(Acres)	(LF)	(Acres)
Rock Creek Watershed						
S1	ES	2	261	0.01	282	0.01
W1	Wet	-	-	0.25	-	0.25
S-2	IS	5	290	0.03	273	0.03
S-3	IS	5	0	0.00	0	0.00
S-4	ES	2	0	0.00	0	0.00
S-5	ES	3	217	0.01	383	0.01
S-6	IS	8	489	0.09	507	0.18
S-7	ES	3	0	0.00	0	0.00
S-8	IS	7	0	0.00	0	0.00
S-9	ES	3	0	0.00	0	0.00
P-1	-	-	0	0.00	0	0.00
West Buffalo Creek Watershed						
S-10 at CR 904*	IS	15	-	-	66	0.01
S-10 at SH 121	IS	8	226	0.04	332	0.09
					115	0.03
		14	567	0.25	611	0.28
S-11	IS	4	0	0.00	0	0.00
		TOTAL	2,050	0.68	2,503	0.88

Sources: USACE Permit No. 200500058 (2004) and Draft PCN submitted December, 2008
OHWM = Ordinary High Water Mark
ES = Ephemeral stream
IS = Intermittent stream
Wet = Wetland
* Stream segment is not located with US 121 ROW. It is affected by the widening of a previously existing roadway.

The proposed mitigation measures for the Modified Alignment would avoid and minimize impacts where practicable and would be accomplished as follows.

- The implementation of modified bridge designs would use a longer bridge crossing. This would prevent impacts to streams and wetlands that result from construction through these areas rather than over as proposed.
- Channel re-alignments for two of the intermittent streams would enhance and improve stream channel function while reducing total linear impacts.
- The alignment shift to the west of the Modified Alignment would avoid and minimize impacts to waters of the U.S. along West Buffalo Creek while reducing the amount of fill that would be placed within the floodplain as compared to the 2004 FONSI Alignment.

In addition to permanent impacts, temporary crossings would be needed on six intermittent streams in both the Rock Creek and West Buffalo Creek watersheds. Most of the delineated ephemeral

channels originate within the proposed ROW and would be avoided during construction where practicable. Temporary construction crossings would be placed in streams during bridge construction and would be limited to the minimum width necessary for construction vehicles. These crossings would be typically constructed of corrugated metal pipe culverts with stabilized, clean rock and/or soil material and would be sized in order to pass anticipated normal high flows (one- to two-year events). Where practical, the temporary crossings would be placed within the proposed location of the future lanes for the ultimate roadway design to minimize impacts. Following construction of the facility, the temporary crossing structures would be removed if not adequate for use in the ultimate facility, and the banks would be re-graded to match pre-existing contours, stabilized, and revegetated using a TxDOT's rural seed mix specification or live plant material. In some cases, bridge piers may result in additional limited impacts to waters of the U.S.

A revised PCN (submitted in December of 2008) would request authorization under NWP 14 for unavoidable impacts at three single and complete crossings for the proposed SH 121 project. The USACE requires that engineering designs for culverts and drainage features maintain protection of stream flow dynamics in jurisdictional waters. The proposed plan efforts support this requirement. Where impacts could not be avoided, a proposed compensatory mitigation plan would include the purchase of mitigation credits from a local USACE-approved mitigation bank to offset the impacts. The permitting effort would be coordinated with USACE by NCTCOG, NTTA, and TxDOT as a part of the Chisholm Trail program efforts.

3.8.2 Floodplains

Floodplains are defined in Executive Order 11988, "Floodplain Management", as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year," or those areas which would be inundated by a 100-year flood (1977).

The extent of Federal Emergency Management Act (FEMA)-designated floodplains in the project areas, and specifically the zones which encompass the 100-year floodplain boundary, are shown in **Figure 10, Sheets 1–5, (Appendix A**). Zone A and Zone X500 are defined as areas within the 100-year floodplain (Zone A) and outside the 500-year floodplain (Zone X500).

Tarrant and Johnson Counties and the Cities of Cleburne and Burleson are participants in the National Flood Insurance Program (NFIP). The hydraulic design practices for this project would be in accordance with the current TxDOT design policy and standards. The toll road facility as proposed would permit the conveyance of the 100-year flood levels without causing substantial damage to the roadway, stream, or other property. The proposed project is not within the Trinity River Corridor Development Regulatory Zone; therefore, a Corridor Development Certificate (CDC) permit would not be required.

According to the FEMA Flood Insurance Rate Maps (Panel Nos. 48251011 F and 48251COI25F, September 27, 1991; 4825100050 G, revised January 6, 1993; and 48439C0510 H and 4843900520 H, revised August 2, 1995), the 2004 FONSI Alignment would cross 100-year floodplains and floodways at eight locations, including the West Buffalo Creek floodplain (Zone AE) and the floodplain of George Marti Lake. The Modified Alignment would reduce the total acreage of ROW within floodplains from 103.7 acres to 64.0 acres, which is a 38 percent decrease in potential effects to floodplains.

Coordination with the floodplain administrators determined that mitigation would be necessary for the West Buffalo Creek crossing. Three flood storage areas between the proposed ROW and Lake George Marti are proposed for mitigation of floodplain impacts. These three areas, totaling approximately 32 acres, would be excavated to a depth of six to eight feet with a storage capacity of 192 to 256 acre-feet of water (**Figure 10, Sheet 5, Appendix A**).

3.8.3 Water Quality

Surface Water

The EPA requires the reporting of crossings of impaired waters of the state, which are identified by TCEQ as required by Section 303(d) of the CWA. Impaired waters are water bodies that do not meet or are not expected to meet applicable water quality standards, as established by the TCEQ's Texas State Water Quality Inventory (TCEQ, 2008). The northern portion of the SH 121 project area lies within the Trinity River Basin. The Rock Creek watershed flows through the northern two-thirds of the project area in a generally west to northwest direction. No streams within the Rock Creek watershed and within the SH 121 project area are listed on the 2008 Section 303(d) of the CWA as threatened or impaired. The southern portion of the project area lies within the Brazos River Basin. The West Buffalo Creek watershed flows generally to the south through the southern one-third of the project area. None of the tributaries that flow through this section of the project area are listed on the 2008 Section 303(d) of the CWA as threatened or impaired. Runoff from this project would not discharge directly into any Section 303(d) listed threatened or impaired water, or into a stream within 5 miles upstream of a Section 303(d) listed threatened or impaired water. The 2008 303 (d) list was utilized in this assessment. The anticipated effects to surface water quality associated with the Modified Alignment are not different than those anticipated under the 2004 FONSI Alignment and are not considered to be substantial.

SH 121 is a Tier I project under the requirements of Section 401 of the CWA. Coordination to implement best management practices (BMPs) and adherence to Section 404 permit requirements would occur during USACE coordination. The Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit requires TxDOT to develop a Storm Water Pollution Prevention Plan (SW3P) and submit a Notice of Intent (NOI) two days prior to initiating construction activities. Prior to construction a SW3P would be developed and a NOI would be submitted. A Notice of Termination (NOT) would be issued following completion of all construction and stabilization activities for SH 121.

Groundwater

The project area overlies the Woodbine and Trinity aquifers. According to the Texas Water Development Board (TWDB) state well inventory, there are 22 water wells within one mile of the proposed project area with only one of these wells actually inside the project area. Of these 22 wells, nine were classified as being for domestic supply, 10 were designated for public supply, one for industrial use, one well was unused, and one well had no designation. The well located within the project area was designated as a domestic supply well. According to TxDOT, the well was properly capped after ROW acquisition; therefore, no associated effects to groundwater would be expected to occur. The Modified Alignment would not result in effects to groundwater quality.

3.8.4 Vegetation and Wildlife Habitat

In accordance with Provision (4) (A) (ii) of the TxDOT-Texas Parks and Wildlife Department (TPWD) Memorandum of Understanding (MOU) and the TxDOT-TPWD Memorandum of Agreement (MOA), an investigation to identify and map the vegetation types and assess the potential effects of the proposed project on these natural habitats was completed (**Figure 11, Sheets 1–5, Appendix A**). In accordance with the TxDOT MOU, habitats given consideration for non-regulatory mitigation include:

- Habitat for federal candidate species (affected by the project) if mitigation would assist in the prevention of the listing of the species,
- Rare vegetation series (S1, S2, or S3) that also locally provide habitat for state-listed species,
- All vegetation communities listed as S1 or S2, regardless of whether or not the series in question provide habitat for state-listed species,
- Bottomland hardwoods, native prairies, and riparian areas, and
- Any other habitat feature considered to be locally important that the TxDOT chooses to consider.

No vegetation types exist in the project area that fit the descriptions of rare vegetation series (S1, S2, or S3 series levels) as described by the TxDOT–TPWD MOA.

As described in the 2004 FONSI, the vegetation within the proposed ROW includes vegetation types such as silver bluestem-Texas wintergrass grassland, post oak, woods, forest and grassland mosaic, and crops. In 2003, the TPWD created a vegetation types map based on the "Vegetation Types of Texas" (McMahan et al, 1984) for use in Geographic Information Systems (GIS). Based on this spatial data, the vegetation types in the proposed ROW are mapped as 1) silver bluestem Texas wintergrass grassland; 2) post oak woods, forest and grassland mosaic; and 3) crops. According to TPWD, approximately 14 percent (93 acres) of the proposed ROW is mapped as silver bluestem Texas wintergrass grassland; 53 percent (351 acres) is mapped as post oak woods, forest and grassland mosaic; and 33 percent (223 acres) is mapped as crops.

According to the Vegetation Types of Texas, species prevalent in the bluestem grassland type include bushy bluestem (*Andropogon glomeratus*), little bluestem (*Schizachyrium scoparium*), silver bluestem (*Bothriochloa saccharoides*), three-awn (*Aristida* spp.), buffalo grass (*Buchloe dactyloides*), brownseed paspalum (*Paspalum plicatulum*), windmillgrass (*Chloris sp*), southern dewberry (*Rubus trivialis*), mesquite (*Prosopis glandulosa*), huisache (*Acacia smallii*) and baccharis (*Baccharis* spp.). The post oak woods, forest and grassland mosaic consists of post oak (*Quercus stellata*), blackjack oak (*Q. marilandica*), eastern redcedar (*Juniperus virginiana*), mesquite, yaupon (*Ilex vomitoria*), American beautyberry (*Callicarpa americana*), cedar elm (*Ulmus crassifolia*), hackberry (*Celtis laevigata*), little bluestem, three-awn, green sprangletop (*Leptochloa dubia*), and coralberry (*Symphoricarpos orbiculatus*). The crop vegetation type is described as cultivated cover or row crops providing food and/or fiber for either man or domestic animals. This type also includes grasslands in crop rotations. Tree species observed in the project area include pecan (*Carya illinioensis*), honeylocust (*Gleditsia triacanthos*), hackberry (*Celtis laevigata*), mesquite, live oak (*Quercus virginiana*), American elm (*Ulmus americana*), cedar elm, cottonwood (*Populus deltoides*), hickory (*Carya cordiformis*), post oak, soapberry (*Sapindus drummondii*), and bois D'arc (*Maclura pomifera*). Grass and forb species observed include big bluestem (*Andropogon gerardii*), little bluestem, silver bluestem, Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*) and wild rye (*Elymus virginiana*), with minor amounts of sideoats grama (*Bouteloua curtipendula*), blue grama (*Bouteloua gracilis*), hairy grama (*Bouteloua hirsuta*), Texas wintergrass (*Stipa leucotricha*), buffalo grass, western ragweed (*Ambrosia psilostachya*), asters (*Aster* spp.), and (*Lespedeza sp*).

In addition, the MOA requires the identification of "unusual vegetation features" which include the following: unmaintained vegetation, trees, or shrubs along a fenceline adjacent to a field (fencerow); riparian vegetation; trees that are unusually larger than other trees in the area; and unusual stands or islands of vegetation. "Unusual vegetation features" described in the 2004 FONSI include riparian vegetation and unmaintained vegetation. Another "unusual vegetation feature" not addressed in the 2004 FONSI which is present in the ROW of the Modified Alignment is fencerow vegetation.

Riparian vegetation provides important travel corridors for wildlife, and usually supports a higher animal diversity. Common tree species observed in riparian sites include pecan, cedar elm, American elm, cedar elm, hackberry, mesquite, black locust, osage orange and post oak. The average canopy cover in the riparian habitat in the Modified Alignment ROW is 40 percent with a range of 10 percent to 90 percent. No unusually large trees were identified. Trees in this habitat type vary in height from 10 to 30 feet with a diameter at breast height (dbh) varying from 3 inches to 25 inches, with an average dbh of 15 inches.

The understory, including the herbaceous component, of the riparian habitat is characterized by a diverse array of mesic-adapted forbs and grasses. Species identified in the sapling/shrub component included cedar elm, osage orange (Maclura pomifera), buttonbush (*Cephalanthus occidentalis*), hackberry, bumelia (*Sideroxylon lanuginosum*) and eastern redcedar. Herbaceous species included silver bluestem, western ragweed, goldenrod (*Solidago* sp.), Japanese brome (*Bromus japonicus*), virginia wild rye, and *Aster* spp.

Unmaintained vegetation includes grasses such as big bluestem, little bluestem, silver bluestem, Indian grass, switchgrass, wild rye, minor amounts of sideoats grama, blue grama, hairy grama, Texas wintergrass and buffalo grass. This area once contained significant amounts of prairie forbs such as western ragweed, littlesnout sedge (*Carex microrhyncha*), heath aster *(Aster ericoides)*, sageworts (*Artemisia sp.*) and tephrosias (*Tephrosia virginiana*).

The TPWD defines fencerow vegetation as trees or shrubs along a fenceline adjacent to a field. An estimate of fencerow vegetation was obtained from 2004 aerial photo interpretation and limited field reconnaissance. The tree species in along fencerows consist of mesquite, osage orange, bumelia, cedar elm, hackberry and Ashe juniper (*Juniperus ashei*). The average canopy cover is 15 percent with the trees ranging from one to 12 inches dbh with an average dbh of five inches. Trees ranged in height from five to 15 feet with an average height of nine feet. The understory is dominated by western ragweed, pricklypear, silver bluestem, tall dropseed, sideoats grama, little bluestem, purple three-awn, and horsemint (*Monarda citriodora*).

In accordance with Provision (4)(A)(i) of the TXDOT – TPWD MOU (1998) and the MOA (2003), the MOA requires the identification of "special habitat features" which include the following: bottomland hardwoods, caves, cliffs and bluffs, native prairies, ponds, seeps or springs, snags, water bodies, and existing bridges with easily visible bird or bat colonies. Although not specifically identified in the 2004 FONSI, the "special habitat features" described within the right of way included ponds and water bodies (i.e. streams and wetlands). These water bodies are described in detail in **Section 3.10.1**.

The proposed ROW includes impacts to vegetation types not protected by the MOU including mesquite pasture, rural developed and regenerative areas. The mesquite pasture areas are composed of tracts of secondary growth of immature mesquite in abandoned pasture and farmland. There are approximately 107 acres of mesquite pasture with an average of 39% canopy cover. Within the mesquite pastures, the trees are approximately 4 to 10 feet tall and average 8 inches diameter at breast height (dbh). Grasses such as silver-bluestem, little bluestem, and ryegrass dominate the understory of the mesquite pastures. Urban development, rural development, industrial, and commercial activities have displaced many of the native biotic communities. Rural developed areas have been developed as rural residential with some mixed use but do not have the density or proximity to urban areas to be considered suburban. The vegetation in the rural developed areas is predominately ornamental. Trees such as crepe myrtle (*Lagerstroemia indica*), sweet gum (*Liquidambar styraciflua*), live oak, American holly (*Ilex opaca*) and mimosa (*Albizzia julibrissin*) are currently located along roads, medians and property lines. The regenerative areas are located primarily around fence lines where they form linear strips of vegetation. There is approximately 1 acre of hackberry re-growth with an average of 70% canopy cover. In the hackberry re-growth areas, the trees range from 12 to 20 feet high, and average dbh is approximately 16 inches. The understory is dominated by various amounts of saw greenbriar (*Smilax bona-nox*) and poison ivy (*Toxicodendron radicans)*.

Field reconnaissance was performed to verify that existing habitat conditions had not changed from what was documented in the EA. **Table 9** includes a summary of the amount and type of vegetation in the ROW for the 2004 FONSI Alignment and the Modified Alignment.

Table 9. Acres of Habitat Types Directly Affected by the Proposed Right of Way

Habitat Type	Acreage within 2004 FONSI Alignment ROW	Acreage within Modified Alignment ROW
Pasture/grassland	250[2]	313.8
Mesquite pasture	103.8	106.9
Rural developed	138.6[2]	71.2
Regenerative areas	1.3	57.9
Upland woods	21.3	48.0
Riparian woods	3.0	39.7

Table 9. Acres of Habitat Types Directly Affected by the Proposed Right of Way		
Habitat Type	**Acreage within 2004 FONSI Alignment ROW**	**Acreage within Modified Alignment ROW**
Water body	7.0	6.1
Total[1]	**525.0**	**643.6**

1. Total acreage of proposed ROW is 644 acres, with 32 acres of floodplain mitigation. However, several ponds are located partially within the proposed ROW. Because the entire pond would be affected, the whole acreage of the ponds, including acreage outside of the proposed ROW, is included as affected acreage.
2. Acreages were not provided in the original EA; therefore, these numbers are estimates based on interpretation of the aerials used in the original EA.
Sources: 2004 FONSI and Interpretation of 2004 Aerial Photograph.

The construction of the Modified Alignment would require the conversion of 643.6 acres of undeveloped land to transportation use. This represents an increase of 118.6 acres from the 2004 FONSI Alignment. The methods used to calculate the habitat cover type acreages for the 2004 FONSI Alignment are not available and cannot be verified; therefore, the increased acreage would not be unreasonable given the variation and level of design detail that was included in this analysis. The initial design was to accommodate an interim two-lane highway, developing to a four-lane toll road as funding allowed. The current facility design is a departure from the original concept moving to a full electronic toll road. Further, additional design detail is known regarding interchanges and drainage easements that were not available during the impact calculations for the 2004 FONSI Alignment. This increase of approximately 23 percent in ROW is due to the increased information available for impact calculations as well as the shift associated with the Modified Alignment.

As outlined in the EA and approved in the 2004 FONSI, no mitigation for impacts to unusual vegetation features were proposed. Many rural landowners incorporate agricultural management practices which include livestock and grazing. The change of ownership and land management practices could result in variation of habitat type. No mitigation is proposed for the change in anticipated impacts to vegetation associated with the Modified Alignment. The Modified Alignment lies within the area surveyed for prairie remnant; therefore, no native prairies would be affected. In addition, an on-site investigation for the EA determined that there are no native prairie remnants that would be impacted by the 2004 FONSI Alignment.

All temporary equipment crossings in riparian corridors would be restored to original contours and reseeded with native species. No staging or material storage areas would be sited in riparian corridors. In addition, compensatory mitigation, in accordance with the Section 404 permitting process, would be incorporated into the proposed project. Due to avoidance, minimization, and compensatory mitigation efforts incorporated into the proposed project, no other non-regulatory mitigation is offered for the anticipated impacts.

Revegetation of disturbed areas would be in compliance with Executive Order 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping. Regionally native and non-invasive plants would be used to the extent practicable in landscaping and revegetation.

3.8.5 Threatened and Endangered Species

Plants and animals with federal classifications of endangered, threatened, proposed endangered, and proposed threatened are protected under the provisions of Sections 7 and 9 of the Endangered Species Act (ESA), as amended. In addition, species listed with a classification of Candidate (C1) are protected as listed species under federal law because information exists to support a listing of Threatened or Endangered.

The U.S. Fish and Wildlife Service (USFWS) maintain a list of endangered, threatened, and candidate species listed by county for their area of responsibility which includes the proposed project area. The TPWD maintains special species occurrences records through the Natural Diversity Database (NDD). A search of the NDD on January 29, 2008 found no records of special species

inside a 1.5-mile radius of the proposed project area (Modified Alignment). However, within the Joshua and Primrose quadrangles, there are single occurrence records for the Golden-cheeked Warbler (federally- and state-endangered) and the Brazos water snake (state-threatened). The NDD is a potential presence database only, and cannot be interpreted as presence/absence data.

According to the current TPWD annotated county special species lists, 29 endangered, threatened, and rare species may occur or have historically occurred within Tarrant and Johnson Counties (**Table 10**). According to TPWD annotated county special species lists at the time the FONSI was issued, 16 endangered, threatened, and rare species were listed as potentially occurring within Tarrant and Johnson Counties. The species that were included in the 2004 FONSI are marked with an asterisk (*) in **Table 10**. The species listed in the 2004 FONSI that are not included in **Table 10** are the Piping Plover (*Charadrius melodus*) which was listed as federally and state threatened, Mountain Plover (*Charadrius montanus*) which was listed as a federal candidate for threatened, Wood Stork (*Mycteria americana*) which was listed as state threatened, and false foxglove (*Tomanthera auriculata*) which was listed as extirpated in Texas. It was determined that the project area may provide habitat for some of the listed species, but the 2004 FONSI Alignment would not likely have an adverse effect.

Table 10. Endangered, Threatened, Proposed, and Candidate Species and Other Species of Concern Reported for Tarrant and Johnson Counties, Texas						
COMMON NAME	SCIENTIFIC NAME	STATUS			Effect/Impact Determination	
		USFWS	TPWD	HABITAT PRESENT (Y/N)	Species Effect	Species Impact
Birds						
*American Peregrine Falcon	*Falco peregrinus anatum*	DL	T	Y	No Effect	May Impact
*Arctic Peregrine Falcon	*Falco peregrinus tundrius*	DL	Rare	Y	No Effect	May Impact
*Bald Eagle	*Haliaeetus leucocephalus*	DL	T	Y	No Effect	No Impact
*Black-capped Vireo	*Vireo atricapilla*	E	E	N	No Effect	No Impact
*Golden-cheeked Warbler	*Dendroica chrysoparia*	E	E	N	No Effect	No Impact
*Henslow's Sparrow	*Ammodrammus henslowii*	NL	Rare	N	No Effect	No Impact
*Interior Least Tern	*Sterna antillarum athalassos*	E	E	Y	No Effect	May Impact
Western Burrowing Owl	*Athene cunicularia hypugaea*	NL	Rare	N	No Effect	No Impact
White-faced Ibis	*Plegadis chihi*	NL	T	N	No Effect	No Impact
*Whooping Crane	*Grus americana*	E	E	Y	Not likely to adversely Effect	May Impact
Fishes						
Sharpnose shiner	*Notropis oxyrhynchus*	C	Rare	N	No Effect	No Impact
Shovelnose sturgeon	*Scaphirhynchus platorynchus*	NL	T	N	No Effect	No Impact
Smalleye shiner	*Notropis buccula*	C	Rare	N	No Effect	No Impact
Mammals						
Gray wolf	*Canis lupus*	E	E	N	No Effect	No Impact
Plains spotted skunk	*Spilogale putorius interrupta*	NL	Rare	Y	No Effect	May Impact
Red wolf	*Canis rufus*	E	E	N	No Effect	No Impact
Mollusks						
Fawnsfoot	*Truncilla donaciformis*	NL	Rare	N	No Effect	No Impact
Little spectaclecase	*Villosa lienosa*	NL	Rare	N	No Effect	No Impact
Louisiana pigtoe	*Pleurobema riddellii*	NL	T	N	No Effect	No Impact

Table 10. Endangered, Threatened, Proposed, and Candidate Species and Other Species of Concern Reported for Tarrant and Johnson Counties, Texas						
COMMON NAME	SCIENTIFIC NAME	STATUS			Effect/Impact Determination	
		USFWS	TPWD	HABITAT PRESENT (Y/N)	Species Effect	Species Impact
Pistolgrip	*Tritogonia verrucosa*	NL	Rare	N	No Effect	No Impact
Rock pocketbook	*Arcidens confragus*	NL	Rare	N	No Effect	No Impact
Sand pocketbook	*Lampsilis satura*	NL	T	N	No Effect	No Impact
Texas fawnsfoot	*Truncilla macrodon*	NL	T	N	No Effect	No Impact
Texas heelsplitter	*Potamilus amphichaenus*	NL	Rare	N	No Effect	No Impact
Reptiles						
Brazos water snake	*Nerodia harteri*	NL	T	Y	No Effect	May Impact
*Texas Horned Lizard	*Phrynosoma cornutum*	NL	T	Y	No Effect	May Impact
*Texas Garter Snake	*Thamnophis sirtalis annectens*	NL	Rare	Y	No Effect	May Impact
*Timber/Canebrake Rattlesnake	*Crotalus horridus*	NL	T	Y	No Effect	May Impact
Plants						
Glen Rose yucca	*Yucca necopina*	NL	Rare	N	No Effect	No Impact

USFWS: United States Fish and Wildlife Service
E: Endangered (in danger of extinction throughout all or a significant portion of its range)
T: Threatened (likely to become endangered within the foreseeable future)
C: Candidate, USFWS has substantial information on the biological vulnerability and threats to support proposing to list as threatened or endangered.
DL: De-listed
NL: Not federally listed.
TPWD: Texas Parks and Wildlife Department
E: Listed as endangered by the state of Texas.
T: Listed as threatened by the state of Texas.
Rare: Rare, but with no regulatory listing status.
* Species listed in the 2004 FONSI
Sources:(USFWS, 2008); (TPWD, 2008)

Both species of Peregrine Falcon (the state listed threatened American Peregrine Falcon and species of concern Arctic Peregrine Falcon) occupy a wide range of habitats during their migration, including urban, concentrations along coast and barrier islands. They are also low-altitude migrants with stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands (TPWD, 2010). The area around the waters of the U.S. in the proposed project area provide suitable temporary foraging habitat for these species. While the proposed project could alter the existing foraging habitat within the proposed project area, the species is highly mobile, and there is abundant habitat available outside of the project area. The project area does not provide suitable nesting habitat. The proposed project is not likely to adversely affect this species.

The Bald Eagle is currently federally tracked as a delisted taxon, recovered, being monitored for the first five years by USFWS. The Bald Eagle remains a state-listed threatened species, and is primarily found near rivers and large lakes (TPWD, 2010). Benbrook Reservoir, which could provide suitable habitat, is located approximately 2 miles north of the proposed project. Nests were not seen during the field visit; however, the project area would be re-examined before and during construction. While the proposed project could permanently alter approximately 48 acres of upland woods, 39.7 acres of riparian woods, and 6.1 acres of water bodies, there is an abundant amount of similar habitat available and readily accessible outside of the project area (Benbrook Reservoir). In the event that Bald Eagles are encountered on-site during project construction, adverse impacts on birds, active nests, eggs, and/or young would be avoided in accordance with the Bald Eagle Protection Act of 1940. The contractor would follow the guidelines in the Draft National Bald Eagle Management Guidelines written by the USFWS in February of 2006. Accordingly, the proposed project would not impact this species.

The proposed project area does not provide suitable habitat for the federally and state listed endangered Black-capped Vireo. Rangelands with scattered clumps of shrubs separated by open grassland are preferred habitat for the Black-capped Vireo (TPWD, 2010). Because of the lack of suitable habitat within the project area, the Black-capped Vireo would not be affected by the proposed project.

The Golden-cheeked Warbler is listed as endangered on the state and federal levels. Golden-cheeked Warblers nest only in central Texas in mixed Ashe-juniper and oak woodlands in ravines and canyons (TPWD, 2010). While Ashe-juniper is found within the proposed ROW, it was not found to support habitat for this species. Because of the lack of suitable habitat within the project area, the Golden-cheeked Warbler would not be affected by the proposed project.

Habitat for the state listed rare Henslow's Sparrow includes large, flat fields with no woody plants and with tall, dense grass, a dense litter layer, and standing dead vegetation (TPWD, 2010). This habitat is not found within the proposed project area. Because of the lack of suitable habitat within the project area, the Henslow's Sparrow would not be impacted by the proposed project.

The federally and state listed endangered Interior Least Tern nests along sand and gravel bars within braided streams, rivers; and is also known to nest on man-made structures that are found within the proposed project area (TPWD, 2010). The areas around the streams within the proposed project area could provide suitable temporary foraging habitat for this species. While the proposed project could alter the potentially suitable habitat within the proposed project area, the species is highly mobile, and there is abundant habitat available outside of the project area. The project area does not provide suitable nesting habitat. The proposed project is not likely to adversely affect the Interior Least Tern.

The Western Burrowing Owl is listed as rare by the TWPD. Burrowing owls typically utilize active or abandoned prairie dog towns due to the clustering of burrows required for brood rearing. No potential nesting burrows were observed in the project area. The Western Burrowing Owl is primarily found in open areas with short vegetation and bare ground in desert, grassland, and shrub-steppe environments (TPWD, 2010). Prairie dog towns and the primary habitat for the Western Burrowing

Owl were not identified in the proposed project area; therefore, the Western Burrowing Owl would not be impacted by the proposed project.

The state listed threatened White-faced Ibis frequents marshes, swamps, ponds and rivers. In Texas, they breed and winter along the Gulf Coast and may occur as migrants in the Panhandle and West Texas (TPWD, 2010). The preferred habitat for this species was not found within the proposed project area; therefore, the White-faced Ibis would not be impacted by the proposed project.

The state and federally listed endangered Whooping Crane winters on the Aransas National Wildlife Refuge's 22,500 acres of salt flats and marshes. The area's coastal prairie rolls gently here and is dotted with swales and ponds. They summer and nest in poorly drained wetlands in Canada's Northwest Territories at Wood Buffalo National Park (TPWD, 2010). While the proposed project could alter the potentially suitable habitat within the proposed project area, the species is highly mobile, and there is abundant habitat available outside of the project area. The project area does not provide suitable nesting habitat. The proposed project is not likely to adversely affect this species.

The federally listed candidate and state listed rare sharpnose shiner is endemic to the Brazos River drainage. It is naturally found in the Red River drainage, when a tributary to the Brazos River was captured into the Red River drainage (Conner and Suttkus 1986, Cross et al. 1986). It has also been introduced in the Colorado River drainage (Gilbert 1980; Conner and Suttkus 1986). Warren et al. (2000) listed the following drainage units for distribution of *Notropis oxyrhynchus* in the state: Brazos River, Colorado River. While the streams within the southern third of the proposed project area are tributaries to the Brazos River, they are intermittent and ephemeral and therefore do not provide suitable habitat for this species. The sharpnose shiner would not be affected by the proposed project.

The state listed threatened shovelnose sturgeon can tolerate high turbidities and is usually found in the strong currents of main river channels. They are often found over sand and gravel substrates feeding on aquatic insects, mussels, worms, and crustaceans (National Paddlefish and Sturgeon Steering Committee 1992). The streams within the proposed project area do not provide suitable habitat for this species, and the proposed project would not impact this species.

The state listed rare smalleye shiner is endemic to the Brazos River and its major tributaries in Texas. It only occurs in stream habitats, primarily in fairly shallow water (less than three feet deep) in broad, open sandy channels with moderate to high current. The often saline and turbid waters of the Upper Brazos River are typical habitat for shiners, which are adapted for finding and feeding on a variety of small aquatic invertebrates, as well as terrestrial arthropods entering the stream from the banks and riparian areas. The streams within the proposed project area do not provide suitable habitat for this species, and the proposed project would not impact this species.

The state and federally listed endangered gray wolves are found in forests, brushlands, or grasslands where suitable cover and denning sites are available. Gray wolves were once found throughout North America. Historically, gray wolves were found over the western 2/3 of the state (TPWD, 2010). Today, none remain in Texas. Because the gray wolf is believed to be extirpated from Texas, the proposed project would not affect this species.

The plains spotted skunk is listed as a species of concern by TPWD. Plains spotted skunks live in open tallgrass prairies, forests, bushy areas and cultivated land. Wild habitat is generally associated with streams or rivers, but will also live in areas of human habitation including barns and brush piles, which are found in the proposed project area (TPWD, 2010). The proposed project could alter the existing habitat for this species within the proposed project area. Although there is abundant similar habitat outside of the project area, the proposed project may impact this species.

The state and federally listed endangered red wolf inhabits brushy and forested areas, as well as the coastal prairies. The red wolf was apparently extinct in the wild by 1980 (TPWD, 2010). The proposed project would not affect this species.

The state listed rare fawnsfoot inhabits medium and large rivers with moderate to slow flowing water. It usually inhabits shallow waters (one to five meters deep) with gravel sand or muddy bottoms (NPS, 2010). The habitat for this species is not found within the proposed project area; therefore, it would not be impacted by the proposed project.

The state listed rare little spectacle case can be found in small to medium streams in sand or gravel. The streams within the proposed project area are ephemeral and intermittent; therefore, they would not provide suitable habitat for this species. The little spectacle case would not be impacted by the proposed project.

The state listed threatened Louisiana pigtoe's habitat ranges from eastern Texas drainages into Louisiana, but has been exceptionally rare in recent decades. Since the mid-1990s, small numbers of living specimens have been found in the Neches River and some of its tributaries and the Angelina River (TPWD, 2009). The streams within the proposed project area are not included in this species' known habitat; therefore, the proposed project would not impact the Louisiana pigtoe.

The state listed rare pistol grip can be found in mud, sand, or gravel in moving waters of medium to large rivers. The streams within the proposed project area are ephemeral and intermittent; therefore, they would not provide suitable habitat for this species. The proposed project would not impact the pistol grip.

The state listed rare rock pocketbook occurs from the Interior Basin (Mississippi and Ohio River Drainages) south and west to the Colorado River, Texas. This mussel inhabits slow-moving rivers with muddy substrates (Miller et al, 2010). The streams within the proposed project area are ephemeral and intermittent; therefore, they would not provide suitable habitat for this species. The proposed project would not impact the rock pocketbook.

The state listed threatened sand pocketbook is known from southern portions of the Mississippi interior basin and western Gulf drainages of Arkansas, Mississippi, Louisiana, and Texas. It is considered rare in all states from which it has been recorded (TPWD, 2009). The streams within the proposed project area are ephemeral and intermittent; therefore, they would not provide suitable habitat for this species. The proposed project would not impact the sand pocketbook.

The state listed threatened Texas fawnsfoot historically occurred in the Colorado and Brazos drainages of Central Texas. A recently discovered population in the Brazos River between Possum Kingdom and the mouth of the Navasota River represents the only known surviving population (TPWD, 2009). Little is known about this species; possibly inhabits rivers and larger streams, and is intolerant of impoundment. It may also be found in flowing rice irrigation canals. It could be found with sand, gravel, and perhaps sandy-mud bottoms in moderate flow streams (TPWD, 2010). The area of known surviving population is not within the proposed project area; therefore, this species would not be impacted.

The state listed rare Texas heelsplitter is restricted to the Sabine, Neches, and Trinity rivers of Texas (TPWD, 2009). Because none of these rivers exist within the proposed project area, this species would not be impacted.

The state listed threatened Brazos water snake can be found in the upper Brazos River drainage and in shallow water with a rocky bottom and on rocky portions of banks (TPWD, 2010). The upper Brazos River drainage is found within the proposed project area, and it is possible that this species could be found in the proposed project area. Therefore, this species may be impacted by the proposed project.

The state threatened Texas horned lizard inhabits open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; soil may vary in texture from sandy to rocky. The proposed project area does not provide suitable habitat for this species; therefore, the Texas horned lizard would not be impacted.

The Texas garter snake is listed as a species of concern by TPWD. The Texas garter snake is usually found in dry, lightly wooded areas (TPWD, 2010). Potentially suitable habitat for this species can be found within the proposed project area. The proposed project could alter the existing habitat for this species within the proposed project area. Although there is abundant similar habitat outside of the project area, the proposed project may impact this species.

The state threatened timber/canebrake rattlesnake occurs in a wide variety of terrestrial habitat including lowland cane thickets, high areas around swamps and river floodplains, hardwood and pine forests, mountainous areas, and rural habitats in farming areas (TPWD, 2010). Potentially suitable habitat for this species can be found within the proposed project area. The proposed project could alter the existing habitat for this species within the proposed project area. Although there is abundant similar habitat outside of the project area, the proposed project may impact this species.

The state listed rare Glen Rose yucca is endemic to Texas. It can be found on grasslands on sandy soils and limestone outcrops. This habitat was not found within the proposed project area; therefore it would not be impacted.

After reviewing habitat requirements and conducting a field visit, it was determined that the proposed project may impact potentially suitable habitat, of the American and Arctic Peregrine Falcons, Bald Eagle, Interior Least Tern, Whooping Crane, plains spotted skunk, Brazos water snake, Texas garter snake, and the timber/canebrake rattlesnake. However, the proposed project is not likely to adversely affect the nationally listed Interior Least Tern or Whooping Crane. Because the proposed project may impact individuals of these state listed threatened species, coordination with TPWD would be required for the proposed project to determine and mitigate any effects to these species.

The terms of the Migratory Bird Treaty Act (MBTA) of 1918 apply to the proposed project. The MBTA prohibits all negative impacts to birds, young, eggs, or occupied nests in part or whole for all birds on the migratory birds list. In the event that migratory birds are encountered on-site during project construction, every effort will be made to avoid adverse impacts to protected birds, active nests, eggs, and/or young. The contractor would be prepared to prevent migratory birds from building nests between February 15 and October 1.

3.9 Coastal Barrier and Coastal Zones

In January 1997, the State of Texas has an approved Coastal Zone Management Plan (CZMP). The proposed project does not lie within the CZMP boundary. Because the project lies outside of the boundary, it has been determined that the proposed project would not have an adverse effect on the coastal natural resources areas as identified in the applicable policies. This finding is consistent with the analysis documented in the 2003 EA and approved in the 2004 FONSI.

3.10 Cultural Resources

NEPA requires agencies of the federal government to consider effects of their actions on "the human environment," which includes cultural as well as natural aspects of the environment. Cultural resources are defined as any prehistoric or historic district, building, structure, object, or archeological site included in, or eligible for inclusion in, the National Register of Historic Places (NRHP).

Cultural resources determined eligible for listing in the NRHP which will be directly affected by a FHWA–funded project are subject to evaluation under Section 4(f) of the DOT act of 1966 (23 CFR 771.135). Section 4(f) requires that the agency show that all planning to minimize harm to any NRHP property resulting from the proposed action was considered and that all feasible and prudent alternatives to avoid adverse effects to the NRHP property have been explored.

3.10.1 Historic Properties

In addition to Section 4(f) requirements, Section 106 (36 CFR 800) of the 1966 National Historic Preservation Act (NHPA), as amended, also requires the agency to consult with the State Historic Preservation Office (SHPO) concerning the potential effects that a proposed project may have on NRHP properties located within the project's Area of Potential Effect (APE) of 300 feet. Section 106 requires that the agency show that project planners and engineers have "taken into account" the effects the project may have on NRHP properties and that a reasonable effort has been made to preserve the resource through avoidance or other means to minimize adverse effects to the property and/or the historic resource.

The historic resources survey completed for the 2004 FONSI remains valid except for the project area divergent from the alignment approved under the FONSI. TxDOT historians surveyed the new APE and determined that no historic-age resources are present and that individual project coordination with SHPO is not required.

3.10.2 Archeological Resources

This project also falls under the purview of the Texas Antiquities Code (TAC), because it may involve "lands owned or controlled by the State of Texas or any city, county, or local municipality thereof." Because the project involves state purchase of right of way, or lands belonging to local municipalities and counties, under jurisdiction of the TAC, cultural resources will also be considered under provisions of the Memorandum of Understanding between the SHPO and TxDOT. The TAC allows for all NRHP-eligible properties to be considered as State Archeological Landmarks (SALs) and requires that each be examined in terms of possible "significance". Significance standards for the code are outlined under Chapter 26 of the Texas Historical Commission's (THC) Rules of Practice and Procedure for the TAC and closely follow those of the U.S. Secretary of Interior's Standards and Guidelines.

A TxDOT archeologist evaluated the potential for the proposed undertaking to affect archeological historic properties (36 CFR 800.16(l)) or State Archeological Landmarks (13 TAC 26.12) in the APE. The APE comprises the existing ROW within the project limits (maximum 516 ft wide for 2.05 mi) and approximately 168 ac of new ROW. Maximum vertical impacts within the APE will extend to less than 2 ft below the modern ground surface in most areas of the APE and approximately 5 ft below the modern ground surface in borrow pit areas. Section 106 review and consultation proceeded in accordance with the First Amended Programmatic Agreement among the FHWA, the TxDOT, the Texas State Historic Preservation Officer, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU), as well as the Memorandum of Understanding (MOU) between THC and TxDOT. The following documentation presents TxDOT's findings and explains the basis for those findings.

An impact evaluation of the area of potential effects (APE) was conducted in May 2002. This impact evaluation found no archeological deposits and the project setting is not favorable for the preservation of intact deposits within the project APE.

TxDOT completed its review on January 17, 2009. Section 106 consultation with federally recognized Native American tribes with a demonstrated historic interest in the area was initiated on December 3, 2008. No objections or expressions of concern were received within the comment period.

The proposed project is not anticipated to impact cultural resources, and this finding is consistent with the analysis documented in the 2003 EA and approved in the 2004 FONSI. However, if any pre-historic or historic resources are encountered during project construction, TxDOT's Cultural Resource Specialist and the State SHPO would be notified and an impact assessment would be completed.

3.11 Section 4(f) Resources

The proposed project would not require the use of or substantially impair the purposes of any publicly owned land from a public park, recreational area, wildlife and waterfowl refuge land or impact any cultural resources; therefore, a Section 4(f) statement would not be required. This finding is consistent with the analysis documented in the 2003 EA and approved in the 2004 FONSI.

3.12 Hazardous Materials

A hazardous materials investigation, including database search and field verification, was performed for the 2004 FONSI. A review of current publicly available databases using the EPA Envirofacts Multisystem Query (October, 2008 and January, 2009) and field reconnaissance was performed (October 14, 2008) to re-evaluate the potential to encounter hazardous materials in the Modified Alignment proposed ROW.

The EPA databases reviewed include the National Priorities List (NPL), the Comprehensive Environmental Response Compensation and Liability Information System (CERCLIS), the Resource Conservation and Recovery Information System (RCRIS), the Emergency Response Notification System (ERNS), and the Toxic Release Inventory System (TRIS). The TCEQ databases searched include the Texas State Superfund, the Industrial and Hazardous Waste (IHW), the Leaking Petroleum Storage Tanks (LPST), the Municipal Solid Waste Landfills (MSWLF), the Registered Petroleum Storage Tanks (RPST), and the Voluntary Cleanup Program (VCP).

Three registered storage tank sites were identified in the 2004 FONSI, but no new sites were identified in any databases. Eight new gas drilling/production sites were identified in or adjacent to the proposed ROW during the field reconnaissance, October 14, 2008. The locations of these wells from north to south along the Modified Alignment are as follows:

1. Two adjacent well pads located west of Modified Alignment, and south of CR 920, Johnson County – unidentified owner/operator
2. One well pad located west of Modified Alignment, south of CR 1015, and west of CR 1015A, Johnson County – unidentified owner/operator
3. Two adjacent well pads located west of Modified Alignment, south of CR 915, east of FM 1902 and northeast of CR 1016B –owner/operator, Devon Energy and Chesapeake Energy Corporation
4. One well pad, under construction, located east of and adjacent to Modified Alignment, northwest of CR1016 – unidentified owner/operator
5. One well pad located adjacent to or within Modified Alignment, immediately south of CR 913 – owner/operator, Devon Energy
6. One well pad located adjacent to or within Modified Alignment, south of CR 910 – owner/operator, Devon Energy
7. One well pad located adjacent to or within Modified Alignment, north of FM 917 – unidentified owner/operator
8. One well pad located west of Modified Alignment, south of CR 904 – owner/operator, EDG Energy and Development Group

Two well pad sites were noted east of the Modified Alignment and west CR 1022 but were estimated to be 1,500 to 2,000 feet outside the construction boundary of the Modified Alignment. In addition one compressor station was located east of the Modified Alignment and north of CR 920A and another was located east of the alignment and south of CR 904 along CR 1022 in Johnson County. Gas well sites may contain hazardous materials that would be handled in accordance with federal, state, and local laws if encountered during construction.

4.0 INDIRECT EFFECTS

The CEQ defines indirect effects as:

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

In many cases, these indirect effects would occur outside of a specific project area. As to the cause and effect relationship between the project and the indirect impact, CEQ states that indirect effects may include induced changes to land use resulting in resource impacts (40 CFR 1508.8). Other indirect effects include the potential alteration of or encroachment on the affected environment. Examples of this include fragmentation of a habitat and functional effects to water resources.

The EA included a cursory analysis of indirect effects; however, it did not include a cumulative effects analysis. The EA examined potential indirect economic impacts of the project related to issues such as: changes in land use and value (i.e., tax base); accessibility to and from business, residential, commercial and recreational points of interest; relocation of existing homes and business; and impacts to existing businesses due to changes in traffic patterns. It also examined the potential indirect physical and environmental impacts to waters of the U.S., floodplains, wildlife habitat, air quality, water quality, and areas of historic significance. It was determined that the project would have a positive indirect effect on economic resources and no reasonably foreseeable indirect impacts on natural resources.

The analysis of indirect effects for this Re-evaluation follows guidance from the National Cooperative Highway Research Program (NCHRP) Report 466, *Desk Reference for Estimating Indirect Effects of Proposed Transportation Projects*, from the Transportation Research Board and NCHRP Report 25-25, Task 22, "Land Use Forecasting for Indirect Impacts Analysis". In accordance with this guidance, this indirect effects analysis involves the following steps.

1. Scoping
2. Identify the Study Area's Goals and Trends
3. Inventory Notable Features
4. Identify Impact-Causing Activities
5. Identify Potentially Substantial Indirect Effects for Analysis
6. Analyze Indirect Effects and Evaluate Results
7. Assess Consequences and Consider/Develop Mitigation (When Appropriate)

In addition to a project-level indirect effects analysis, this Re-evaluation includes an analysis of the regional toll and managed lane/High Occupancy Vehicle (HOV) system.

4.1 Project-Level Impact Analysis

4.1.1 Scoping

To evaluate potential indirect effects associated with the proposed project, a study area was developed. The NCHRP Report 466, on page 62 states that "development effects are most often found up to one mile around a freeway interchange, up to two to five miles along major feeder roadways to the interchange, and up to one-half mile around a transit station." The NCHRP Report 466 also states that there are certain general circumstances which may influence the likelihood of induced development shifts (2002). Thus, the two- to five-mile boundary serves as a guideline, and individual projects must be analyzed case-by-case.

Following is an evaluation of the directional boundaries for indirect effects study area for SH 121.

South—Development to the south of the terminus of the SH 121 would be influenced by SH 174 and US 67. The potential effects of SH 121 would be difficult to distinguish from the effects of SH 174 and US 67 which are heavily utilized roads. Also, the City of Cleburne is currently developed as commercial/industrial and residential uses south of SH 174 and US 67, which would inhibit induced development in the area. This, along with the lack of forecasted development south of SH 174 and US 67 from local planners, support selecting SH 174 and US 67 as the southern boundary of the study area for indirect effects (**Figure 12, Appendix A**).

East—SH 174 lies approximately 1.5 miles east of the proposed project at the southern terminus and approximately 6.5 miles to the east at the northern terminus. IH 35W lies approximately 10 miles east of the proposed project at the southern terminus and approximately 6.5 miles to the east at the northern terminus. These two established roadways have been the primary influence on development in the surrounding area. The potential effects of SH 121 with regard to induced development east of SH 174 would be difficult to distinguish from those related to SH 174 or IH 35W. However, local planners forecasted development along US 67 (southern terminus) up to approximately one mile east of SH 121. Based on the forecasted development, the eastern boundary of the study area for indirect effects lies approximately 1.5 miles east of the SH 174-US 67 intersection. This boundary parallels SH 174 approximately 1.5 miles to the east of the roadway until it reaches a point approximately five miles from the proposed project and continues north to Cleburne/Crowley Road (**Figure 12, Appendix A**).

North—The northern terminus of the project is Cleburne/Crowley Road. North of Cleburne/Crowley Road development is primarily influenced by the City of Fort Worth. The effects from the Fort Worth metropolitan area would be difficult to distinguish from the potential impacts from the proposed project. Therefore Cleburne/Crowley Road, approximately 1.4 miles north of the northern terminus, serves as the northern boundary for the study area for indirect effects (**Figure 12, Appendix A**).

West—There are no major roadways within 10 miles west of the proposed project. The area to the west of the proposed project is not developed or incorporated. Development is limited west of the proposed project by lack of infrastructure, primarily wastewater service. The local planners did not forecast any reasonably foreseeable development more than 1.5 miles west of the project under the Build or No-Build Scenario. Therefore, the western study area boundary for indirect effects is approximately 1.5 miles west of the proposed project area (**Figure 12, Appendix A**).

The resulting study area for indirect effects (Area of Influence) associated with SH 121 is approximately 39,100 acres (**Figure 12, Appendix A**). Indirect impacts were considered to a future year, 2030, the planning year for the proposed project.

4.1.2 Identify the Study Area's Goals and Trends

The 2030 MTP defines transportation systems and services in the area containing the boundaries of the Area of Influence. The MTP addresses regional transportation needs that are identified through forecasting current and future travel demand, developing and evaluating system alternatives and selecting those options which best meet the mobility needs of the region. The proposed facility is included in this plan.

To gather data regarding future land use and the study area's goals and trends, the study team conducted interviews with local land use planners and consulted local land use plans. Where the jurisdictions did not have land use planners on staff, interviews with other local officials with knowledge of their jurisdiction's growth plans were held. These individuals are referred to as local planners. The study team interviewed local planners from the jurisdictions through which SH 121 would pass.

For this analysis, the Build Scenario is the *Mobility 2030 - 2009 Amendment* (NCTCOG, 2009) plan with SH 121, and the No-Build Scenario is the *Mobility 2030 - 2009 Amendment* plan without SH 121 (**Figures 13** and **14 Appendix A,** respectively). These figures showing the Build and No-Build Scenarios are the results of what was presented to the local planners in order to ascertain the forecasted development under these two scenarios. Other than the existence of SH 121, the two scenarios shown to the local planners were identical. The local planners were asked to consider where future development would be expected to occur within their jurisdictions under each of these two scenarios through 2030, which equates to the planning year for the project and the future temporal boundary for the indirect and cumulative effects analyses. Development would continue past 2030; therefore, these scenarios do not represent the ultimate development for these jurisdictions. A list of the local planners interviewed is provided in **Appendix D**.

The Build and No-Build Scenarios (**Figures 13** and **14, Appendix A**) were compared, and the differences in forecasted development were identified as the indirect effects of the SH 121 project on development or land use. Where there were differences in forecasted development, the resulting "Indirect Effects Areas" were overlaid on resource maps using geographic information system (GIS) data to identify the indirect effects associated with SH 121. Where it was not possible to quantify indirect effects for a particular resource, indirect effects are discussed qualitatively. Where the timing of development would be affected by the SH 121 project, effects to resources were also considered. Where possible, indirect effects for resources within the Area of Influence were quantified using this difference.

Figure 15, (**Appendix A**), shows a composite of this development under the Build and No-Build Scenarios. The local planners predicted that while the total amount of development under each scenario would be similar, some of the land in the southern portion of the Area of Influence forecasted to develop under the No-Build Scenario would shift to the northern portion of the Area of Influence under the Build Scenario. The shift in development under the Build Scenario would likely result from the proposed project providing a more efficient route to the DFW metropolitan area. The local planners stated that the most restrictive issue for development in the Area of Influence was a lack of infrastructure, primarily wastewater.

4.1.3 Inventory Notable Features

Notable features within the Area of Influence include water features, floodplains, flood zones, urban areas, areas zoned for future development, and unincorporated areas that could be used for development in the future. These features are shown in **Figure 5 (Sheets 1-5), Appendix A** and are discussed further in this section.

The ecosystem and socioeconomic conditions associated with the Area of Influence are similar to those described in the **Section 3.0** (Environmental Effects). The Area of Influence for the proposed project consists mostly of undeveloped land, small commercial developments, and single family residential home developments. Notable features within the Area of Influence include Buffalo Creek, East Buffalo Creek, West Buffalo Creek, Martin Branch Nolan River, McAnear Creek, Rock Creek, Rocky Creek, Shannon Creek, Village Creek, Willow Creek, and Deer Creek and their tributaries. Portions of some of these streams and their tributaries intersect existing residential and commercial developments.

The MOA between TxDOT and TPWD outlines a list of unique and unusual landscape features that have been identified as special habitat features which warrant special consideration. The "unusual vegetation features" which are found within the Area of Influence include the following: unmaintained vegetation, trees, or shrubs along a fenceline adjacent to a field (fencerow); and riparian vegetation. The "special habitat features" which are found within the Area of Influence include the following: bottomland hardwoods, ponds, snags, and water bodies. There may be other unusual or special habitat features within the Area of Influence; however, the entire Area of Influence was not surveyed and therefore existence of the additional features was not included in this discussion.

During surveys of the proposed project area it was found that the proposed study area provides suitable habitat for the following state-threatened or rare species: American and Arctic Peregrine falcons, Bald eagle, Interior least tern (also federally listed endangered), Whooping crane (also federally listed endangered), plains spotted skunk, Brazos water snake, Texas garter snake, and the timber/canebrake rattlesnake. It is reasonable to assume that additional suitable habitat for these species occurs within the Area of Influence. A survey for the presence or absence of suitable habitat for the species listed in **Table 10** was not completed for the Area of Influence. Therefore, it is unknown whether the areas forecasted to be developed contain suitable habitat for the additional species listed in **Table 10**.

No minority or low income populations were identified in the Area of Influence. Other vulnerable elements of the population including the elderly, children, and persons with disabilities are found within the Area of Influence; however, none of these vulnerable elements of the population are anticipated to be adversely affected by the proposed project.

4.1.4 Identify Impact-Causing Activities

Impact-causing activities are described by type.

Modification of Regime Effects
Regime modification is not anticipated as a result of the proposed project.

Land Transformation and Construction
The construction of the Modified Alignment would require the conversion of 644 acres of undeveloped land to transportation use. To accommodate current design, construction of the toll road would require the typical ROW widths of approximately 220 to 600 feet. Those interchanges requiring additional ROW would be FM 1187, FM 1902 (which also includes CR 915 access), and CR 904.

Resource Extraction
Excavation is not anticipated for the proposed project.

Processing
Storage of materials will occur off-site. If the contractor chooses to use undeveloped land or another site for material storage, impacts to natural resources may increase.

Land Alteration
Land alteration as a result of this project would largely be limited to the increase in paved area.

Resource Renewal
It is not known exactly how many acres would be revegetated after construction. Vegetated areas in the ROW would be restored to their current condition with similar vegetation.

Changes in Traffic
The proposed project is expected to reduce traffic congestion. This may result in some changes in traffic on adjacent roadways, as people shift their preferred travel routes to take advantage of the proposed project. This is referred to as latent demand. No studies have been performed to estimate the amount of latent demand for this roadway, but TxDOT anticipates such demand to be minimal, based on their experience and the public involvement conducted during the planning process.

Waste Emplacement and Treatment
No sanitary waste discharge is anticipated. Any pavement removed from the existing roadway would be recycled for use as riprap material, in accordance with local policy. Packing materials would be disposed of in the landfill by a certified contractor.

Chemical Treatment
No use of fertilizer is anticipated during revegetation. Periodic applications of herbicide may occur during the maintenance phase of the project.

Access Alteration
The air quality in the Area of Influence is currently considered in poor or declining health because it is within the nonattainment area for ozone. The proposed project will result in increased mobility in or access to an area. This action can result in changes of traffic patterns and thus have the potential to indirectly impact air quality in the area.

Access to adjacent properties is not anticipated to be altered by the proposed project.

4.1.5 Identify Potentially Substantial Indirect Effects for Analysis

Encroachment/Alteration Effects
As detailed in **Section 3.10.1**, the Modified Alignment would impact a total of approximately 0.88 acre of waters of the U.S., including wetlands. Permanent impacts due to fill for culvert construction and/or relocations associated with roadway embankments would be 2,503 LF (0.63 acre) of streams and 0.25 acre of wetlands. Although mitigation is planned to compensate for these impacts, it is possible that these impacts could result in alteration effects beyond the ROW. The mitigation for these direct effects has been coordinated with the USACE, and potential encroachment or alternation effects to wetlands are not anticipated to be substantial.

Table 9 in **Section 3.10.4** details the anticipated impacts to the vegetative communities within the ROW. Habitat would be fragmented by the roadway as the proposed project crosses these different communities (pasture/grassland, mesquite pasture, rural developed, regenerative areas, upland woods, riparian woods, and water bodies). In addition, it is possible that edge effects could occur as the vegetation transitions from maintained ROW adjacent to the roadway to the different communities.

Induced Growth Effects and Effects Related To Induced Growth
The induced development which is forecasted to occur only under the Build Scenario is represented as the "Indirect Effects Areas" in **Figure 12,** (**Appendix A**). As reflected in this figure, the local planners forecasted that approximately 10,100 acres of development would occur under the No-Build Scenario by 2030. Under the Build Scenario, they forecasted a total of 11,000 acres of development by 2030, which includes a shift of approximately 3,100 acres of development forecasted in the southern portion of the Area of Influence under the No-Build Scenario. Therefore, the net additional development (induced development) forecasted under the Build Scenario is approximately 4,000 acres. This additional development, which is approximately 10.2 percent of the Area of Influence, represents the potential indirect effects of SH 121. The analysis of indirect effects presented in the following subsections is based on the 4,000 acres of development anticipated to be induced by the proposed project.

The Area of Influence is part of the EPA designated nine-county nonattainment area for ozone. The Area of Influence is currently in attainment for all other NAAQS pollutants, as discussed in **Section 3.8**. Based on the results of Steps 1 through 4, which evaluated the possible project-related actions that can indirectly impact air, it was determined that the proposed project would be anticipated to cause indirect air quality impacts in the Area of Influence. The project will result in increased mobility in and accessibility to areas within Tarrant and Johnson Counties. As the proposed project is anticipated to result in indirect air quality impacts, further evaluation and discussion of air quality and MSATs is necessary.

4.1.6 Analyze Indirect Effects and Evaluate Results

Indirect effects are evaluated for each resource.

Land Use

Of the approximately 39,100 acres within the Area of Influence, approximately 15,900 acres are currently developed. Land use features were identified using the NCTCOG *Mobility 2030 - 2009 Amendment* database, city land use plans (Cities of Fort Worth, Burleson, Joshua, and Cleburne), county land use plans (Tarrant and Johnson Counties), and aerial interpretation.

Within the Area of Influence, the induced development associated with the proposed project is anticipated to result in the conversion of approximately 4,000 acres of undeveloped land to development uses. This represents approximately 10.2 percent of the land in the Area of Influence that is available for development.

Because the forecasted development is consistent with local planning efforts, the change in land use associated with any induced development is not considered to be adverse. This induced development would primarily include residential land use along with some commercial and industrial/mixed uses. There seemed to be a consensus among the local planners that more residential land uses would be developed near SH 121 and the Tarrant County/Johnson County boundary.

Community Resources

Socioeconomic Conditions

Community Cohesion

In the northern portions of the Area of Influence, where residential and commercial land uses are prevalent and an appreciable amount of development is forecasted under the No-Build Scenario, it is possible that the additional development area attributed to the Build Scenario could result in a reduction of community cohesion. Most of the forecasted development in the southern portion of the Area of Influence would occur only under the No-Build Scenario, and the relatively small amount of development anticipated to be induced is not anticipated to result in a reduction of community cohesion. Development under either scenario is anticipated to be consistent with local planning efforts, and adverse effects to community cohesion are not anticipated.

Environmental Justice

There are four Census tracts in the Area of Influence (Census Tract 1110.09 in Tarrant County and Census Tracts 1302.01, 1303.02, and 1302.06 in Johnson County). Based on an evaluation of Census data for the Census tracts encompassing the Area of Influence, there are no minority or low-income populations. The populations in the Census tracts range from 6.0 to 11.8 percent minority, with the largest racial minority group being Black or African American. Hispanic persons comprise from 5.5 to 11.4 percent of the population in the Census tracts. The Area of Influence is less diverse than Tarrant and Johnson Counties. The median household income in the Census tracts ranges from $31,747 to $82,785.

As development occurs, ethnic, cultural, or language-based identity of the area could be affected by the shift from a rural area to a more suburban area and the associated influx of people, who are likely to be commuters, retirees, or others of diverse ethnic or racial backgrounds. However, this is a potential effect to all populations in the metropolitan area as growth continues; therefore, it does not represent a disproportionate impact to minority or low-income populations from the SH 121 project. In addition, the potential increase in commercial development in the Area of Influence represents economic opportunities through the creation of more employment than would exist in the project area without the project. This additional employment adds to the opportunities for any local minority and low-income

populations to find jobs closer to their homes. As with the potential effect on culture, the effect on employment opportunity is not likely to have a disproportionate impact on minority or low-income populations. One aspect that could affect minority and low-income populations is increased property and rent values that could cause displacement because of economics. However, as indicated, there would be employment and potentially wage growth resulting from the construction of the project that could offset any adverse effects to these populations.

Tolling
Potential indirect effects from tolling are discussed in **Section 4.2**, Regional Toll and Managed Lane/HOV System Impact Analysis.

Public Safety
It is unlikely that the level of public safety within the Area of Influence would be adversely affected by induced development associated with the proposed project. Development is anticipated to be consistent with local planning efforts. Any approvals issued for development in the Area of Influence are anticipated to account for public safety issues, such as emergency vehicle access, disaster protection, and other emergency services.

Noise
Indirect effects to noise levels within the Area of Influence would be affected by future development, infrastructure, and population growth.

Additional noise would result from future development. To the extent that this development is induced by the proposed project, an indirect effect of increased noise levels could occur. Noise is essentially a localized physical condition, and while induced development is anticipated under the Build Scenario, most of the noise from the forecasted development would result from increased traffic within the Area of Influence.

Pedestrian/Bicycle Facilities
It is unknown to what extent bicycle and pedestrian facilities would be included in any of the induced development associated with the proposed project. There are no known plans for comprehensive bicycle and pedestrian facilities in the Area of Influence.

Farmland
Of the approximately 26,000 acres of prime farmland soils within the Area of Influence, approximately 9,000 acres are currently developed. For this analysis, it is assumed that approximately 17,000 acres of prime farmland soils would be available for development.

The induced development associated with the proposed project is anticipated to result in the conversion of approximately 2,400 acres of prime farmland soils, which represents approximately 14.1 percent of the prime farmland soils in the Area of Influence that are available for development.

While the development induced by SH 121 would increase the acreage of farmland soils converted to non-agricultural uses, these soils are lower in value under NRCS criteria given the proximity to the Fort Worth metropolitan area. As a result, indirect effects to prime farmland soils are not considered to be substantial. As determined through the AD-1006 coordination with the NRCS, the proposed project received a rating of below 160; therefore, it is exempt from the FPPA. Much of this score was based on the proximity of the area to urban uses. Based on this assessment, it is not likely that conversion of prime farmland soils to residential and commercial development within the Area of Influence, regardless of whether it occurred under the Build or No-Build Scenario, would be regulated under the FPPA.

Air Quality
The Area of Influence is located within Tarrant and Johnson Counties, which is within the boundary of the NCTCOG TMA. This area is designated as a moderate non-attainment area for eight-hour ozone. The Area of Influence is currently in attainment for all other NAAQS pollutants, including CO. No

change in attainment status is anticipated within the Area of Influence area as the result of emissions associated with the proposed project. In order for the region to achieve ozone attainment, a variety of point, non-point, and mobile source emission reduction strategies must be implemented for the entire DFW area as outlined in the SIP.

Direct impacts on air quality and MSATs from the project are primarily those associated with the increased capacity and accessibility, as well as the resulting projected increases in VMT. EPA's new fuel and vehicle standards projected to reduce emissions of air pollutants and MSATs are expected to offset these impacts resulting from the increases in VMT. These net emissions reductions are expected to contribute to continued maintenance and improvement of air quality and MSAT levels in the Area of Influence.

The potential indirect impacts on air quality and MSATs are primarily related to any expected development/redevelopment resulting from increased accessibility or capacity to the area. The project would be expected to result in increased development/redevelopment in the area. Future development may cause degradation of air quality as a result of increased traffic volumes within the Area of Influence; however, based on input from the local planners, most of the area is anticipated to develop for residential and light commercial land uses. Only limited heavy commercial and industrial land uses are anticipated within the southern portion of the Area of Influence, which is located in Johnson County. The network of future roadways and subdivision streets associated with the forecasted development in the Area of Influence are expected to accommodate increased traffic volumes.

Any increased air pollutant or MSAT emissions resulting from the potential development or redevelopment of the area must meet regulatory emissions limits established by the TCEQ and EPA, as well as obtain appropriate authorization from the TCEQ. Regulatory emission limits set by TCEQ and EPA are established to attain and maintain the NAAQS by assuring any emissions sources resulting from new development or redevelopment will not cause or contribute to a violation of those standards.

Therefore, because the project's potential direct and indirect impacts on air quality and MSATs are projected to be offset by federal fuel and vehicle control programs or state and federal regulatory programs, negative impacts on air quality are not anticipated.

Waters of the U.S.

For purposes of this analysis, the study area for waters of the U.S. is Buffalo Creek and Rock Creek watersheds, which flow into the Brazos River and the Trinity River, respectively. The Buffalo Creek and Rock Creek watersheds encompass the Area of Influence; however, quantification of the waters of the U.S. within the study area was limited to the Area of Influence.

Potential effects to waters of the U.S. from development include placement of fill and degradation of function through encroachment and as a result of increased runoff. The extent and nature of the development that could be induced by the proposed project is unknown because wetland data area unavailable for the Area of Influence. However, it is possible that such forecasted development could result in impacts to waters of the U.S.

Based on U.S. Census Bureau TIGER/Line data, there are approximately 285,100 LF of ephemeral, intermittent, and perennial streams in the Area of Influence; however, this dataset includes many features which may not be determined to be jurisdictional after field verification. Additionally, approximately 76,900 LF of ephemeral, intermittent, and perennial streams are mapped in areas shown as currently developed. It is unlikely that these streams have been either completely avoided or completely impacted by current development.

Based on available data, the induced development areas (Indirect Effects Areas) associated with the proposed project include approximately 15,400 LF of ephemeral, intermittent, and perennial streams, which represents approximately 7.4 percent of the ephemeral, intermittent, and perennial streams in

the portion of the Area of Influence that is available for development. However, these quantifications are likely an overstatement of both the jurisdictional resources within the Area of Influence, and it is highly unlikely that all of the waters resources within the induced development area would be impacted.

Because of the data limitations, not all of these streams would be considered jurisdictional by the USACE and subject to protection under Section 404 of the CWA. Regardless of whether the forecasted development would be public or private, these developments would have to comply with Section 404 of the CWA, which regulates the filling of and encroachment on waters of the U.S. The USACE administers Section 404 of the CWA and operates under "no net loss" policy for wetlands, requiring avoidance and minimization of impacts and compensatory mitigation for unavoidable impacts. Given the regulatory requirements governing impacts to waters of the U.S., substantial adverse indirect effects to these resources are not anticipated.

Floodplains

For purposes of this analysis, the study area for floodplains is the same as the previously described waters of the U.S. study area. The extent of FEMA-designated floodplains in the Area of Influence, and specifically the zones which encompass the 100-year floodplain boundary, are shown in **Figure 10, Sheets 1–5,** (**Appendix A**). Zone A and Zone X500 are areas defined as areas within the 100-year floodplain (Zone A) and outside the 500-year floodplain (Zone X500).

According to the FEMA floodplain maps, the Area of Influence contains approximately 4,900 acres of 100-year floodplain, and of the 4,900 acres, approximately 1,100 acres of 100-year floodplain are mapped in areas that are currently developed. Given regulations governing development within floodplains, it is unlikely that these floodplain areas have been impacted completely by current development.

In general, floodplains pose a constraint to development, as county and local ordinances regulate fill in and encroachment upon floodplains. While these ordinances do not prohibit development within the floodplain, they limit and regulate development to eliminate or reduce potential damage from future floods.

The induced development associated with the proposed project could affect up to approximately 250 acres of 100-year floodplain, which represents approximately 6.6 percent of the of the 100-year floodplains in the portion of the Area of Influence that is available for development. However, considering the regulations governing development within floodplains, no adverse indirect effects to floodplains are anticipated.

Development within floodways is regulated. In addition, Executive Order 11988 (1977), "Floodplain Management", as well as county and local ordinances, would minimize floodplain encroachment, to the extent allowable within the regulations, thereby preserving some of a floodplain's natural values. These values include retention of riparian vegetation buffers, which preserve wildlife habitat and provide natural filtration for improved water quality.

Water Quality

For purposes of this analysis, the study area for water quality is the same as the previously described waters of the U.S. study area. There are no threatened or impaired stream segments within five miles downstream of the proposed project area. In addition, there are no mapped water wells that could affect ground water quality.

Potential development induced by the proposed project could result in some adverse effects to water resources through degradation of surface water and groundwater. Development effects that contribute to water quality degradation include increased impermeable surface and increased non-point source pollution (e.g., from fertilizers, pesticides, sediments, and vehicle residues). Effects from development under either scenario can include increased stormwater runoff velocities and pollutant loads leading to impacts to surface waters and, subsequently, groundwater.

Because there are no threatened or impaired stream segments or water wells within the indirect effects study area that could affect ground water quality, no substantial adverse effects to water quality are anticipated. In addition, considering the water quality regulations governing development, such as Sections 401 and 402 of the CWA, potential indirect effects to water quality are anticipated to be avoided and minimized to the extent practical.

Vegetation and Wildlife Habitat

For purposes of this analysis, the study area for vegetation and wildlife habitat is the portion of the Post Oak Savannah and Blackland Prairie Regions within the Area of Influence. In accordance with the TxDOT MOU, habitats given consideration for non-regulatory mitigation include:

- Habitat for federal candidate species (affected by the project) if mitigation would assist in the prevention of the listing of the species,
- Rare vegetation series (S1, S2, or S3) that also locally provide habitat for state-listed species,
- All vegetation communities listed as S1 or S2, regardless of whether or not the series in question provide habitat for state-listed species,
- Bottomland hardwoods, native prairies, and riparian areas, and
- Any other habitat feature considered to be locally important that the TxDOT chooses to consider.

Vegetation and wildlife habitat were mapped in the Area of Influence using 2004 infrared National Agriculture Imagery Program (NAIP) aerial photographs with limited field investigation. The Area of Influence contains approximately 7,500 acres of mesquite pasture, 2,000 acres of regenerative vegetation, 1,800 acres of riparian vegetation, 2,200 acres of upland woods, 9,100 acres of pasture/grassland, and 500 acres of water[1]. This includes approximately 300 acres of mesquite pasture, 480 acres of regenerative vegetation, 330 acres of riparian vegetation, 1,050 acres of upland woods, and 480 acres of pasture/grassland that are currently developed.

The induced development associated with the proposed project is anticipated to affect up to approximately 800 acres of mesquite pasture, 320 acres of regenerative vegetation, 150 acres of riparian vegetation, 160 acres of upland woods, and 1,100 acres of pasture/grassland. The potential indirect effects associated with SH 121 could affect approximately 11.1 percent of mesquite pasture, 21.0 percent of regenerative vegetation, 10.2 percent of riparian vegetation, 13.9 percent of upland woods, and 11.0 percent of pasture/grassland in the portion of the Area of Influence that is available for development.

These habitats could be affected by induced development through conversion of land, fragmentation of vegetation resources, and reduction of habitat connectivity in the larger area. Of the habitats anticipated to be indirectly affected by the proposed project, riparian vegetation could be afforded protection by regulations that govern effects to waters of the U.S. or floodplains, as these habitats are adjacent to streams and other surface waters.

Threatened and Endangered Species

For the purposes of this analysis the study area for threatened and endangered species is the area contained in USGS topographic quadrangle maps, Primrose and Joshua, which encompass the Area of Influence. Although the species lists are organized by county, these quadrangle maps were used in the information request sent to TPWD to gather NDD information on threatened and endangered species occurrences within the Area of Influence.

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[1] Potential impacts related to water are discussed in Waters of the U.S.

The USFWS maintains a list of endangered, threatened, and candidate species listed by county. The TPWD maintains special species occurrences records through the NDD. Based on a search of the NDD within the quadrangles, there are single occurrence records for the Golden-cheeked Warbler (federally- and state-endangered) and the Brazos water snake (state-threatened). A survey for the presence or absence of suitable habitat for these species was not completed for the Area of Influence. Therefore, it is unknown whether the areas forecasted to be developed contain suitable habitat for these species.

Impacts to Federally-listed endangered and threatened species are regulated by the USFWS under Sections 7, 9, and 10 of the Endangered Species Act. The TPWD has regulatory authority over state-listed animals where direct take (killing or injuring) is involved, but the agency does not have authority over destruction of habitat of state-listed animals. For state-listed plants, TPWD does not regulate either direct or indirect take except for lands owned or managed by TPWD. For any of the development anticipated to be induced by the proposed project, it would be the responsibility of the individual developers, in coordination with USFWS and TPWD, to determine if their projects have the potential to affect threatened or endangered species as any proposed development, public or private, would be subject to regulation under the ESA.

Coastal Barrier and Coastal Zones

Because the Area of Influence does not lie within the CZMP boundary, indirect effects are not anticipated.

Cultural Resources

Historic Properties

There are two types of indirect effects to historic properties considered in this analysis: indirect effects as defined by Section 106 of the NHPA and indirect effects as defined by the NEPA. The indirect effects as defined under Section 106 of the NHPA include visual and atmospheric effects created by the project on resources located within a project's APE. Indirect effects as defined by the NEPA include effects to historic properties (including total physical loss and loss of historical integrity) as a result of development induced by the project.

Section 106 coordination determined that there are no historic resources in the APE of the Modified Alignment under revaluation. Therefore the Modified Alignment would have no indirect effects as defined under Section 106.

There are eight known historic sites that are listed on, or eligible for listing on, the NRHP in the Area of Influence (**Table 11** and **Figure 16, Appendix A**), but none would be impacted by the induced development forecasted by the local planners. Although it is possible that other, undocumented historic sites exist in the induced development area for the proposed project, it is not possible to determine potential effects as the exact locations and nature of the resources are unknown.

Table 11. Known Historic Sites within the Area Of Influence

SITE NAME	LOCATION	CITY	COUNTY
First Baptist Church of Crowley	400 South Eagle Drive	Crowley	Tarrant
Methodist Church of Joshua	Main and 4th Streets	Joshua	Johnson
Caddo Cemetery	FM 1902	Joshua	Johnson
Moss Cemetery	West Vaughn Rd	Cleburne	Johnson
Green Acres Cemetery (Memorial Park Cemetery)	SH 174	Cleburne	Johnson

Table 11. Known Historic Sites within the Area Of Influence			
Lightfoot Cemetery	Dove Creek Drive	Cleburne	Johnson
Old Lane Prairie Cemetery	SH 174	Cleburne	Johnson
Lane Prairie Cemetery	SH 174	Cleburne	Johnson

Archeological Resources
Archeological sites are typically directly affected through site clearing, grading, or excavation during development. Archeological resources in the study area are unknown, and it cannot be determined whether any of the induced development forecasted by the local planners would result in adverse effects to these sites because the quantity, location, and character of individual resources are unknown.

Some induced development may fall under federal or state regulatory resource protection review, and therefore, archeological and historic resources could be protected, preserved, or mitigated. If development is publicly funded, or if private development requires certain federal permits, such as a permit under Section 404 of the CWA, then it would likely be subject to federal or state regulations. However, most of the development, such as residential and commercial development, would not fall under the regulatory review process; therefore, these resources would have no protection under federal or state laws.

Section 4(f) Resources
Section 4(f) governs potential impacts to publicly owned lands, including public parks, recreational areas; wildlife and waterfowl refuge lands or impact any cultural resources resulting from transportation projects. The development anticipated to be induced by the proposed project is primarily residential and commercial in nature and not likely to be regulated by Section 4(f) of the U.S. Department of Transportation Act of 1966.

There are no parks, recreational areas, wildlife and waterfowl refuge lands or known cultural resources located in the Area of Influence. As a result, impacts to these resources are not anticipated as a result of development induced by the proposed project.

Hazardous Materials
Although a database search was not completed for the entire Area of Influence, it is possible that development induced be the proposed project could encounter sites contaminated with hazardous materials. To minimize the risk of impacting these sites through land disturbing activities, a Phase I Environmental Site Assessment to identify potential hazardous materials could be conducted prior to property acquisition and development. This is a standard practice in commercial and residential subdivision land development.

The potential adverse effect is associated with additional costs and schedule. There would be a beneficial effect to soil and ground water resources by remediation of the contamination. Although hazardous materials may increase from future development of commercial areas, potential effects would likely be abated from recent, more stringent regulations regarding hazardous materials management.

4.1.7 Assess Consequences and Consider/Develop Mitigation

The potential indirect impacts associated with the proposed project are not anticipated to be substantial. No mitigation measures have been identified.

4.2 Regional Toll and Managed Lane/HOV System Impact Analysis

The current regional network for roadways, priced facilities (i.e., toll, HOV/managed), and passenger rail is expected to increase by 2030. **Sheets 1** through **3 (Appendix E)** obtained from the 2030 MTP 2009 Amendment show the proposed roadway, toll/managed lane facilities, and passenger rail for the region in 2030. For the roadways system, the 2009 transportation network for DFW (calculated in main lane lane-miles) consists of 4,559 lane-miles. Of the total system, 520 of the lane-miles are tolled (approximately 11 percent). The anticipated 2030 transportation network for DFW would consist of approximately 8,528 main lane lane-miles, of which 40 percent (approximately 3,379 lane-miles) are tolled. **Table 12** lists the toll/managed lane facilities included in the 2030 MTP 2009 Amendment and when they are expected to be open to traffic. These projects include the construction of new location toll roads, the addition of managed HOV lanes, and the expansion of existing toll facilities. **Sheets 4** and **5 (Appendix E)** show the toll/managed lane system listed in **Table 12** for the projected years of 2019, 2025, and 2030.

Table 12. Future Toll Road and Managed HOV lane Projects

Roadway	Location	Responsible Agency	Work Planned
Open to Traffic by 2019			
Dallas North Tollway	SH 121 to Royal Lane	NTTA	Expand existing toll road
IH 30 – Dallas County	SH 161 to IH 35E	TxDOT-Dallas	Add managed HOV lanes
IH 30 – Tarrant County	Cooper Street to Ballpark Way	TxDOT-Fort Worth	Add managed HOV lanes
IH 35E	IH 635 to Loop 12	TxDOT-Dallas	Add managed HOV lanes
IH 635	Luna Road to US 75	TxDOT-Dallas	Add managed HOV lanes
IH 820	IH 35W to SH 121/SH 10	TxDOT-Fort Worth	Add managed HOV lanes
Loop 9	US 287/Outer Loop to IH 20/SH 190	TxDOT-Dallas	New toll road
Loop 12	IH 35E to SH 183	TxDOT-Dallas	Add managed HOV lanes
President George Bush Turnpike	IH 35E to SH 78	NTTA	Expand existing toll road
President George Bush Turnpike (Eastern Extension)	SH 78 to IH 30	NTTA	New toll road
SH 114	SH 121 (West) to International Parkway	TxDOT-Fort Worth	Add managed HOV lanes
SH 121	IH 820 to Minnis Road	TxDOT-Fort Worth	Add managed HOV lanes
SH 121	SH 183 to IH 820	TxDOT-Fort Worth	Add managed HOV lanes
SH 121	IH 30 to US 67	NTTA	New toll road
SH 121 – Sam Rayburn Tollway	US 75 to Hillcrest Road	TxDOT-Dallas	New toll road
SH 121 – Sam Rayburn Tollway	Hillcrest Road to Business SH 121	TxDOT-Dallas	Expand existing toll road
SH 161	SH 183 to IH 20	TxDOT-Dallas & NTTA	New toll road
SH 161/SH 360 Toll Connector	SH 161 to Sublett Road (SH 360)	TxDOT-Dallas & TxDOT-Fort Worth	New toll road
SH 170	SH 114 to US 81/US 287	NTTA	New toll road

Table 12. Future Toll Road and Managed HOV lane Projects			
Roadway	**Location**	**Responsible Agency**	**Work Planned**
SH 183	SH 121 to SH 161	TxDOT-Fort Worth	Add managed HOV lanes
SH 183	SH 161 to IH 35E	TxDOT-Dallas	Add managed HOV lanes
SH 360 (toll road)	Sublett Road to US 287	NTTA	New toll road
Trinity Parkway	IH 35E to IH 45/US 175	NTTA	New toll road
US 75 – Collin/Dallas County	SH 121 (South) to IH 635	TxDOT-Dallas	Add managed HOV lanes
US 75 – North Collin County	US 380 to SH 121 (South)	TxDOT-Dallas	Add managed HOV lanes
Open to Traffic by 2025			
Dallas North Tollway	FM 121 to US 380	NTTA	New toll road
IH 20/US 287	IH 820 to Park Springs Blvd./Sublett Road	TxDOT-Fort Worth	Add managed HOV lanes
IH 30	IH 45 to Bobtown Road	TxDOT-Dallas	Add managed HOV lanes
IH 30 – Tarrant County	IH 820 to Cooper Street	TxDOT-Fort Worth	Add managed HOV lanes
IH 30 – Tarrant County	Ballpark Way to SH 161	TxDOT-Fort Worth	Add managed HOV lanes
IH 35E	SH 183 to IH 20	TxDOT-Dallas	Add managed HOV lanes
IH 35E "Northern Link"	IH 35/IH 35W to IH 635	TxDOT-Dallas	Add managed HOV lanes
IH 635	US 75 to IH 30	TxDOT-Dallas	Add managed HOV lanes
IH 820/US 287	US 287 to IH 20	TxDOT-Fort Worth	Add managed HOV lanes
Loop 12	SH 183 to Spur 408	TxDOT-Dallas	Add managed HOV lanes
Outer Loop (Eastern Subregion)	US 175 to IH 30	TxDOT-Dallas	New toll road
Outer Loop (Eastern Subregion)	US 75 to IH 35	TxDOT-Dallas	New toll road
President George Bush Turnpike	Belt Line Road to IH 635	NTTA	Expand existing toll road
SH 114 – Dallas County	SH 121 to SH 183	TxDOT-Dallas	Add managed HOV lanes
SH 170	SH 199/Outer Loop to US 81/US 287	NTTA	New toll road
SH 190	IH 30/PGBT to IH 20/Loop 9	NTTA	New toll road
SH 360	Outer Loop to FM 2258	TxDOT-Fort Worth	New toll road
SH 360 (toll road)	US 287 to Outer Loop/Loop 9	NTTA	New toll road
US 67	IH 35E to FM 1382	TxDOT-Dallas	Add managed HOV lanes
US 67 – Dallas/Ellis County	FM 1382 to Loop 9	TxDOT-Dallas	Add managed HOV lanes
US 287	Berry Street to IH 820	TxDOT-Fort Worth	Add managed HOV lanes

Table 12. Future Toll Road and Managed HOV lane Projects			
Roadway	**Location**	**Responsible Agency**	**Work Planned**
Open to Traffic by 2030			
IH 35	Outer Loop (FM 156) to IH 35E/IH 35W	TxDOT-Dallas	Add managed HOV lanes
IH 35W	IH 35/IH 35E to SH 170	TxDOT-Dallas	Add managed HOV lanes
IH 35W	SH 170 to IH 30	TxDOT-Fort Worth	Add managed HOV lanes
IH 635	US 80 to IH 20	TxDOT-Dallas	Add managed HOV lanes
Outer Loop (Eastern Subregion)	IH 30 to US 75	TxDOT-Dallas	New toll road
Outer Loop (Western Subregion)	SH 199 to US 287/Loop 9	TxDOT-Fort Worth	New toll road
US 80	IH 30 to Lawson Road	TxDOT-Dallas	Add managed HOV lanes

Source: NCTCOG - Mobility 2030: Metropolitan Transportation Plan – 2009 Amendment

The expanding roadway network, including toll/managed lane facilities, would cause indirect and/or cumulative impacts to the region. Because of the regional nature of these impacts, the proposed impacts would be better discussed at the regional level. The expansion of the toll/managed lane component of the system is discussed in the cumulative impacts section.

5.0 CUMULATIVE EFFECTS

Cumulative effects (impacts) include both direct and indirect, or induced, effects that would result from the project, as well as the effects from other projects (past, present, and reasonably foreseeable future actions) not related to or caused by this project. Therefore, the cumulative effects analysis includes the direct effects and indirect effects of the proposed project and effects of other past, present, and reasonably foreseeable actions. The cumulative effects analysis considers the magnitude of the cumulative effect on the resource health. Health refers to the general overall condition, stability, or vitality of the resource and the trend of that condition. Therefore, the resource health and trend are key components of the cumulative effects 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 effects on a stressed resource, or a resource that will continue to be stressed will be presented.

The 2003 EA did not contain an analysis of cumulative effects. As a result, the cumulative effects analysis presented herein does not provide a comparison to the 2003 EA/2004 FONSI.

This cumulative effects analysis was conducted to comply with the CEQ regulations (40 CFR 1500-1508), FHWA Technical Advisory T 6640.8A (FHWA, 1987), FHWA Position Paper: Secondary and Cumulative Impact Assessment in the Highway Project Development Process (FHWA, 1992), and TxDOT's Guidance on Preparing Indirect and Cumulative Impact Analyses (TxDOT, 2006). The CEQ regulations for implementing the NEPA define cumulative effects as:

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

The TxDOT eight-step process is intended to provide an efficient, consistent, and logical method of evaluating cumulative effects of a project.

1. Identify Resources to Consider
2. Define the Study Area for Each Resource
3. Describe the Current Status/Viability and Historical Context for Each Resource
4. Identify Direct and Indirect Impacts of the Project that Might Contribute to a Cumulative Effect
5. Identify Other Reasonably Foreseeable Future Effects
6. Identify and Assess Cumulative Impacts
7. Report the Results
8. Assess the Need for Mitigation

For this EA Re-evaluation, cumulative effects analyses have been conducted for the proposed project and the regional toll and managed lane/ HOV system.

5.1 Project-Level Impact Analysis

5.1.1 Identify Resources to Consider

Evaluation of cumulative effects should be completed for any resource that was found to be directly or indirectly affected by the proposed project. Specific resources and environmental effects categories evaluated in this Re-evaluation are listed in **Table 13.** The table summarizes the direct and indirect impacts anticipated for each resource. Only those resources that were anticipated to be directly or indirectly affected by the proposed project were considered in the cumulative effects analysis. These resources include land use, air, waters of the U.S., floodplains, water quality, vegetation and wildlife habitat, threatened and endangered species, and cultural resources.

Table 13. Summary of Project-Level Direct and Indirect Effects					
Resource or Topic Evaluated		**Summary of Direct Effects**	**Summary of Indirect Effects**	**Included in Cumulative Effects Analysis**	**Reason for Exclusion**
Land Use		Conversion of 644 acres of land to transportation use. This represents an increase of 119 acres from the FONSI.	Conversion of approximately 4,000 acres to developed uses. Development is anticipated to be consistent with local land use planning efforts.	Yes	N/A
Community Resources	Socioeconomic Conditions	No adverse impacts to community cohesion or demographics are anticipated. No disproportionate or adverse effects anticipated to minority or low-income populations are anticipated.	No adverse impacts to community cohesion or demographics are anticipated. No disproportionate or adverse effects anticipated to minority or low-income populations are anticipated.	No	While direct and indirect effects are not anticipated, the electronic tolling analysis includes a discussion on possible effects to minority and low-income populations.
	Public Safety	No adverse effect.	No adverse effect.	No	No direct or indirect effects are anticipated.
	Noise	Minor impact to 13 receivers.	Local noise levels could increase as the area is developed.	No	Based on TxDOT noise guidance, potential direct and indirect effects do not warrant

Table 13. Summary of Project-Level Direct and Indirect Effects				
Resource or Topic Evaluated	**Summary of Direct Effects**	**Summary of Indirect Effects**	**Included in Cumulative Effects Analysis**	**Reason for Exclusion**
				consideration under the cumulative effects analysis.
Pedestrian/Bicycle Facilities	No adverse effect.	No adverse effect.	No	No direct or indirect effects are anticipated.
Farmlands	Approximately 398 acres of prime farmland soils to be converted to non-agricultural uses. This represents a decrease of 9 acres from the FONSI. Coordination with NRCS indicates that the land is considered to be "in urban use"	Approximately 2,400 acres of prime farmland soils to be converted to non-agricultural uses. Coordination with NRCS indicates that the project area is considered to be "in urban use, and this designation would likely apply to the prime farmland soils within the Area of Influence.	No	Because the prime farmland soils are considered to be "in urban use", the impacts from conversion of the prime farmland soils are considered to be negligible.
Air Quality	Direct impacts on air quality and MSATs from the project are primarily those associated with the increased capacity and accessibility, as well as the resulting projected increases in VMT.	Future development may cause degradation of air quality as a result of increased traffic volumes within the Area of Influence	Yes	N/A
Waters of the U.S.	Approximately 2,503 linear feet of stream and 0.88 acre of wetlands	Induced development area includes approximately 15,400 linear feet of	Yes	N/A

Table 13. Summary of Project-Level Direct and Indirect Effects				
Resource or Topic Evaluated	**Summary of Direct Effects**	**Summary of Indirect Effects**	**Included in Cumulative Effects Analysis**	**Reason for Exclusion**
	would be affected. This represents an increase in 500 linear feet of stream and 0.20 acre of wetlands. Avoidance, minimization, and compensatory mitigation measures are included in the PCN (December 2008).	streams. This is likely an overestimate of surface waters. No wetland data are available. All development in waters of the U.S. is regulated by the USACE. As a result, substantial effects are not anticipated.		
Floodplains	The ROW would cross 64.0 acres of 100-year floodplain, a 38 percent decrease in affected floodplain from the FONSI. However, it was determined through coordination with floodplain administrators that some mitigation would be necessary. This project would not raise the base floodplain elevation to a level that would violate the applicable floodplain regulations or ordinances.	Induced development could affect up to 250 acres of 100-year floodplain. All development in floodplains regulated, and no substantial effects to floodplains are anticipated.	Yes	N/A
Water Quality	No substantial adverse effect.	Induced development could result in decreased water quality; however, development must comply with existing TCEQ regulations. No substantial adverse effect is anticipated.	Yes	N/A
Vegetation & Wildlife Habitat	The ROW would affect approximately 106.9 acres of mesquite pasture, 57.9 acres of regenerative vegetation, 39.7 acres of riparian vegetation, 48.0 acres of upland woods, and 313.8 acres of pasture/grassland. No native prairie remnants would be impacted.	Induced development could affect up to approximately 800 acres of mesquite pasture, 320 acres of regenerative vegetation, 150 acres of riparian vegetation, 160 acres of upland woods, and 1,100 acres of pasture/grassland. No native prairie remnants would be impacted.	Yes	N/A

Table 13. Summary of Project-Level Direct and Indirect Effects					
Resource or Topic Evaluated		**Summary of Direct Effects**	**Summary of Indirect Effects**	**Included in Cumulative Effects Analysis**	**Reason for Exclusion**
Threatened and Endangered Species		Not likely to adversely affect the Interior Least Tern or Whooping Crane. May Impact the American and Arctic Peregrine Falcons, Bald Eagle, plains spotted skunk, Brazos water snake, Texas garter snake, and the timber/canebrake rattlesnake. No effect to other federally- and state-listed species.	Potential effects are unknown; however, based on existing USFWS and TPWD regulations, induced development is not likely to adversely affect federally- or state-listed species.	Yes	N/A
Cultural Resources	Historic Resources	No Effect	No effects anticipated to the eight known historic resources within the Area of Influence. Other potential effects to undocumented historic resources are unknown as resources are unknown in the Area of Influence.	Yes	N/A
	Archeological Resources	No Effect	Potential effects unknown as resources are unknown in the Area of Influence.	Yes	N/A
Hazardous Materials		Low risk for encountering materials during construction.	No adverse effect.	No	No direct or indirect effects are anticipated.

5.1.2 Define the Study Area for Each Resource

The cumulative effects analysis considered both geographic and temporal study limits. A Resource Study Area (RSA) was defined for each resource and is discussed in the pertinent sections. The RSAs are used for characterization of the health condition and trend for each resource, and cumulative effects were determined considering the potential effects of the project, along with past, present, and reasonably foreseeable future actions on the health and trend within the RSA.

Additionally, the temporal limits were considered for the cumulative effects analysis. The time frame was established as the period from a past environmental reference point (in this case the year 1950) to 2030, the planning year for the proposed project. The early date established the approximate year in which the population began to increase significantly. Between 1900 and 1960 Johnson County's population remained fairly stable; it reached a peak of 37,286 in 1920, only to decline for the next twenty years. The influence of Dallas and Fort Worth began to be felt in the second half of the 20th Century. Johnson County was designated first as a part of the Fort Worth Standard Metropolitan Statistical Area (SMSA), and later as part of the DFW SMSA, an indication of its economic ties to the area. Both of these organizations are now known as NCTCOG and the SMSA is now known as the MSA. Although the 1960 county population was still only 34,720, the population of Burleson in the north had reached 2,345, a 196 percent increase since 1950. The next decade saw an increase of 224 percent as Burleson became a bedroom community to the expanding Fort Worth area. The county's rapid development in the late 20th Century was reflected in the overall county population, which rose to 45,769 in 1970, showing an increase of 33 percent (Handbook of Texas, 2009). Between 1970 and 1980, the population of Johnson County increased from 45,769 to 67,649 (47.8 percent) and the population of Tarrant County increased from 716,317 to 860,880 (20.2 percent). Between 1980 and 1990, the population of Johnson County increased from 67,649 to 97,165 (43.6 percent) and the population of Tarrant County increased from 860,880 to 1,170,103 (35.9 percent). The year 2030 was chosen to correlate with current land use and transportation plans. Unless noted in the following sections, the temporal boundaries are from 1950 to 2030 for all resources.

5.1.3 Describe the Current Health and Historical Context for Each Resource

The historical context and health of each resource is described and presented in the resource sections. This information is important to establish the baseline condition and the trends which the resource is experiencing to be able to estimate the magnitude of the resource effect. The historical context is first described to provide an explanation of the factors that have caused the current health of the resource. As previously mentioned, health refers to the general overall condition, stability, or vitality of the resource and the trend of that condition.

5.1.4 Identify the Direct and Indirect Impacts of the Project

The cumulative effects analysis considers the direct and indirect effects, as previously described. A summary of these effects is presented for each resource in **Table 13** and discussed in the appropriate cumulative effects section. Additional details regarding direct and indirect effects to resources considered in the cumulative effects analysis are presented in Sections 3.0 and 4.0, respectively.

5.1.5 Identify Other Reasonably Foreseeable Effects

The cumulative effects analysis considered the direct and indirect effects of the project, together with the effects of past, present, and reasonably foreseeable future projects. However, incomplete or unavailable information precluded a quantitative assessment of all resources. In many cases, historic quantitative or geographically referenced (mapped) information on the various resources (e.g., acres of a given resource, land use, or land cover type) for prior years is not available. In addition, a complete list of specific past and present actions is not available. CEQ NEPA regulations and guidance on cumulative effects do not require development of a catalog of specific past and present actions or quantification of these actions in a cumulative effects analysis, and CEQ recognizes that

this may not be practical and information may not be available (40 CFR 1500-1508; CEQ, 2005). Therefore, quantification of individual past and present actions was not performed. Past actions were considered collectively as the development that had occurred as of 2009, and these actions are considered in describing the existing conditions for each resource. The magnitude of the cumulative effects was determined by comparing the effect to the health and trend of the affected resource.

Based on available city and county plans the following projects are anticipated in the project vicinity:

- City of Cleburne predicts a residential development east of SH 121 and south of CR 904.
- City of Burleson is rebuilding the old town area; and due to the population increase, is building a major sewer line, 2 pump stations, a new ground storage area, and are doing general upgrades for the community including major park renovations.
- HEB is planning to build a store in Burleson
- The City of Burleson planner also predicts that with the addition of SH 121, higher value single family residential developments will develop between SH 121 and IH 35W.

This analysis is limited to available information through public resources and information gathered from the city planners. Therefore, specific spatial information for many of the known reasonably foreseeable future actions included is not available. As discussed in the Indirect Effects Section, the local planners identified future growth areas that are likely to occur regardless of the proposed project (No Build Scenario). **Figure 14** shows what is considered a reasonably foreseeable growth scenario and is used in the cumulative effects analysis as a surrogate for specific reasonably foreseeable actions

The improvements would aid further development in the area by providing better accessibility. These improvements were mentioned by the local planners and are assumed to be included in their assumptions for forecasted development.

5.1.6 Identify and Assess Cumulative Impacts

The cumulative effects analysis considered the direct and indirect effects of the project, together with the effects of past, present, and reasonably foreseeable future projects. The magnitude of the cumulative effect was determined by comparing the effect to the health and trend of the affected resource.

5.1.7 Report the Results

The results of the cumulative effects analysis are reported herein. Direct effects and indirect effects are summarized in this section as they are included in the cumulative effects analysis. The assumptions and methods used to calculate these effects are described in the appropriate resource sections.

5.1.8 Assess the Need for Mitigation

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

5.1.9 Land Use

Resource Study Area

For purposes of this EA Re-evaluation, the RSA includes the Area of Influence for the indirect effects analysis. As previously discussed, the study area boundary was defined as SH 174 and US 67 to the south, 1.5 miles east of SH 174/US 67 to the east, Cleburne/Crowley Road to the north, and 1.5 miles to the west of the proposed project to the west. The RSA for cumulative effects associated with SH 121 is approximately 39,100 acres (**Figures 14** and **15 Appendix A**). Although RSA's have been

established for each resource in the cumulative effects analysis, the Area of Influence discussed in **Section 4.0** is also the area used for quantifications in the cumulative effects analysis.

Historical Context and Current Health

Land use in the project area continues to be dominated by agricultural and undeveloped uses interspersed with low-density rural residential, farms and ranches, retail/commercial, and small service/manufacturing facilities. The primary change in land use observed in the vicinity of the proposed project is the introduction of natural gas drilling and production sites. Existing zoning and land use within and surrounding the study area reveal infrastructure, single-family residential; and general business development as the main drivers of land development adjacent to the study area. This development is typical for rural areas that could be or are currently suburbs to nearby metropolitan areas. The rate of population immigration and physical development in this area of North Texas has been relatively high during the last decade compared to state and national trends. The land within the RSA has the potential to continue development as long as vacant parcels are available for conversion to residential, commercial, or industrial land uses. Both the north and south ends of the Area of Influence are relatively well-developed with new neighborhoods and businesses, industrial/commercial businesses, and residential neighborhoods.

Many regional and municipal organizations have planned for SH 121 as an integral part of the region's future mobility infrastructure or, as in the case of Burleson, have annexed an area with some future development as a possibility. SH 121 is part of, or compatible with, plans and planning documents of the City of Cleburne, the City of Joshua, the City of Burleson, the City of Fort Worth, the NCTCOG, and the Regional Transportation Council (RTC), an independent transportation policymaking body for NCTCOG. In general, the construction of SH 121 is not only taken into consideration in local land use plans and policies, but is also a key component of those plans.

Direct and Indirect Effects

The proposed project would convert approximately 644 acres of land to transportation use. Induced development associated with SH 121 could convert up to approximately 4,000 acres of land to developed uses. Development is anticipated to be consistent with local land use planning efforts.

Effects of Other Reasonably Foreseeable Future Actions

To determine the effects from the reasonably foreseeable future actions, the effects of the No-Build Scenario minus the development shift (the development forecasted under the No-Build Scenario that would not occur under the Build Scenario) were used. This method is used throughout the cumulative effects analysis. Based on input from the local planners, approximately 7,000 acres within the Area of Influence would be converted from an undeveloped use to a developed use. As previously discussed, the forecasted development would be primarily residential with some commercial and industrial/mixed uses.

Results of the Cumulative Effects Analysis

Construction of SH 121 would contribute to a cumulative increase over time in the amount of land converted from its current land use. This land resource effect would consist primarily of a shift from largely undeveloped and agricultural land to residential, commercial, industrial, and public infrastructure land uses. **Table 14** presents a summary of the anticipated potential cumulative effect (acres of land use conversion) compared to the project's direct (ROW) and indirect (induced) effects and to the total land in the RSA (Area of Influence).

Table 14. Summary of Potential Effects to Land Use						
Resource	Currently Developed	Potential Effects under the No-Build Scenario	Proposed Project		Potential Cumulative Effects	Total Land within RSA
			Direct Effects	Potential Indirect Effects		
Land Use Conversion (acres)	15,900	7,000	644	4,000	27,544	39,100

The estimated land use cumulative effect presented in **Table 14** is based on forecasted development through 2030 and includes current development as well as development predicted under the Build and No-Build Scenarios. This cumulative effect would occur over time as development occurs. Under the No-Build Scenario, forecasted development would result in the conversion of 7,000 acres of land. The project would directly and indirectly result in the conversion of 4,644 acres of land. The potential cumulative effect (27,544 acres) is approximately 70.4 percent of the RSA; however, the project would contribute to the conversion of only 11.9 percent of the RSA. Most of these indirect effects are expected to occur in the northern part of the RSA. The trend of land use conversion over the past three decades is not anticipated to decline. While other resources would be affected, as discussed in the following sections, the forecasted development is anticipated to continue the trend of conversion of rural lands to residential and commercial uses. The forecasted development is consistent with local planning efforts, and the cumulative effect is not considered to be adverse.

Mitigation
Because adverse cumulative effects to land use are not anticipated, no mitigation has been proposed.

5.1.10 Air Quality

Resource Study Area
The RSA for evaluating air quality associated with NAAQS and transportation conformity was designated as the Dallas-Fort Worth area that has been designated by EPA as a moderate nonattainment area for ozone. The counties included in this area are: Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, and Rockwall. This large area represents the management unit for mobile source pollutants as regulated by federal, state, and local government agencies. The NAAQS criteria pollutants include ozone, carbon monoxide, particulate matter, nitrogen dioxide, sulfur dioxide, and lead. Unlike the other resources evaluated, air quality impacts from mobile sources are evaluated and managed on a regional basis primarily through the NCTCOG, in coordination with the EPA, TCEQ, TxDOT, and FHWA.

Historical Context and Current Health
The EPA establishes limits on atmospheric pollutant concentrations through enactment of the NAAQS for six principal, or criteria, pollutants. The EPA designated nine counties in the Dallas-Fort Worth area as nonattainment for ozone. The region is currently in attainment for all other criteria pollutants. Although there have been year-to-year fluctuations, the ozone trend continues to show improvement. The trend of improving air quality in the region is attributable in part to the effective integration of highway and alternative modes of transportation, cleaner fuels, improved emission control technologies, and NCTCOG regional clean air initiatives

Direct and Indirect Effects
Direct impacts on air quality and MSATs from the project are primarily those associated with the increased capacity, accessibility and the resulting projected increases in VMT. Emission reductions as a result of EPA's new fuel and vehicle standards are anticipated to offset impacts associated with VMT increases.

Indirect impacts on air quality and MSATs are primarily related to any expected development resulting from the project's increased accessibility or capacity to the area. Any increased air pollutant or MSAT emissions resulting from the potential development of the area 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.

Effects of Other Reasonably Foreseeable Future Actions

Increased development and urbanization can result in increased air pollutant or MSAT emissions resulting from these actions. These 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.

Beyond the continued residential and commercial development of Tarrant and Johnson Counties, there are plans to improve other roads in the Area of Influence. Reasonably foreseeable actions that could impact air quality within the resource study area include those based on the NCTCOG *Mobility 2030 - 2009 Amendment*.

Table 15. Reasonably Foreseeable Future Actions

Project Name	Project Sponsor	Project Summary
Loop 9/SH 121 Crossing	TxDOT	Loop 9 southwest upgraded to a toll road system, crossing SH 121
FM 1187; Loop	TxDOT	FM 1187 developed as a potential loop to the City of Fort Worth
Widen FM 1187	TxDOT	Widen FM 1187 as part of the overall SH 121 plan
SH 121/US67 Improvement	TxDOT	Improve the SH 121/US 67 intersection

Results of the Cumulative Effects Analysis

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 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 a conforming MTP and TIP coupled with EPA's vehicle and fuel regulations fleet turnover, are anticipated to have a cumulatively beneficial impact on air quality

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 2030 MTP and the 2008-2011 TIP. The proposed project and the other reasonably foreseeable transportation projects were included in the 2030 MTP and the 2008-2011 TIP and have been determined to conform to the SIP. When combined, planned transportation improvements, revised EPA fuel and vehicle regulations, and fleet turnover are anticipated to have a cumulatively beneficial impact on air quality.

Mitigation

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.

The CAA also requires states with areas that fail to meet the NAAQS prescribed for criteria pollutants to develop a SIP. The SIP describes how the state would reduce and maintain air pollution emissions in order to comply with the federal standards. Important components of a SIP include emission inventories, motor vehicle emission budgets, control strategies to reduce emissions, and an attainment demonstration. The TCEQ develops the Texas SIP for submittal to the EPA. One SIP is created for each state, but portions of the plan are specifically written to address each of the non-attainment areas. These regulatory controls, as well as other local transportation and development initiatives implemented throughout the Dallas-Fort Worth area by local governments and other entities provide the framework for growth throughout the area consistent with air quality goals. As part of this framework, all major transportation projects, including the proposed project, are evaluated at the regional level by the NCTCOG for conformity with the SIP.

The cumulative impact of reasonably foreseeable future growth and urbanization on air quality within this area would be minimized by enforcement of federal and state regulations, including the EPA and TCEQ, which are mandated to ensure that such growth and urbanization would not prevent attainment with the ozone standard or threaten the maintenance of the other air quality standards.

5.1.11 Waters of the U.S.

Resource Study Area

For purposes of this analysis, the RSA for waters of the U.S. is Buffalo Creek and Rock Creek watersheds, which flow into the Brazos River and the Trinity River, respectively. The area of quantification for cumulative effects is the land use RSA (Area of Influence).

Historical Context and Current Health

Within the RSA, there has been localized degradation of water quality and aquatic life habitat, and small-scale impacts to jurisdictional waters have occurred. Past human impacts on waters of the U.S. were created from development of land for agricultural uses for crops and ranching. These uses affected the quality and availability of waters of the U.S., however these effects are cannot be quantified. The statewide water quality inventory by the TCEQ has identified water quality limited segments, and specific water quality parameters of concern within those segments. Persistent water quality problems identified in certain streams within the RSA, including Nolan River, Lower West Fork Trinity River, West Fork Trinity River, and Clear Fork Trinity River are expected to receive further study and be addressed through the Total Maximum Daily Load (TMDL) permitting process or alternatives such as watershed protection plan implementation through the Texas State Soil and Water Conservation Board (TSSWCB). These waters are listed on TCEQ's 303(d) list for unacceptable levels of sulfate, dissolved solids, chloride, polychlorinated biphenyls (PCBs) in fish tissue, and bacteria (TCEQ, 2008). Local organizations such as Blum High School, Brazos Basin Volunteer Citizen's Monitoring Program, and the Texas Boys Choir at the Trinity are conducting water sampling and cleanup in an effort to remove these waterbodies from the 303(d) list (EPA, 2009).

Direct and Indirect Effects

Approximately 2,503 linear feet of streams and 0.88 acre of waters of the U.S., including wetlands, would be adversely affected by the proposed project. Induced development associated with SH 121 could affect ephemeral, intermittent, and perennial streams; however, this is likely an overstatement

of effects based on previously discussed limitations of the data set. Not all of these streams would be considered jurisdictional by the USACE and subject to protection under Section 404 of the CWA. In addition, it is unlikely that all waters of the U.S., including wetlands, within the Area of Influence would be impacted. Regardless of whether the forecasted development would be public or private, these developments would have to comply with Section 404 of the CWA, which regulates the fill of waters of the US resources. The USACE administers Section 404 of the CWA and operates under "no net loss" policy for wetlands, requiring avoidance and minimization of impacts and compensatory mitigation for unavoidable impacts. Given the regulatory requirements governing impacts to waters of the U.S., substantial adverse indirect effects to these resources are not anticipated.

Effects of Other Reasonably Foreseeable Future Actions

Based on input from the local planners, approximately 127,303 LF of ephemeral, intermittent, and perennial streams within the RSA could be affected by other forecasted development; however, this is likely an overstatement of effects based on previously discussed limitations of the data set. Not all of these streams would be considered jurisdictional by the USACE and subject to protection under Section 404 of the CWA. In addition, it is unlikely that all waters of the U.S., including wetlands, within the RSA would be impacted. Regardless of whether the forecasted development would be public or private, these developments would have to comply with Sections 404 of the CWA, which regulates the filling of and encroachment on these resources. Given the regulatory requirements governing impacts to waters of the U.S., substantial adverse effects to these resources are not anticipated.

Results of the Cumulative Effects Analysis

This overall shift from largely undeveloped and agricultural land to residential, commercial, industrial, and public infrastructure land uses would result in cumulative effects to waters of the U.S. **Table 16** presents a summary of the anticipated potential cumulative effect to waters of the U.S., including wetlands, compared to the project's direct (ROW) and indirect (induced) effects and to the total resource in the RSA.

Table 16. Summary of Potential Effects to Waters of the U.S.[1]

Resource	Currently Developed	Potential Effects under the No-Build Scenario	Project		Potential Cumulative Effects	Total within RSA
			Direct Effects	Potential Indirect Effects		
Waters of the U.S. (linear feet)	76,900	32,500	2,503	15,400	127,303	285,100

1. Potential effects to waters of the U.S. are based on U.S. Census Bureau TIGER/Line data. National Wetland Inventory mapping is not available digitally for the RSA.

The estimated cumulative effect to waters of the U.S. presented in **Table 16** is based on forecasted development through 2030 and includes current development as well as development predicted under the Build and No-Build Scenarios. This cumulative effect would occur over time as development occurs. Under the No-Build Scenario, forecasted development could result in impacts to approximately 127,303 linear feet of perennial, intermittent, and ephemeral streams. The project could directly and indirectly result in impacts to approximately 17,903 linear feet of perennial, intermittent, and ephemeral streams. The potential cumulative effect of 127,303 linear feet is approximately 44.7 percent of the RSA; however, approximately 27.0 percent of the streams within the RSA are in areas that are currently developed and the project would contribute to the conversion of only 6.3 percent of the RSA. In addition, this is likely an overstatement of potential resources in the RSA. First, not all of these streams and wetlands would be considered jurisdictional by the USACE and subject to protection under Section 404 of the CWA. Second, it is unlikely that all waters of the U.S., including wetlands, within the RSA would be impacted. Regardless of whether the forecasted development would be public or private, these developments would have to comply with Sections 404 and 401 of the CWA, which regulates the filling of and encroachment on these resources. Given the regulatory requirements governing impacts to waters of the U.S., and the mitigation measures

discussed in the following section, substantial adverse cumulative effects to these resources are not anticipated.

Mitigation
Through the permitting and mitigation process the USACE has implemented a "no net loss" policy for permanent impacts to wetlands that are waters of the U.S. Additionally, the 2008 Final Mitigation Rule (Federal Register Vol. 73, No. 70; April 10, 2008) which prioritizes compensatory mitigation projects based on likelihood of success in replacing the function of aquatic habitats will further enhance mitigation success within the region. This ensures that the loss of these wetlands would require mitigation that is equal to or greater than the loss. Because the USACE would regulate and require mitigation for loss of these wetlands, the priced facility would meet the "no net loss" policy and not cause a cumulative impact to waters of the U.S.

Compensatory mitigation may include mitigation banking under specific criteria defined and approved by EPA and the USACE. The federal regulatory framework would continue to positively affect the health of the resource. Impact awareness and public education seminars could be conducted to address avoidance and minimization of permanent impacts to jurisdictional waters. This could potentially avoid future degradation of wetland quality and functionality and help prevent alterations of stream sinuosity and water quality. In addition to public awareness, future developers in the RSA should incorporate methods to avoid or minimize impacts to these resources during the planning and design processes in order to preserve existing riparian vegetation, stream bank conditions, and upland wetland features.

5.1.12 Floodplains

Resource Study Area
For purposes of this analysis, the RSA for floodplains is the same as the previously described RSA for waters of the U.S.

Historical Context and Current Health
Floodplains are defined in Executive Order 11988 (1977), "Floodplain Management", as "the lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum, that area subject to a one percent or greater chance of flooding in any given year," i.e., those areas which would be inundated by a 100-year flood. The FEMA administers the NFIP, of which Tarrant and Johnson Counties are all participating members. In order to participate, the counties were required to adopt and enforce floodplain management ordinances designed to reduce the potential for future flood damage. The overall intent in floodplain management is to ensure that development takes place in a manner that does not increase the 100-year flood elevation. Historical trends in the Floodplain RSA have resulted in the widespread utilization of floodplains for grazing and forage production. Developed land uses tend to be minimal within mapped floodplains due to the inherent unsuitability of floodplains as development sites. The health of floodplains in the RSA is moderate due to protection of the resource by federal, state, and local regulations.

Direct and Indirect Effects
The proposed project would cross approximately 64 acres of floodplains. It was determined through coordination with the floodplain administrators that mitigation would be necessary in the Buffalo Creek floodplain. Three flood storage areas between the proposed ROW and George Marti Lake are proposed for mitigation of floodplain impacts. These three areas, totaling approximately 32 acres, would be excavated to a depth of 6- to 8-feet with a storage capacity of 192 to 256 acre-feet of water.

Induced development could impact up to 250 acres of 100-year floodplain. However, as a result of the aforementioned regulations governing development within floodplains, potential indirect effects to floodplains are anticipated to be minimal.

Effects of Other Reasonably Foreseeable Future Actions
It is estimated that the No-Build Scenario could affect approximately 510 acres of 100-year floodplains in the Area of Influence. Although this development may impact floodplains, any new development would be regulated by federal, state, and local policies. As a result, adverse impacts to floodplains from other reasonably foreseeable development are not anticipated.

Results of the Cumulative Effects Analysis
This overall shift from largely undeveloped and agricultural land to residential, commercial, industrial, and public infrastructure land uses would result in cumulative effects to floodplains. **Table 17** presents a summary of the anticipated potential cumulative effect compared to the project's direct (ROW) and indirect (induced) effects and to the total resource in the RSA.

Table 17. Summary of Potential Effects to Floodplains

Resource	Currently Developed	Potential Effects under the No-Build Scenario	Project		Potential Cumulative Effects	Total within RSA
			Direct Effects	Potential Indirect Effects		
100-Year Floodplains (acres)	1,100	510	64	250	1,924	4,900

The estimated cumulative effect to 100-year floodplains presented in **Table 17** is based on forecasted development through 2030 and includes current development as well as development predicted under the Build and No-Build Scenarios. This cumulative effect would occur over time as development occurs. Under the No-Build Scenario, forecasted development could result in impacts to approximately 510 acres of 100-year floodplains. The project could directly and indirectly result in impacts to approximately 314 acres of 100-year floodplains. The potential cumulative effect (1,924 acres) is approximately 39.3 percent of the RSA; however, the project would contribute to the conversion of only 6.4 percent of the RSA. Development within floodplains is regulated, and development within floodways is prohibited; therefore, the potential indirect and cumulative effects to floodplains would be reduced. In addition, given the existing regulations that govern development within floodplains, potential effects to floodplains would be minimized. Due primarily to restrictive regulatory requirements, no substantial cumulative adverse effect to floodplains is anticipated

Mitigation
Coordination with the floodplain administrators determined that mitigation would be necessary for the direct effects to the West Buffalo Creek crossing. Three flood storage areas between the proposed ROW and Lake George Marti are proposed for mitigation of floodplain impacts. These three areas, totaling approximately 32 acres, would be excavated to a depth of six to eight feet with a storage capacity of 192 to 256 acre-feet of water (**Figure 10, Sheet 5, Appendix A**).

Under the NFIP, FEMA requires communities to adopt adequate land use planning and management measures to qualify for flood insurance in flood prone areas. In addition to these federal requirements, local practices could include more stringent standards for developers in the Land RSA to incorporate flood control and storm water management into their projects to ensure that base flood elevations are not increased by alterations made to the landscape.

5.1.13 Water Quality

Resource Study Area
For purposes of this analysis, the RSA for water quality is the same as the previously RSA for described waters of the U.S.

Historical Context and Current Health
As discussed in **Section 5.1.12**, within the RSA, there is localized degradation of water quality and aquatic life habitat, and small-scale impacts to jurisdictional waters have occurred. There are water quality issues within the RSA, including the following streams: Nolan River, Lower West Fork Trinity River, West Fork Trinity River, and Clear Fork Trinity River. Water quality in these streams is anticipated to be addressed through TMDL permitting or watershed protection plans. These waters are listed on TCEQ's 303(d) list for unacceptable levels of sulfate, dissolved solids, chloride, PCBs in fish tissue, and bacteria (TCEQ, 2008).

Direct and Indirect Effects
The anticipated direct effects to water quality associated with the proposed project are not considered to be substantial. Potential development induced by the proposed project could result in some adverse effects to water resources through degradation of surface water and groundwater. Development effects that contribute to water quality degradation include increased impermeable surface and increased non-point source pollution (e.g., from fertilizers, pesticides, sediments, and vehicle residues). Indirect effects from development can include increased stormwater runoff velocities and pollutant loads leading to impacts to surface waters and, subsequently, groundwater. However, considering the water quality regulations governing development, potential indirect effects to water quality are anticipated to be avoided and minimized to the extent practical and are not anticipated to be substantial.

Effects of Other Reasonably Foreseeable Future Actions
Development associated with the No-Build Alternative could result in some adverse effects to water resources through degradation of surface water and groundwater. Development effects would likely be similar to those experienced with induced development. Effects from development can include increased storm water runoff velocities and pollutant loads leading to impacts to surface waters and, subsequently, groundwater.

Results of the Cumulative Effects Analysis
The estimated cumulative effect is predicted for year 2030 and would include impacts associated with development not related to the project, as well as project effects. This cumulative effect would occur over time as conversion of land impacts water resources in the RSA. Cumulative effects to water quality could include increased storm water runoff velocities and pollutant loads leading to impacts to surface waters and, subsequently, groundwater. Public and private development would have to adhere to Sections 401 and 402 of the CWA in addition to state regulations such as construction permits, which require SW3P. Considering the regulations governing effects to water quality, the potential adverse cumulative effects are not anticipated to be substantial.

Mitigation
Because substantial adverse cumulative effects to water quality are not anticipated, no mitigation has been proposed. Federal and state regulations currently in place would mitigate for the effects of development on water quality.

5.1.14 Vegetation and Wildlife Habitat

Resource Study Area
For purposes of this analysis, the RSA is the portion of the Post Oak Savannah and Blackland Prairie Regions within the Land RSA.

Historical Context and Current Health
The Post Oak Savannah and Blackland Prairie have historically been altered by agricultural land uses. The Blackland Prairie is considered the most altered Texas grassland. Less than 0.1 percent of the native prairies within the Blackland Prairie remain. This began with the inception of agricultural activities in the area, long before the past time horizon for this analysis. Since 1990, there has been a trend in land use from agricultural to residential and light commercial (TPWD, 2007). The

vegetation and wildlife habitat described in the RSA is indicative of areas containing agricultural, residential, and light commercial development.

Direct and Indirect Effects

Approximately 107 acres of mesquite pasture, 58 acres of regenerative vegetation, 40 acres of riparian vegetation, 48 acres of upland woods, and 314 acres of pasture/grassland would be directly converted to transportation use. Under the Build Scenario, development anticipated to be induced by SH 121 could affect approximately 800 acres of mesquite pasture, 320 acres of regenerative vegetation, 150 acres of riparian vegetation, 160 acres of upland woods, and 1,100 acres of pasture/grassland. These habitats could be affected by induced development through conversion of land, fragmentation of vegetation resources, and reduction of habitat connectivity in the larger area

Effects of Other Reasonably Foreseeable Future Actions

It is estimated that the No-Build Scenario could affect approximately 550 acres of mesquite pasture, 350 acres of regenerative vegetation, 50 acres of riparian vegetation, 340 acres of upland woods, and 2,400 acres of pasture/grassland.

Results of the Cumulative Effects Analysis

This overall shift from primarily undeveloped and agricultural land to residential, commercial, industrial, and public infrastructure land uses would result in cumulative effects to vegetation and wildlife habitat. **Table 18** presents a summary of the anticipated potential cumulative effects compared to the project's direct (ROW) and indirect (induced) effects and to the total resource in the RSA.

Table 18. Summary of Potential Effects to Vegetation and Wildlife Habitat

Resource	Currently Developed	Potential Effects under the No-Build Scenario	Project		Potential Cumulative Effects	Total within RSA
			Direct Effects	Potential Indirect Effects		
Mesquite Pasture (acres)	300	550	107	800	1,757	7,500
Regenerative Vegetation (acres)	480	350	58	320	1,208	2,000
Riparian Vegetation (acres)	330	50	40	150	430	1,800
Upland Woods (acres)	1,050	340	48	160	1,598	2,200
Pasture/Grassland (acres)	480	2,400	314	1,100	4,294	9,100

As illustrated in **Table 18**, substantial cumulative effects to vegetation and wildlife habitat from the proposed project are anticipated. The potential cumulative effects to vegetation and wildlife habitat are as follows:

- Mesquite pasture – 1,757 acres (23.4 percent of the RSA)
- Regenerative vegetation – 1,208 acres (60.4 percent of the RSA)
- Riparian vegetation – 430 acres (23.9 percent of the RSA)
- Upland woods – 1,598 acres (72.6 percent of the RSA)
- Pasture/grassland – 4,294 acres (47.2 percent of the RSA)

The estimated cumulative effects to vegetation and wildlife habitat presented in **Table 18** is based on forecasted development through 2030 and includes current development as well as development

predicted under the Build and No-Build Scenarios. This cumulative effect would occur over time as development occurs.

Mitigation
No mitigation has been proposed for potential impacts to vegetation and wildlife habitat.

5.1.15 Threatened and Endangered Species

Resource Study Area
For purposes of this analysis, the RSA for threatened and endangered species is the area contained in USGS topographic quadrangle maps, Primrose and Joshua, which encompass the land RSA (Area of Influence). These quadrangle maps were used in the information request sent to TPWD to gather NDD information on threatened and endangered species occurrences within the Area of Influence.

Historical Context and Current Health
Impacts to Federally-listed endangered and threatened species are regulated by the USFWS under Sections 7, 9, and 10 of the Endangered Species Act. The TPWD has regulatory authority over state-listed animals where direct take (killing or injuring) is involved, but the agency does not have authority over destruction of habitat of state-listed animals. For state-listed plants, TPWD does not regulate either direct or indirect take except for lands owned or managed by TPWD.

Based on a search of the NDD within the quadrangles, there are single occurrence records for the Golden-cheeked Warbler (federally- and state-endangered) and the Brazos water snake (state-threatened). A survey for the presence or absence of suitable habitat for these species was not completed for the Area of Influence.

Direct and Indirect Effects
The proposed project would have no effect on any federally-listed species. Within the proposed ROW for the Modified Alignment, suitable habitat exists for the federally and state-listed Interior Least Tern and the Whooping Crane; however the proposed project is not likely to adversely affect these species. The proposed project contains suitable habitat for the following state-listed species: American and Arctic Peregrine Falcons, Bald Eagle, plains spotted skunk, Brazos water snake, Texas garter snake, and the timber/canebrake rattlesnake. Therefore, these state listed species may be impacted by the proposed project. The proposed project would have no impact on other state-listed species.

Because a survey for the presence or absence of suitable habitat for federally- or state-listed species (Tarrant and Johnson Counties) was not completed for the Area of Influence, it is unknown whether the induced development areas associated with the proposed project contain suitable habitat for these species. However, for any of the development anticipated to be induced by the proposed project, it would be the responsibility of the individual developers, in coordination with USFWS and TPWD, to determine if their projects have the potential to affect threatened or endangered species as any proposed development, public or private, would be subject to regulation under the ESA. Indirect effects to threatened and endangered species habitat are not anticipated to be adverse.

Effects of Other Reasonably Foreseeable Future Actions
Because a survey for the presence or absence of suitable habitat for federally- or state-listed species was not completed for the Area of Influence, it is unknown whether any of the development areas forecasted under the No-Build Scenario contain suitable habitat for these species. For any future development, it would be the responsibility of the individual developers, in coordination with USFWS and TPWD, to determine if their projects have the potential to affect threatened or endangered species as any proposed development, public or private, would be subject to regulation under the ESA. Effects from these other reasonably foreseeable future actions to threatened and endangered species habitat are not anticipated to be adverse.

Results of the Cumulative Effects Analysis
As detailed in **Section 4.1.6**, the proposed project in addition to past, present, and reasonably foreseeable actions would contribute to the conversion of vegetation and wildlife habitat to developed uses. While threatened and endangered species also depend on habitat for their existence, there is no critical habitat mapped within the RSA. Additionally, habitat suitable for threatened and endangered species is regulated by the ESA, one of the most restrictive environmental laws. Any development within the RSA must comply with federal and state regulations.

It is unknown whether suitable habitat exists in the forecasted development areas; however, any of the forecasted development would have to comply with the ESA. Considering existing regulations along with the lack of critical habitat within the RSA, cumulative effects to threatened and endangered species are not anticipated to be adverse.

Mitigation
Because the potential effects to federally- and state-listed species associated with the forecasted development are unknown, it is not possible to outline specific mitigation measures. Because public and private development is subject to regulation by the ESA, mitigation for any impacts would be coordinated with USFWS and TPWD.

5.1.16 Cultural Resources

Resource Study Area
For the purposes of this analysis, the RSA for cultural resources is the Land RSA (Area of Influence).

Historic Properties

Historical Context and Current Health
Legislation designed to protect historic resources (Section 106 of the NHPA) applies only to projects that require a federal action (e.g. approval to use), publicly-owned property, public funds, or a permit. The Section 106 review process provides for the identification of project impacts to archeological and historic resources and consideration of avoidance or mitigation for projects requiring a federal action. Private developments which are not subject to such reviews could increase the impacts on and loss of archeological and historic resources.

There are eight known historic sites that are listed in or eligible for listing in the NRHP (**Table 11**). The locations of these sites are mapped and described in the THC Atlas Database. One site is in Tarrant County and seven are in Johnson County.

The First Baptist Church of Crowley is located at 400 S. Eagle Drive in the City of Crowley in Tarrant County. The earliest record mentioning this church dates was in 1896, the year of its establishment and admission into the Tarrant County Baptist Association. The church is still in use today. The Methodist Church of Joshua is located in the City of Joshua and Johnson County. The historical marker for this church is listed as Methodism in Joshua and was erected in 1983. The church is still active today. Caddo Cemetery is located on FM 1902, north of CR 910 west of the City of Joshua. Moss Cemetery is located west of Vaughn Road on SH 174 north of the City of Cleburne. Green Acres Cemetery, also known as Memorial Park Cemetery, is located on SH 174 north of the City of Cleburne. Lightfoot Cemetery is located on Dove Creek Dr. north of the City of Cleburne, on SH 174. Old Lane Prairie Cemetery is located west of SH 174 in Johnson County north of the City of Cleburne. Lane Prairie Cemetery is located East of 174, directly across (to the east) from Old Lane Cemetery north of the City of Cleburne.

Direct and Indirect Effects
The proposed project would have no direct effects on historic structures.

Within the Area of Influence, there are eight known historic sites that are listed in or eligible for listing in the NRHP, however none would be impacted by the induced development forecasted by the local planners. No indirect effects as defined by Section 106 of the NHPA would occur because there are no historic resources within the APE of the Modified Alignment. Although it is possible that historic sites exist in the induced development area for the proposed project, it is not possible to determine potential effects as the exact location and nature of the resource is unknown.

Some induced development may fall under federal or state regulatory resource protection review; these resources would be protected, preserved, or mitigated. If development is publicly funded, or if private development requires certain federal permits, such as a permit under Section 404 of the CWA, then it would likely be subject to federal or state regulations. However, most of the development, such as residential and commercial development, would not fall under the regulatory review process; therefore, these resources would have no protection under federal or state laws.

Effects of Other Reasonably Foreseeable Future Actions
None of the eight known historic sites that are listed in or eligible for listing in the NRHP within the RSA would be affected by the development forecasted under the No-Build Scenario. As previously discussed, although it is possible that historic sites exist in the forecasted development areas associated with the No-Build Alternative, it is not possible to determine potential effects as the exact location and nature of the resource is unknown.

Results of the Cumulative Effects Analysis
Because most of the development forecasted within the RSA is likely to be privately funded residential and commercial development, potential effects to historic resources would only be regulated if the development requires federal permits (e.g. Section 404 of the CWA). It is possible that unknown historic sites could be affected, it is not possible to determine the potential effects as the exact location and nature of these resources is unknown. None of the eight historic sites that are listed in or eligible for listing in the NRHP within the RSA (Area of Influence) is anticipated to be affected by the development forecasted by the local planners.

Mitigation
Future impacts to historic resources could be mitigated through better awareness of the importance of these resources and regulatory restrictions and review at the local level. In addition, loss of resources could be mitigated to some extent by encouraging voluntary presentation by developers.

Archeological Resources

Historical Context and Current Health
Legislation designed to protect archeological resources (Section 106 of the NHPA and TAC) applies only to projects that require a state or federal action (e.g. approval to use), publicly-owned property, public funds, or a permit. The Section 106 review process provides for the identification of project impacts to archeological and historic resources and consideration of avoidance or mitigation for projects requiring a federal action. Private developments which are not subject to such reviews could increase the impacts on and loss of archeological and historic resources.

There are no known archeological materials and no settings with reasonable potential to contain archeological or historic properties within the RSA.

Direct and Indirect Effects
The proposed project would have no direct effects on archeological resources. Because archeological resources in the RSA are unknown, and it cannot be determined whether any

induced would result in adverse effects to these sites because the quantity, location, and character of individual resources are unknown.

Some induced development may fall under federal or state regulatory resource protection review; therefore, these resources could be protected, preserved, or mitigated. If development is publicly funded, or if private development requires certain federal permits, such as a permit under Section 404 of the CWA, then it would likely be subject to federal or state regulations. However, most of the development, such as residential and commercial development, would not fall under the regulatory review process; therefore, these resources would have no protection under federal or state laws.

Effects of Other Reasonably Foreseeable Future Actions
Because archeological resources in the RSA are unknown, and it cannot be determined whether any of the development forecasted under the No-Build Scenario would result in adverse effects to these sites because the quantity, location, and character of individual resources are unknown.

Results of the Cumulative Effects Analysis
Because most of the development forecasted within the RSA is likely to be privately funded residential and commercial development, potential effects to archeological resources would only be regulated if the development requires federal permits (e.g. Section 404 of the CWA).

Mitigation
Future impacts to archeological resources could be mitigated through better awareness of the importance of these resources and regulatory restrictions and review at the local level. In addition, loss of resources could be mitigated to some extent by encouraging voluntary presentation by developers.

5.1.17 Cumulative Effects Summary

The population growth, employment growth, and development within the land RSA (Area of Influence) is anticipated to continue with or without the proposed project. Local and regional government agencies continue to plan for this growth and have adopted various land use and transportation plans for the area, such as Mobility 2030 - 2009 Amendment. The proposed project, combined with other local/regional development efforts, would serve to accommodate current and future growth and development. In addition, a number of regulatory mechanisms are in place to offset or minimize the adverse effects of social and economic growth. Because conversion of land from one undeveloped use to some type of development causes most of the effects on other social and natural resources, the objective of this cumulative effects analysis was to evaluate land use and corresponding environmental effects that would be expected to occur over the timeframe of the study (1950 to 2030).

The cumulative effects analysis attempted to determine the magnitude of the potential cumulative effects on the resources. As previously discussed, the 2003 EA did not contain an analysis of cumulative effects. It is unknown whether or not potential cumulative effects to archeological and historic resources would be substantial because sufficient information does not exist for the quality of the resource, the nature of the potential impact, or both. Although there is an abundance of similar habitat within the RSA, cumulative effects to vegetation and wildlife habitat are anticipated. Anticipated cumulative effects to the other resources considered in this analysis, including land use, air, waters of the U.S., floodplains, water quality, and threatened and endangered species, are not considered to be substantial.

5.2 Regional Toll and Managed Lane/HOV System Impact Analysis

The indirect impact section identified the need to study the impacts from the regional toll and managed/HOV lane network as it expands for the *Mobility 2030 - 2009 Amendment* proposed

transportation system. Each cumulative resource is studied from a regional perspective and addresses the impacts that the proposed toll/managed lane network would have on each resource. Because of the accessibility of data resources supplied by the NCTCOG, the RSA for the regional study is the MPA.

5.2.1 Land Use

Metropolitan areas have come under intense pressure to respond to federal mandates to link the planning of land use, transportation, and environmental quality from persons concerned about managing the side effects of growth such as sprawl, congestion, housing affordability, and loss of open space. The planning models used by MPOs were not designed to address these questions, creating a gap in the ability of planners to systematically assess these issues.

The relationships between land use, transportation, and the environment are at the heart of growth management. The emerging concern that construction of new suburban highways induces additional travel, vehicle emissions, and land development, making it implausible to "build our way out" of congestion has reshaped the policy context for metropolitan transportation planning. Recognizing the effects of transportation on land use and the environment, the CAA and the Intermodal Surface Transportation Efficiency Act (ISTEA) mandated that MPOs integrate metropolitan land use and transportation planning. Later, the Transportation Equity Act for the 21st Century (TEA-21) succeeded the ISTEA to refine this process.

The NCTCOG is promoting sustainable development as a specific objective of *Mobility 2030 - 2009 Amendment* because of the direct link between land use, transportation, and air quality. NCTCOG has defined sustainable development as:

- Land use and transportation practices that promote economic development while using limited resources in an efficient manner.
- Transportation decision making based on impacts on land use, congestion, VMT, and the viability of alternative transportation modes.
- Planning efforts which seek to balance access, finance, mobility, affordability, community cohesion, and environmental quality.

The essence of sustainable development is the wise use of scarce resources so that future generations may enjoy them. At the regional level, the key to maintaining sustainable patterns of development is to allow cities the option to present a variety of land use, zoning, mobility, and service packages to the development market and residents. This can be accomplished by providing planning support for a diverse range of mobility options such as rail, automobiles, bicycling, transit, and walking.

The DFW MPA is forecasted to grow to almost 8.5 million people and 5.3 million jobs by the year 2030, producing nearly a 63 percent increase in population and a 64 percent increase in employment. If not planned for and implemented in a responsible way, this type of rapid growth would have negative impacts on the region. If development continues to grow away from the urban core, the VMT would substantially rise per household, per person, and per employee. Higher densities, mixed-land uses, and increased transportation alternatives, which are characteristics of the urban core, reduce overall VMT. This leads to lower emissions of VOC and NOx, improving air quality. NCTCOG's analysis of travel patterns showed that mixing land uses has a similar beneficial impact on travel as density. There are five types that categorize all land in the DFW MPA: employment dominant, employment leaning, mixed, household leaning, and household dominant. The localized mixing and integration of land uses occur at a variety of densities in urban, suburban, and rural settings in the region.

The MTP land development policies were created by combining regional expectations with local city plans, including anticipated population growth and land use. NCTCOG relies on the information provided by cities as a basis for their land development policies. By understanding the cities' expectations, NCTCOG is better able to educate the public and municipalities on the best alternatives for regional land development.

NCTCOG conducted a series of demographic sensitivity analyses scenarios to quantitatively assess the potential impacts of alternative growth scenarios on the region in 2030. Historically, the DFW area has grown outward with new developments turning rural areas into suburban cities. Within the alternative growth scenarios modeled by NCTCOG, households and employment locations were redistributed throughout the region to simulate alternative market assumptions; however, the control numbers for population and employment remained the same. **Table 19** shows the statistics produced through the analysis of each scenario. Brief descriptions of each scenario are as follows:

- Connected Centers Scenario: NCTCOG redistributed 2030 population and employment growth, while maintaining the population and employment control totals for the region. Growth was taken from rural areas and added to moderate intensity mixed use centers located throughout the region. The investment framework emphasizes mobility choices including trails/paths, public transportation (bus, streetcar, light rail and commuter rail), and travel by car.

- Return on Investment Scenario: NCTCOG redistributed 2030 population and employment growth, while maintaining the population and employment control totals for the region. Growth was taken from rural areas and added to urban service areas where existing neighborhoods and business areas are maintained and vacant or underutilized properties are revitalized. The investment framework focuses on reinvestment in existing infrastructure. Roads, sewers, water systems and other services are generally not extended and suburban or urban development intensities generally do not occur in areas that are now ranchland or open space.

- Diverse, Distinct Communities Scenario: NCTCOG redistributed 2030 population and employment growth, while maintaining the population and employment control totals for the region. Growth was taken from rural areas and added to the downtowns of large and small communities around the region. The investment framework provides urban levels of service in existing communities around the region. There would be some extension of urban services and facilities to new areas, but to centers where this infrastructure can be clustered efficiently rather than to large areas of low intensity development.

- Green Region Scenario: NCTCOG redistributed 2030 population and employment growth, while maintaining the population and employment control totals for the region. Growth was redistributed around protected or enhanced natural areas and open spaces. The investment framework includes green infrastructure to serve the region's needs for parks and trail connections and for storm water management and other needs. It uses alternative energy sources, leadership in energy and environmental design (LEED) building standards, and conservation to reduce the region's energy consumption and carbon footprint.

Table 19. Sensitivity Results of Alternative Growth Scenarios

Data of Interest	Connected Centers	Return on Investment	Diverse, Distinct Communities	Green Region
MPA Average of Trip Length	- 10.57%	-13.25%	- 13.11%	- 10.41%
MPA Rail Transit Boardings	+ 19.2%	+ 4.9%	+ 4.9%	+ 1.3%
MPA Bus Transit Boardings	+ 19.5%	+ 19.7%	+ 20.0%	+ 14.5%
MPA Vehicle Miles Traveled	- 8.05%	- 7.9%	- 11.07%	- 8.34%
MPA Vehicle Hours Traveled	- 9.7%	- 8.1%	- 12.9%	- 11.3%

Table 19. Sensitivity Results of Alternative Growth Scenarios				
Data of Interest	**Connected Centers**	**Return on Investment**	**Diverse, Distinct Communities**	**Green Region**
Total Vehicle Hours of Delay	- 15.7%	- 14.7%	- 18.7%	- 19.4%
Lane Miles Needs	- 6.1%	- 8.0%	- 7.9%	- 6.5%
Roadway Pavement Needs (sq. miles)	- 5.8	- 7.6	- 7.5	- 6.2
Financial Needs (billions)	- $4.9	- $6.9	- $6.5	- $5.4
Volatile Organic Compounds (VOC) Emissions	- 8.4%	- 8.3%	- 11.3%	- 8.4%
Nitrogen Oxide (NOx) Emissions	- 6.6%	- 6.5%	- 9.2%	- 6.3%

Source: NCTCOG - Mobility 2030: Metropolitan Transportation Plan – 2009 Amendment

The analysis results in **Table 19** show the increases and decreases that would occur in each growth scenario versus a growth scenario that represents population and employment distributions based on the past trends and current policies of local governments regarding land use (*VNT North Texas Alternative Futures Initial Findings*, June 12, 2009). All of the scenarios show reductions in average trip length, vehicle miles traveled, vehicle hours traveled, total vehicle hours of delay, lane miles needed, roadway pavement needs, financial needs, VOC emissions, and NOx emissions. All of the scenarios show an increase in bus transit boardings. The Connected Centers scenario shows a substantial increase in rail transit boardings relative to the other scenarios.

Mobility 2030 - 2009 Amendment does not pick, favor, or choose any regional land use scenario. This data is provided by NCTCOG as an educational guide for the cities and municipalities that comprise the Dallas/Fort Worth metropolitan area. The alternative growth scenarios are presented as suggested alternatives the municipalities could incorporate into their land use policies in order to improve regional transportation and environmental issues. Because NCTCOG has no power to control regional growth and land development, the MTP provides these alternatives as guidance to city planners and developers as the most efficient way to grow. By presenting these options, NCTCOG's transportation goals are better served.

The *Mobility 2030 - 2009 Amendment* does not utilize any of these alternative growth scenarios as a basis for development since these regional scenarios cannot be realistically implemented. The proposed roadway system (includes toll/managed lane facilities) developed by the MTP is based on projected growth and land use changes that are predicted to occur in the future. The MTP growth model takes each municipality's land use growth projections as a basis for the *Mobility 2030 - 2009 Amendment.* Each municipality has its own method of addressing development within their boundaries depending on the growth they are experiencing. This growth includes mixed use, redevelopment, new development, industrial, commercial, high density, low density, transit oriented, rural growth, etc. The *Mobility 2030 - 2009 Amendment* was modeled using each city's growth projections and combining them with future growth patterns extrapolated from existing patterns for the region. These patterns do not follow, support, or conform to any regional scenarios presented in the *Mobility 2030 - 2009 Amendment* and the scenarios are used only as a guide for future consideration for growth and land use development.

The RTC is an independent transportation policy body of the MPO and is comprised of elected officials representing the region's counties and municipalities as well as the region's transportations providers (DART, TxDOT, NTTA, etc.). The RTC is responsible for overseeing the *Mobility 2030 - 2009 Amendment* as it relates to transportation and creates policies for regional transportation including toll policies, managed lane policies, CDA policies, and other transportation related issues.

The RTC has taken a proactive approach to improving regional traffic congestion and air quality through its Sustainable Development Policy adopted in 2001. The RTC established basic policy directions which serve as strategies to meet finance constraints, diversify mobility, and improved air quality. The objectives of these practices are to:

- Respond to local initiatives for town centers, mixed-use growth centers, transit-oriented developments, infill/brownfield developments, and pedestrian-oriented projects.
- Complement rail investments with coordinated investments in park-and-ride, bicycle, and pedestrian facilities.
- Reduce the growth in VMT per person.

Although the *Mobility 2030 - 2009 Amendment* and the RTC state that these practices should be followed, the local municipalities have direct jurisdiction over land use, and public agencies such as DART, TxDOT, and NTTA have jurisdiction over the regional transportation system. These agencies and municipalities would need to work with the NCTCOG and the RTC to implement these sustainable development policies. These policies represent an important new trend in local development patterns that are based on an increased desire for a greater variety of transportation options, mixed-use developments, and unique communities with a sense of place. This trend contributes to the region's increasing emphasis on sustainable development and the ability to attain federal air quality attainment.

This sustainable land use is one tool the NCTCOG uses to reduce the need for new infrastructure (utilities, transportation, emergency response, government facilities, water, etc.). Without sustainable land use, the addition cost of new infrastructure items would increase beyond the current cost.

Sustainable land use is only one part of the solution. The cost of implementation of a full sustainable land use plan is expensive and only municipalities have the power in the state of Texas to affect and implement land use zoning, codes, and enforcement. Furthermore, no government entity has the authority or power to instruct developers or people where to develop or live.

The future roadway network outlined in the *Mobility 2030 - 2009 Amendment* supports the predicted land use changes and growth in the region. Current and anticipated funding from the federal government for transportation will not meet the demands for the transportation infrastructure needed to support the predicted population growth and land use changes. Toll roads and managed lanes are the methods that the MTP employs to ensure the transportation demands from future growth are met based on limited transportation funds.

The development of a toll/managed lane network is consistent with the land use policies discussed in the MTP. One component of the managed lane system is planned access to high density development areas. As more mixed-use development centers are planned in the region, managed lane facilities would continue to connect to these centers, allowing HOV and transit vehicles access to the transportation system. This would help remove SOV users from the main lanes and increase mobility, efficiency and reliability on all traffic facilities.

The proposed *Mobility 2030 - 2009 Amendment* toll/managed lane network may affect land use within the MPA boundaries by helping to enhance land development opportunities. However, toll/managed lane network is only one factor in creating favorable land development conditions; other prerequisites for growth in the region include demand for new development, favorable local and regional economic conditions, adequate utilities, and supportive local land development regulations and policies. The proposed *Mobility 2030 - 2009 Amendment* priced facility network as currently envisioned may, with the right conditions, help influence and facilitate the planned regional land use conversion, redevelopment and growth.

5.2.2 Environmental Justice

Mobility 2030 - 2009 Amendment presents a system of transportation improvements needed to maintain mobility in the DFW area over the next 20 plus years and serves as a guide for the expenditure of state and federal funds for the region. Its development was coordinated among local governments, transit authorities, TxDOT, FHWA, and FTA. The plan is based on regional transportation needs through the process of forecasting future travel demand, evaluating system

scenarios, and selecting those options which best meet the mobility needs of the region. It also serves as a guide for the implementation of multi-modal transportation improvements, policies, and programs through the year 2030.

As part of the development of *Mobility 2030 - 2009 Amendment*, NCTCOG conducted an environmental justice study for the existing transportation system compared to the MTP 2030 proposed transportation system. NCTCOG concluded that the *Mobility 2030 - 2009 Amendment* transportation improvements and recommendations for the NCTCOG region would not cause adverse impacts to environmental justice populations. However, it did not account for the impact of tolls on environmental justice populations.

To further analyze the effects of expansion of toll roads and managed lanes in the NCTCOG region, a regional study was performed for environmental justice populations comparing regional build and no build scenarios. The regional no build scenario utilized the existing roadway network in 2009 with 2030 population demographics. The regional build scenario used the proposed MTP roadway network in 2030 with 2030 population demographics.

Regional traffic analysis performance reports and regional origin-destination studies were developed for the NCTCOG's MPA transportation network for the build and no build regional toll/managed lane scenarios. The analysis was conducted to investigate the possible cumulative impacts from the construction of toll roads and managed lanes to environmental justice populations and to determine if there would be disproportionately high and adverse cumulative impacts to these populations.

Traffic Analysis Performance Reports

Traffic analysis performance reports were developed for the regional build and no build scenarios for the entire MPA transportation network. The average daily vehicle trips for both scenarios are 24,865,314 trips.

A comparison of the average loaded speed per roadway classification is shown in **Table 20**. Average loaded speed, based on the NCTCOG's performance reports, is defined as "the average speed on roadways with traffic on the road; it is the volume-weighted average of loaded speed." The average loaded speed is the average speed a vehicle is traveling along a specific roadway classification during traffic. This is calculated using the miles traveled divided by the time it took to travel a fixed distance. This calculation illustrates the usage of the roadway system by roadway classification. The results show that the regional build scenario would result in an increase in roadway speed for all roadway classifications.

Table 20. 2030 Average Loaded Speed (mph)

Roadway Classification	Build Scenario			No Build Scenario			Percent Change		
	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Freeways (includes toll roads)	53.71	54.36	57.49	38.11	43.89	49.62	29.04%	19.26%	13.69%
Major Arterials	27.23	28.94	31.80	20.13	21.25	25.87	26.07%	26.57%	18.65%
Minor Arterials	24.16	25.75	27.46	19.99	21.55	24.73	17.26%	16.31%	9.94%
Collectors	20.57	21.96	23.27	17.51	18.74	21.12	14.88%	14.66%	9.24%
Frontage Roads	25.94	28.45	30.26	19.45	20.21	24.17	25.02%	28.96%	20.13%
HOV Lanes (includes managed lanes)	49.57	52.05	53.15	44.48	50.12	51.35	10.27%	3.71%	3.39%

Source: NCTCOG TransCAD® data for 2030 regional build and no build scenarios (April 2009 Performance Reports)

In addition, an evaluation of the regional no build scenario versus the regional build scenario was conducted for the MPA using LOS per lane mile by roadway classification. The results are shown in

Table 21. The regional no build scenario shows an increase in lane-miles in LOS F for all roadway classifications with the exception of HOV/managed lanes.

Table 21. Level of Service for the Traffic Study Area (2030)				
Roadway Classification	Build Scenario		No Build Scenario	
	Lane-Miles	LOS	Lane-Miles	LOS
Freeways (includes toll roads)	7,651	A-B-C (3,943 lane-miles) 52%	4,367	A-B-C (826 lane-miles) 19%
		D-E (2,239 lane-miles) 29%		D-E (1,160 lane-miles) 27%
		F (1,469 lane-miles) 19%		F (2,381 lane-miles) 55%
Major Arterials	8,580	A-B-C (4,791 lane-miles) 56%	3,942	A-B-C (858 lane-miles) 22%
		D-E (1,762 lane-miles) 21%		D-E (614 lane-miles) 16%
		F (2,027 lane-miles) 24%		F (2,470 lane-miles) 63%
Minor Arterials	7,869	A-B-C (5,642 lane-miles) 72%	9,034	A-B-C (3,446 lane-miles) 38%
		D-E (915 lane-miles) 12%		D-E (1,546 lane-miles) 17%
		F (1,312 lane-miles) 17%		F (4,042 lane-miles) 45%
Collectors	9,438	A-B-C (7,544 lane-miles) 80%	8,092	A-B-C (4,339 lane-miles) 54%
		D-E (694 lane-miles) 7%		D-E (929 lane-miles) 11%
		F (1,200 lane-miles) 13%		F (2,824 lane-miles) 35%
Frontage Roads	4,359	A-B-C (3,367 lane-miles) 77%	2,465	A-B-C (1,148 lane-miles) 47%
		D-E (430 lane-miles) 10%		D-E (320 lane-miles) 13%
		F (562 lane-miles) 13%		F (997 lane-miles) 40%
HOV Lanes (includes managed lanes)	1035	A-B-C (713 lane-miles) 69%	173	A-B-C (95 lane-miles) 55%
		D-E (209 lane-miles) 20%		D-E (28 lane-miles) 16%
		F (112 lane-miles) 11%		F (50 lane-miles) 29%

Source: NCTCOG TransCAD® data for 2030 regional build and no build scenarios (April 2009 Performance Reports)

Regional Origin-Destination Study

An origin-destination study was conducted by NCTCOG for the MPA toll road/managed lane network for environmental justice populations. The assumptions and limitations of origin-destination studies are discussed in the Environmental Justice section of this document. **Sheets 7 and 8** (**Appendix E**) show the basis of the NCTCOG analysis and the identified TSZs that contain environmental justice populations (i.e., TSZs that contain greater than 50 percent minority and low-income populations) and the existing and future toll roads and managed lanes used in the origin-destination analysis. The figures show that the majority of environmental justice communities are located within the IH 635 and IH 820 loops in Dallas and Fort Worth, respectively.

The entire MPA was evaluated for the existing and future toll network. The total TSZs that comprise the origin-destination study area within the MPA is 4,813. A total of 1,624 of these are considered environmental justice TSZs.

For the regional no build scenario, 4,712 TSZs are anticipated to regularly utilize the existing toll roads in the MPA in 2030 (originating at least one trip per day); this represents 97.9 percent of the total TSZs in the MPA. Under the regional no build scenario, 1,610 environmental justice TSZs are anticipated to regularly utilize the existing toll facilities (originating at least one trip per day); this represents 99.1 percent of the environmental justice TSZs in the MPA. Data analysis indicates that from the 265,203 total trips which would originate from all of the TSZs that would utilize the existing toll facilities in the MPA, approximately 14.6 percent (38,603 trips) of the total trips would originate from environmental justice TSZs.

The build scenario is anticipated to contain 4,765 TSZs that would regularly utilize the future toll facilities in the MPA in 2030 (originating at least one trip per day); this represents 99 percent of the total TSZs in the MPA. From the total environmental justice TSZs identified in the MPA, 1,622 are anticipated to regularly utilize the proposed toll facilities in 2030 (originating at least one trip per day) for the build scenario; this represents 99.9 percent of the total environmental justice TSZs in the MPA. Data analysis indicates that from the 429,924 total trips which would originate from TSZs that would utilize the future proposed toll roads, approximately 18.1 percent (77,820 trips) originate from environmental justice TSZs.

Table 22 outlines the origin-destination results for the MPA study area.

Table 22. Origin-Destination Results

TSZ	2030 No Build Scenario (Existing Toll Facilities)	2030 Build Scenario (Future Toll Facilities)
Total TSZs in the MPA	4,813	4,813
Total environmental justice TSZs in the MPA	1,624	1,624
TSZs utilizing toll facilities	4,712 (97.9%)	4,765 (99%)
Environmental justice TSZs utilizing toll facilities	1,610 (99.1%)	1,622 (99.9%)
Trips from TSZs utilizing toll facilities	265,203	429,924
Trips from environmental justice TSZs utilizing toll facilities	38,603 (14.6% of total trips)	77,820 (18.1% of total trips)

Source: NCTCOG TransCAD® data for 2030 regional build and no build scenarios (March 2009 Origin-Destination data)

Results and Conclusions

The origin-destination results in **Table 22** show an increase in usage of toll roads from the 2030 no build scenario to the 2030 build scenario for the NCTCOG MPA region. Both the build and no build scenarios showed trips generated from a majority of the TSZs in the MPA (97.9 to 99 percent), including a majority of environmental justice TSZs (99.1 to 99.9 percent).

Trips on the future toll facilities in the build scenario would increase 62 percent from the current toll road facilities. Environmental justice TSZ trips would increase 102 percent. Because of the increase in trips generated by environmental justice TSZs, low-income populations would be impacted by the regional increase in toll facilities because low-income populations would use a greater amount of their income for toll road and managed lane usage. As shown in **Sheets 7 and 8,** (**Appendix E**), existing toll roads and managed lanes are not adjacent to the majority of environmental justice TSZs, but

future proposed toll roads and managed lane facilities would be built closer to environmental justice populations.

Results from the performance reports prepared for the MPA showed an increase in roadway speed and an improvement in LOS for the majority of the roadway classifications in the build scenario compared to the no build scenario. The build scenario for the MPA would improve roadway conditions throughout the NCTCOG region by increasing roadway speed and improving the LOS on the roadway network.

Although environmental justice populations would see an increase in spending for toll facilities, the entire MPA region would also see an increase in spending and usage as the toll road and managed lane system expands. The majority of environmental justice populations were identified by the NCTCOG travel demand model to potentially make trips along existing and future toll facilities. In addition, for populations (including environmental justice populations) who would opt to use non-toll options, the build scenario for 2030 (which includes all proposed toll facilities and managed lanes) would provide a roadway network that would operate at better traffic conditions (greater speeds and an improved LOS) on all roadways than the no build scenario and would provide an increased benefit for all users over the no build scenario.

Based on the previous discussion and analysis, the build scenario for the NCTCOG MPA would not cause disproportionately high and adverse cumulative impacts on any minority or low-income populations as per Executive Order 12898 regarding environmental justice.

As discussed, the analysis does not show any disproportionately high and adverse impacts to environmental justice populations; therefore, no project-specific mitigation measures are appropriate for cumulative impacts in this document. However, NCTCOG will continue its efforts to work with all communities in the planning process to identify transportation challenges and explore and develop the appropriate strategies to respond to the issues. Examples include programs and projects to improve availability and accessibility to alternate transportation options including discounted transit fares and tolls, HOV discounts on toll roads and managed lanes, better accessibility to regional transportation systems, and community level congestion management. Specific strategies and projects will be developed through discussions with local governments and community representatives.

5.2.3 Air Quality

The NCTCOG serves as the MPO for transportation for the Dallas-Fort Worth area. It serves a 16-county metropolitan region centered on Dallas and Fort Worth. Since the early 1970s, MPOs have had the responsibility of developing and maintaining a MTP. The MTP is federally mandated; it serves to identify transportation needs; and guides federal, state, and local transportation expenditures.

ISTEA strengthened the role of the MTP and made it the central mechanism for the decision-making process regarding transportation investments. The passage of the TEA-21 in 1998 continued this emphasis. The Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) was signed into law on August 10, 2005. SAFETEA-LU addresses the challenges on our transportation system such as improving safety, reducing traffic congestion, improving efficiency in freight movement, increasing intermodal connectivity, and protecting the environment. Both SAFETEA-LU and the CAAA impose certain requirements on an urbanized area's long-range transportation plan.

Transportation plans such as *Mobility 2030 - 2009 Amendment*, according to SAFETEA-LU metropolitan planning regulations, must be "fiscally constrained," that is, based on reasonable assumptions about future transportation funding levels. Because the Dallas-Fort Worth area is designated as a nonattainment area for the eight-hour ozone standard, the CAAA require the transportation plan to be in conformity with the SIP for air quality to demonstrate that projects in the

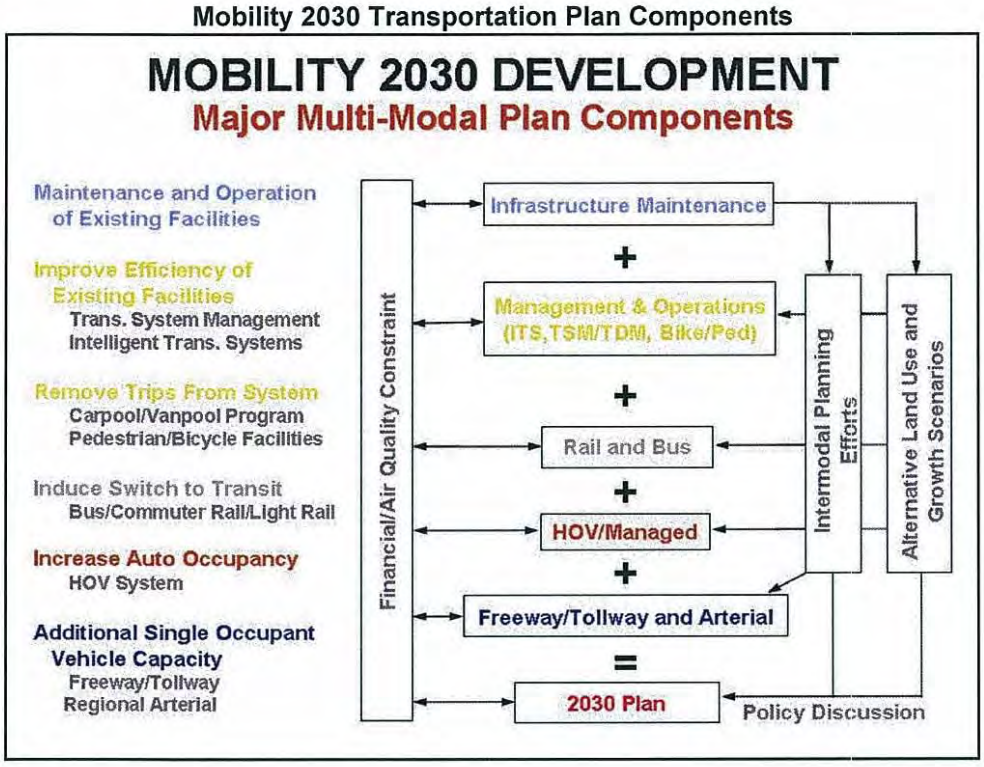
MTP meet air quality goals. *Mobility 2030 - 2009 Amendment* specifically addresses regional ozone in addition to its studies of general regional air quality and the final result showed that the regional roadway network (including toll roads and managed lanes) would show a decrease in nitrogen oxides and emissions of volatile organic compounds.

Transportation conformity is a process which ensures federal funding and approval goes to transportation activities that are consistent with air quality goals. Transportation activities that do not conform to state air quality plans cannot be approved or funded.

The CAAA established specific criteria which must be met for air quality non-attainment areas. The criteria are based on the severity of the air pollution problem. Transportation conformity is a CAAA requirement that calls for the EPA, U.S. Department of Transportation (U.S. DOT), and various regional, state, and local government agencies to integrate air quality and transportation planning development processes. Transportation conformity supports the development of transportation plans, programs, and projects that enable areas to meet and maintain national air quality standards for ozone, PM, and CO, which impact human health and the environment. Through the SIP, the air quality planning process ties transportation planning to the conformity provisions of the CAAA. This ensures that transportation investments are consistent with state and local air quality objectives. The NCTCOG is responsible for the conformity analysis in the Dallas-Fort Worth area. If the criteria are not met, EPA can then impose sanctions on all or part of the state. Sanctions include stricter industrial controls and the withholding of federal highway and transit funds.

Dallas County has been designated as part of a nine-county moderate nonattainment area for eight-hour ozone by the EPA. In accordance with the metropolitan planning regulations, *Mobility 2030 - 2009 Amendment* must include a CMP to systematically address congestion. The evaluation of additional transportation system improvements beyond the committed system began with a detailed assessment of transportation improvements that would not require building additional facilities for SOVs. Various improvements/modes including congestion management strategies, bicycle and pedestrian facilities, rail facilities, HOV lanes, managed lanes, and toll road facilities were investigated prior to determining the need for additional freeway capacity improvements. The following figure shows the implementation of these resources and how they are integrated into the MTP.

Mobility 2030 Transportation Plan Components



Transportation system performance information was developed as a product of the Dallas-Fort Worth Regional Transportation Model (DFWRTM) travel model throughout the MTP development process. This information guided development of the system alternatives and indicated the impact of various improvements. The improvements recommended in *Mobility 2030 - 2009 Amendment* include regional congestion management strategies, bicycle and pedestrian facilities, managed HOV lanes, light/commuter rail and bus transit improvements, ITS technology, freeway and tollway lanes, and improvements to the regional arterial and local thoroughfare system such as intersection improvements and signal timing. Because *Mobility 2030 - 2009 Amendment* is financially and air quality constrained, other more cost effective methods are reviewed before SOV lanes (freeways and toll roads) are added into the roadway system. ITS, mass transit, and Managed/HOV lanes are ways to meet regional transportation demands under the financially constrained MTP while improving regional air quality.

The additional introduction of toll/managed lane facilities into the existing roadway network would not cause any cumulative impacts to air quality. The regional toll/managed lane system would provide additional travel capacity to the roadway network which would allow a greater flow of traffic throughout the region, decreasing the amount of cars traveling at lower speeds or idling conditions. This would result in less fuel combustion and lower emissions including MSATs, CO, and ozone. As noted in the direct, indirect, and system cumulative analysis discussions, EPA's vehicle and fuel regulations, coupled with fleet turnover, are expected to result in substantial reductions of on-road emissions, including MSATs, CO and ozone precursors.

5.2.4 Water Quality

Water quality is regulated on the state level by TCEQ. TCEQ monitors all major water bodies (rivers, lakes and streams) and reports the conditions of these streams in a biennial Texas Water Body Inventory report. Section 303(d) of this report details those water bodies TCEQ has identified as impaired due to water contamination.

The 303(d) list identifies five major water systems as impaired with pollutants and bacteria in the MPA. These major water bodies are the Upper Trinity River, the West Fork Trinity River, the East Fork Trinity River, the Elm Fork Trinity River, and the Clear Fork Trinity River. The construction of the proposed toll/managed lane system would not cross or impact these water bodies and therefore would not cause water quality impacts.

As stated previously, TCEQ regulates water quality through SW3P, MS4, and BMPs. All construction of these toll/managed lane facilities would follow these water quality permits that would prevent further pollution to these impaired waters and to waters that are not impaired. Additionally any indirect land use development that would occur from the construction of these facilities would follow TCEQ's regulations for water quality through SW3P and MS4. Therefore, the regional toll/managed lane network would not have a cumulative impact to water quality.

5.2.5 Waters of the U.S.

The USACE regulates waters of the U.S. in the state of Texas. The MPA is under the jurisdiction of the Forth Worth District of the USACE. Fill of any jurisdictional waters of the U.S. is required to be permitted through the USACE.

While the USACE has specific guidelines for identifying waters of the U.S., several methods exist to preliminary identify these waters. USGS topography maps and TCEQ's Water Quality Inventory database provides information for the location of larger rivers and streams that would fall under the USACE jurisdiction. The National Wetlands Inventory maps created and maintained by the USFWS attempts to identify potential wetlands through the use of infrared aerial photography (Digital Ortho Quarter Quads). The current status for the National Wetland Inventory maps for the MPA consist digital formats and hard copy formats; some areas are currently not mapped.

Although this data is incomplete, it only serves as a background for the identification of waters of the U.S. Government and private developments must permit any fill into waters of the U.S. and the identification of these waters of the U.S. is completed at the project level with field surveys.

From the available data, the regional toll/managed lane system would impact and cause fill to waters of the U.S., both streams and potential wetlands. These roadway projects would be required to comply with permitting and mitigation for the fill of these waters of the U.S. Any land use change or development that would occur from this regional toll/managed lane system would also be required to permit and mitigation for fill and loss of waters of the U.S.

Through the permitting and mitigation process the USACE has implemented a "no net loss" policy for permanent impacts to wetlands and waters of the U.S. This ensures that loss of these waters would require mitigation that is equal or greater than the loss. Because the USACE would regulate and require mitigation for loss of these waters of the U.S., the toll/managed lane network would not cause a cumulative impact to waters of the U.S.

5.2.6 Vegetation

An inventory of regional vegetation is not available for the MPA. General vegetation descriptions identifying regions and ecological areas are available from many resources. These resources (e.g. the *Vegetation Types of Texas*, etc.) vary in description of areas of regions and do not update their descriptions from the original publications. Project specific vegetation descriptions are the best method to map the vegetation that would be affected by a project.

Currently, the MPA lies in the Blackland and Cross Timbers prairies ecological regions identified by TPWD. The construction of most of the proposed toll/managed lane system would occur in areas already developed and contain urban type vegetation. The projects outside the urban areas could impact natural vegetation and the changes in land use and development that may be caused by these facilities would impact vegetation surrounding these projects.

The NCTCOG does not address impacts to vegetation or mitigation for loss of vegetation in the MTP. TxDOT districts can mitigate for loss of vegetation based on the MOU and MOA with TPWD, which focuses on special habitat types of wildlife and protected species. Wetlands are under the jurisdiction of the USACE and mitigation for the loss of these wetlands (which includes the vegetation) would occur through the permitting process. The USFWS can regulate and require mitigation for loss of vegetation that is designated habitat for a threatened or endangered species. Finally, cities can implement ordinances to protect trees, natural land, or open green spaces.

Although impacts to vegetation would occur from the toll/managed lane system, these impacts would be regulated at the project level for each individual roadway project. Because of this project mitigation, there would be no cumulative impacts to vegetation from the toll/managed lane system.

5.2.7 Conclusion

The regional toll/managed lane system would cause minor impacts to some of the identified resources in this section. Regional mitigation for some of these resources would be addressed by the NCTCOG. As part of *Mobility 2030 - 2009 Amendment,* NCTCOG specifically addresses two issues – air quality and environmental justice populations. The Transportation Planning Process, at a regional level, provides ways to mitigate for any potential impacts that could occur. The priced facility projects would be included in the STIP/TIP and MTP, and the STIP/TIP and MTP would conform to the State Implementation Plan (SIP). This assurance addresses each project is in compliance with the STIP/TIP and MTP for air quality under the CAA and environmental justice under Executive Order 12898.

Land use impacts cannot be mitigated at a regional level, but at a municipality level because these entities have direct control over land use. These municipalities would work with NCTCOG to address regional infrastructure changes in their comprehensive plans. State and federal regulatory agencies that have direct jurisdiction over natural and cultural resources would be responsible for requiring avoidance, minimization and mitigation from any entity whose proposed project (transportation or other type) has a direct impact to any of these resources.

Finally as required by NEPA, mitigation for impacts would occur at the project level. Because of these potential mitigation measures, the regional proposed toll/managed lane system would not have a cumulative impact to these resources.

6.0 AGENCY COORDINATION AND PUBLIC INVOLVEMENT

6.1 Agency Coordination

Coordination for the 2004 FONSI Alignment is detailed in the EA. No additional coordination was initiated with USFWS for the Modified Alignment because neither federally-listed species nor any critical habitat for those species would be affected by the proposed project. Coordination efforts with TPWD would occur after project letting. No additional coordination was initiated with THC because the Modified Alignment is not anticipated to affect archeological or historic resources (**Appendix B**).

A revised PCN was submitted to the USACE December 2008 to request authorization and describe the proposed mitigation plan under Nationwide Permit (NWP) 14, Linear Transportation Crossings for unavoidable impacts at three single and complete crossings within the proposed project area (Project Number 2005-00058), but was put on hold pending coordination with USACE by NCTCOG, NTTA, and TxDOT as a part of the Chisholm Trail program efforts. In addition, the proposed project would be coordinated with the TCEQ as a Tier I project under the requirements of Section 401 of the CWA. As previously discussed, appropriate construction BMPs as outlined by TCEQ under Section 401 of the CWA would be used.

6.2 Public Involvement

Public meetings were held May 9, 2000 and October 19, 2000 and a public hearing was conducted February 13, 2003 to allow stakeholders and the general public the opportunity to provide comment on the EA for SH 121. A public hearing would be conducted once FHWA's approval for further processing is received for this EA Re-evaluation.

7.0 CONCLUSION

The environmental documentation for this project has been reviewed, and the majority of the changes in the direct effects associated with the proposed project are related to the shift from the 2004 FONSI Alignment to the Modified Alignment to avoid and minimize impacts to waters of the U.S. along West Buffalo Creek. Although the 2003 EA examined potential indirect effects, quantification of effects was not performed. The Re-evaluation provides more detail regarding potential indirect effects in accordance with TxDOT's Revised Guidance on Preparing Indirect and Cumulative Effects Analyses (2009). A summary of direct and indirect effects anticipated as a result of the proposed project is provided in **Table 13**. As detailed in **Section 5.0**, anticipated cumulative effects to the other resources considered in this analysis, including land use, air, waters of the U.S., floodplains, water quality, and threatened and endangered species, are not considered to be substantial. It is unknown whether or not potential cumulative effects to archeological and historic resources would be substantial because sufficient information does not exist for the quality of the resource, the nature of the potential impact, or both. Although there is an abundance of similar habitat within the RSA, cumulative effects to vegetation and wildlife habitat are anticipated. Because of changes in guidance for evaluation of indirect and cumulative effects, it is not possible to compare the findings of the Re-evaluation to the 2004 FONSI. However, the nature of the project has not changed, and the Re-evaluation generally supports the conclusions of the 2004 FONSI.

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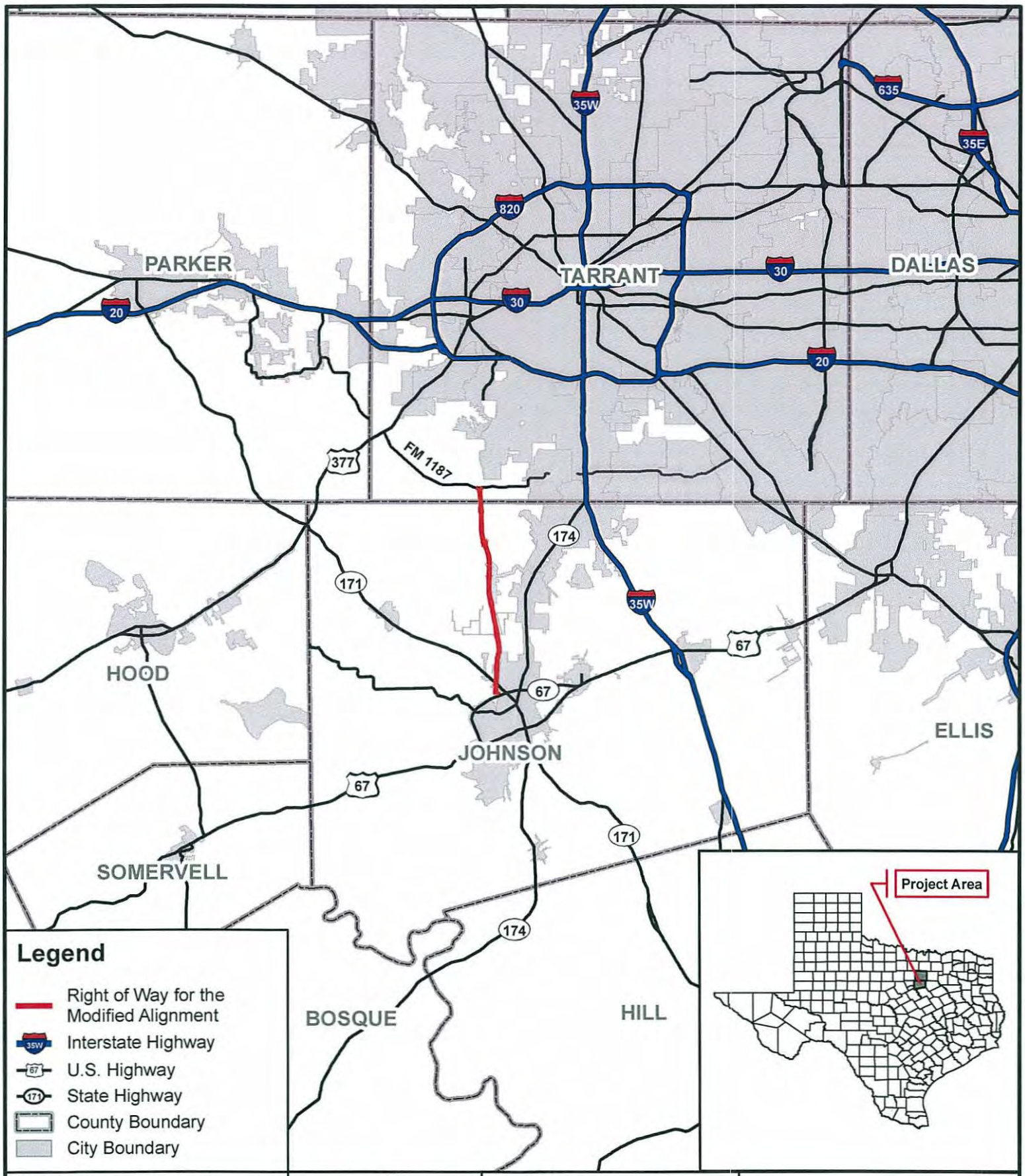
APPENDIX A: FIGURES



Re - evaluation
State Highway 121
FM 1187 to US 67
CSJ: 0504-05-001
CSJ: 0504-04-001
Tarrant and Johnson Counties

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General Location Map

Figure 1

SHEET 1 OF 1

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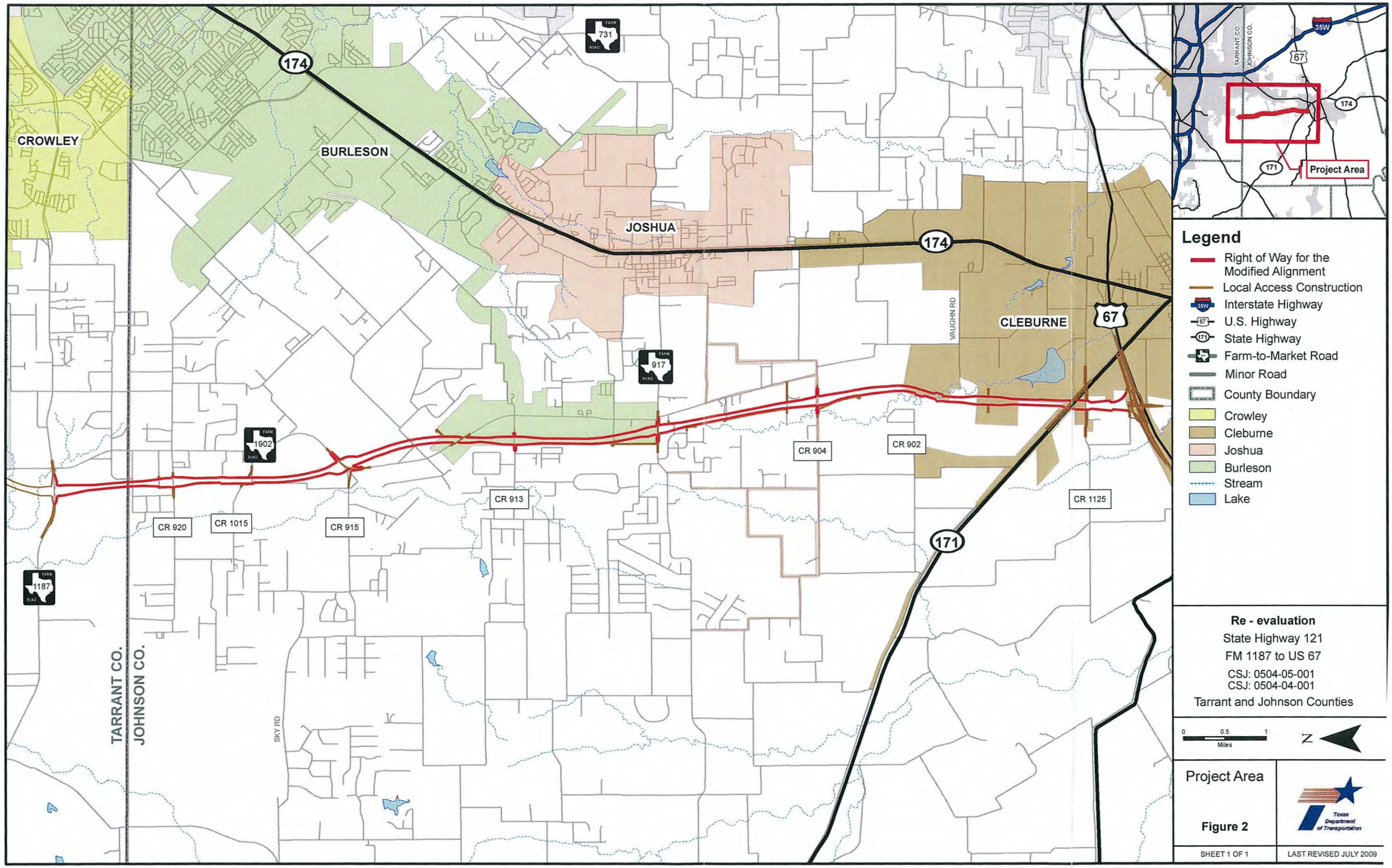
Texas Department of Transportation


CROWLEY
BURLESON
JOSHUA
CLEBURNE
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35W
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1902
1187
CR 920
CR 1015
CR 915
CR 913
CR 904
CR 902
CR 1125
VAUGHN RD
SKY RD
TARRANT CO.
JOHNSON CO.
Project Area
Legend
Right of Way for the Modified Alignment
Local Access Construction
Interstate Highway
U.S. Highway
State Highway
Farm-to-Market Road
Minor Road
County Boundary
Crowley
Cleburne
Joshua
Burleson
Stream
Lake
Re - evaluation
State Highway 121
FM 1187 to US 67
CSJ: 0504-05-001
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Tarrant and Johnson Counties
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Project Area
Figure 2
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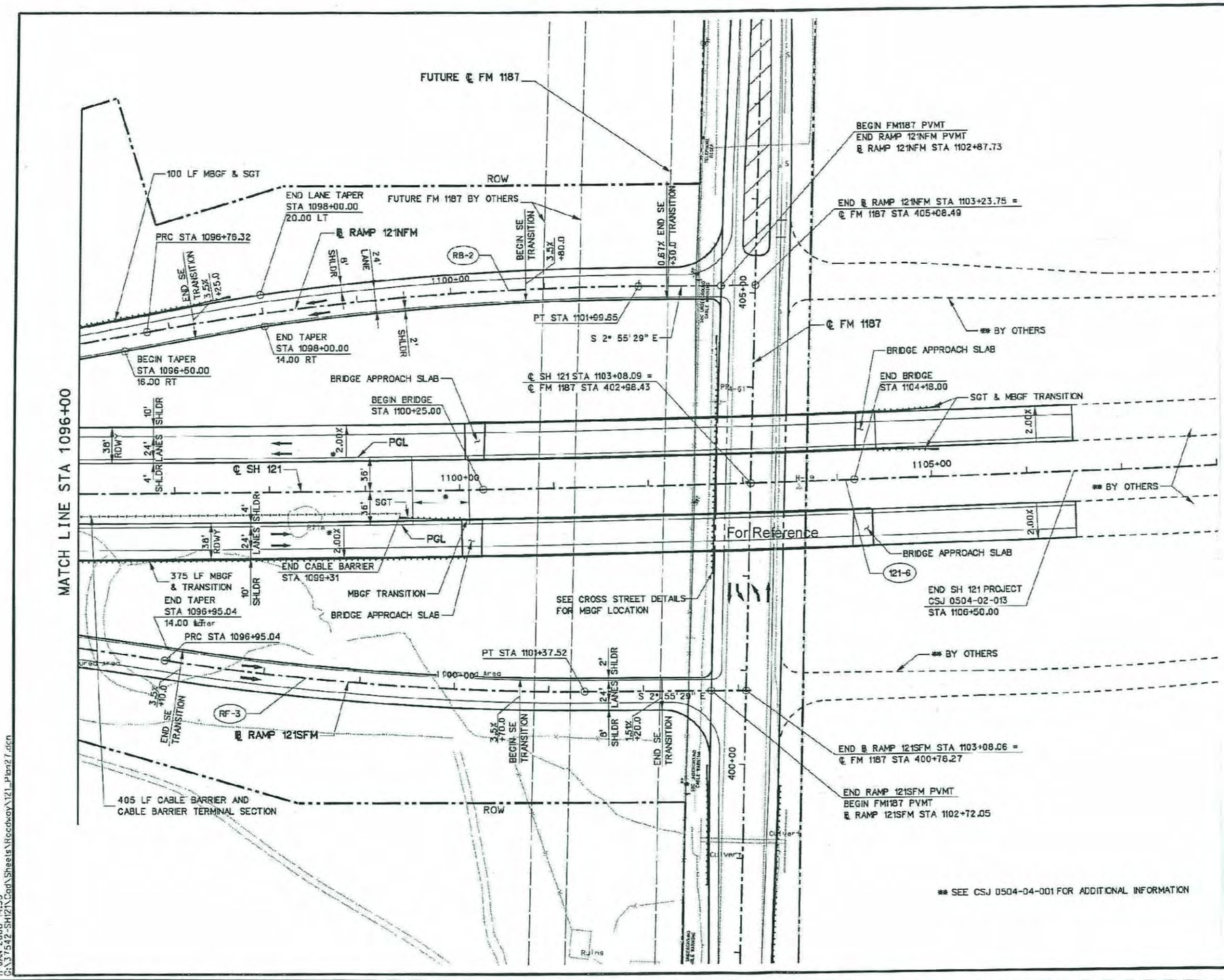

0 50 100 150 200
HORIZ. SCALE IN FEET

ROADWAY LEGEND

- CABLE BARRIER SYSTEM (DRIVEN POST OPTION NOT ALLOWED) TERMINAL SECTIONS NOT SHOWN FOR CLARITY
- METAL BEAM GUARD FENCE
- ROW
- RETAINING WALL
- CONCRETE RIPRAP

NOTES:

1. ALL SUPERELEVATION TRANSITIONS ARE LINEAR.
2. SEE PROFILE SHEETS FOR PROFILE INFORMATION.
3. REFER TO UTILITY EXHIBITS FOR ADDITIONAL INFORMATION.
4. REFER TO PROJECT LAYOUT FOR PROJECT CONTROL DATA.
5. REFER TO CURVE AND COORDINATE DATA SHEETS FOR HORIZONTAL ALIGNMENT INFORMATION.
6. SEE CULVERT GRADING PLANS FOR EASEMENT INFORMATION.
7. SEE CROSS STREET PLAN AND PROFILE SHEET FOR ADDITIONAL INFORMATION.

* TRANSITION INSIDE 4' SHOULDER CROSS SLOPE TO MATCH BRIDGE CROSS SLOPE:
-1.5%, STA 1099+50
2.0% STA 1100+00

95% DESIGN SUBMITTAL
By: GEORGE T. DIAMOND
P.E. #58650
Date: 11-JAN-2008

NOT TO BE CONSTRUED AS COMPLETE AND NOT TO BE USED FOR REGULATORY APPROVAL, PERMIT, BIDDING OR CONSTRUCTION PURPOSES

NO.	REVISIONS	BY	DATE

HNTB Corporation The HNTB Companies Engineers Architects Planners

Texas Department of Transportation

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SH 121 PLAN
STA 1096+00 TO END PROJECT

SHEET 27 OF 27

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
6			119
STATE	DISTRICT	COUNTY	
TEXAS	FTW	TARRANT	
CONTROL	SECTION	JOB	HIGHWAY NO.
0504	02	013	SH 121

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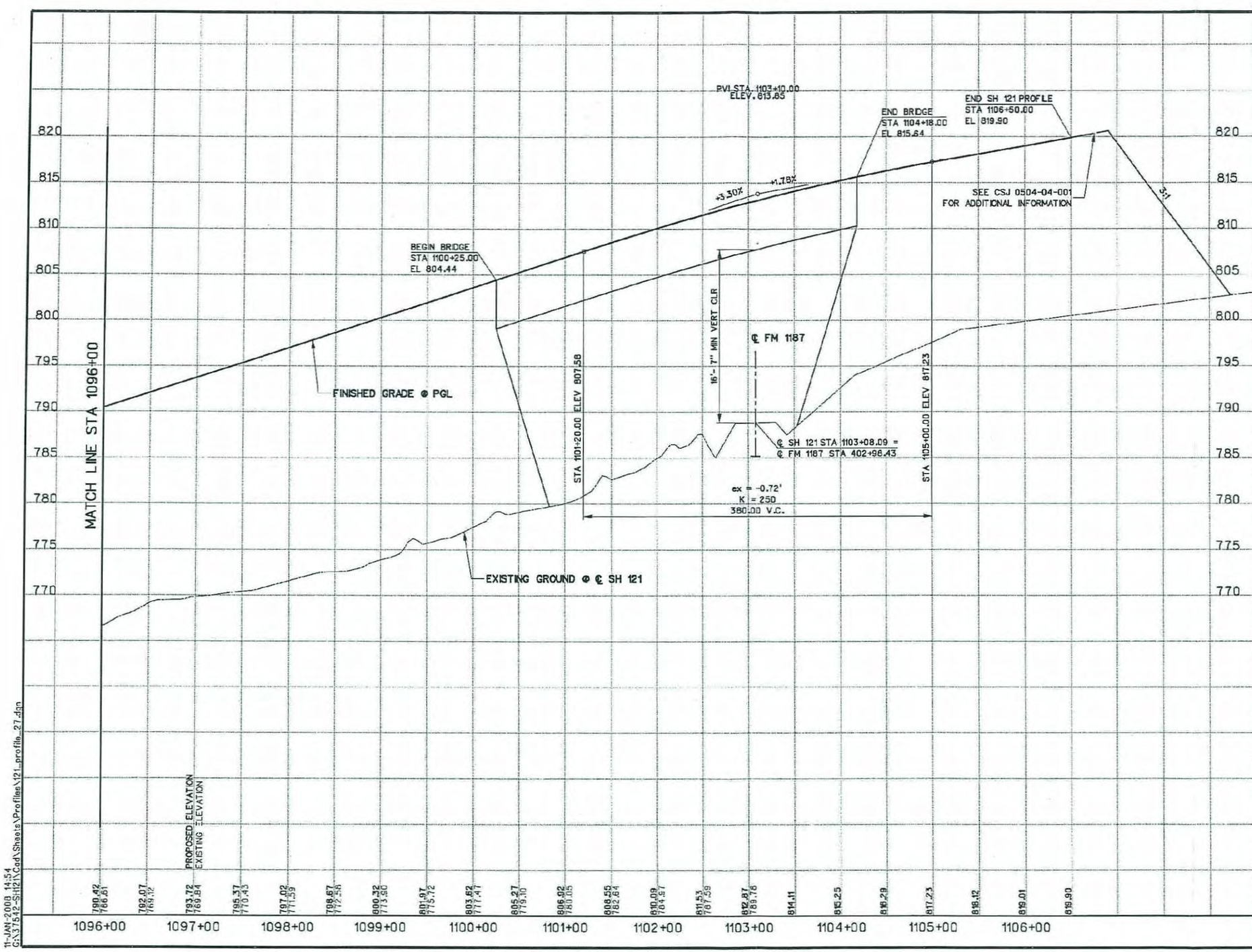
ENVIRONMENTAL ASSESSMENT RE-EVALUATION **SH 121 - FM 1187 to US 67** CSJ: 0504-04-001 CSJ: 0504-05-001	**Plan** **SH 121 and FM 1187** INTERSECTION	FOR REFERENCE ONLY	Figure 3 SHEET 1 OF 3



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By: GEORGE T. DIAMOND
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Date: 11-JAN-2008

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Engineers Architects Planners

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SH 121 PROFILE
STA 1096+00 TO END PROJECT

SHEET 27 OF 27

FED. RD. DIV. NO.	FEDERAL AID PROJECT NO.		SHEET NO.
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TEXAS	FTW	TARRANT	
CONTROL	SECTION	JOB	HIGHWAY NO.
0504	02	013	SH 121

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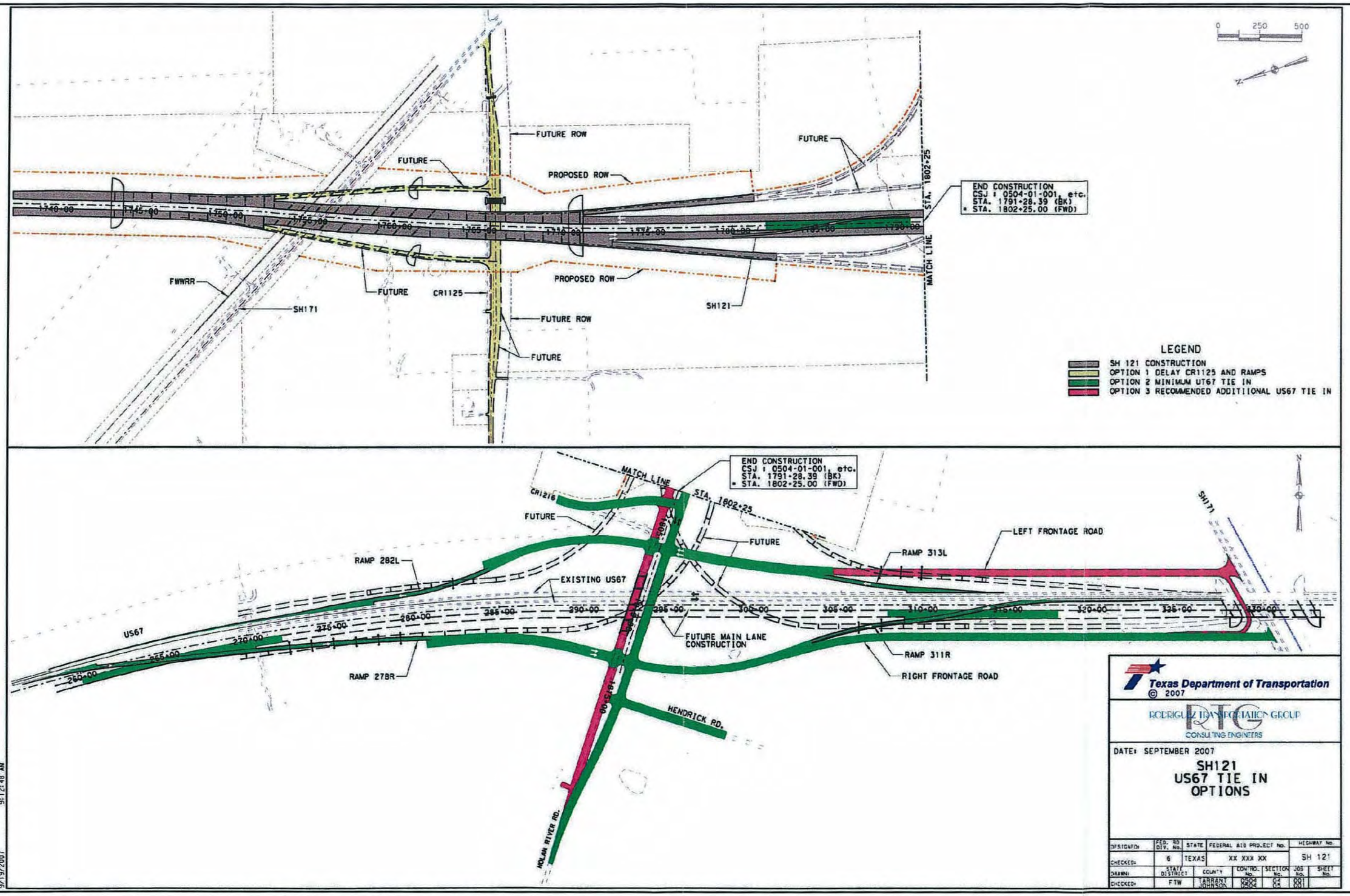

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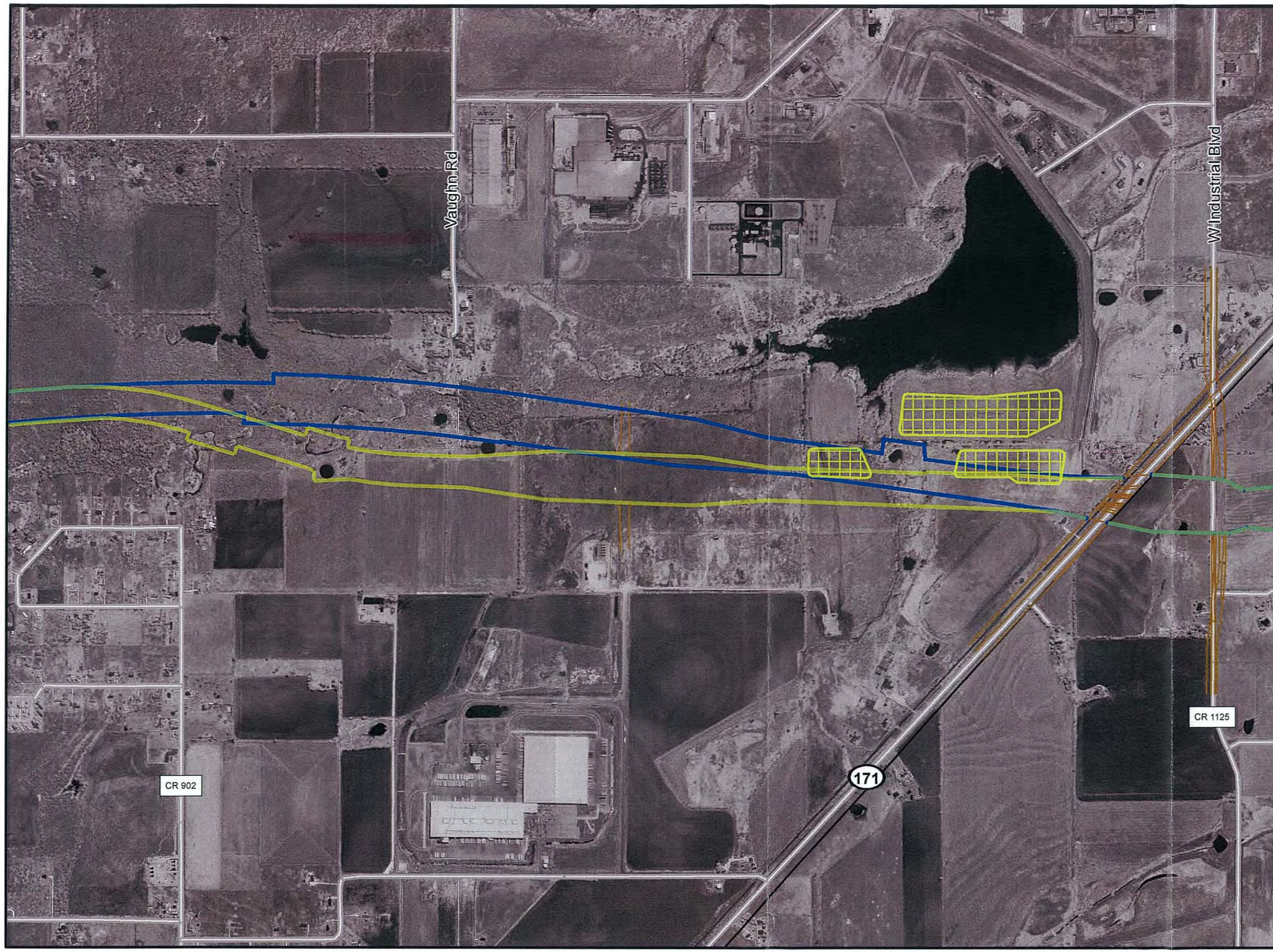

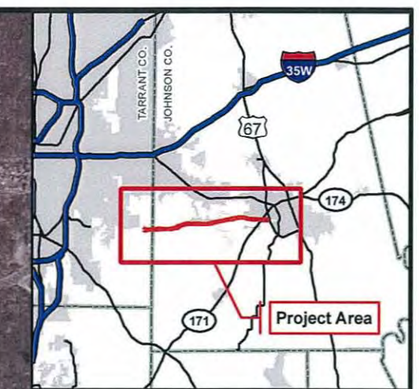

Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary
- Floodplain Mitigation Areas

Roadway Types

- Right of Way for the 2004 FONSI Alignment
- Right of Way for the Modified Alignment
- No Change

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

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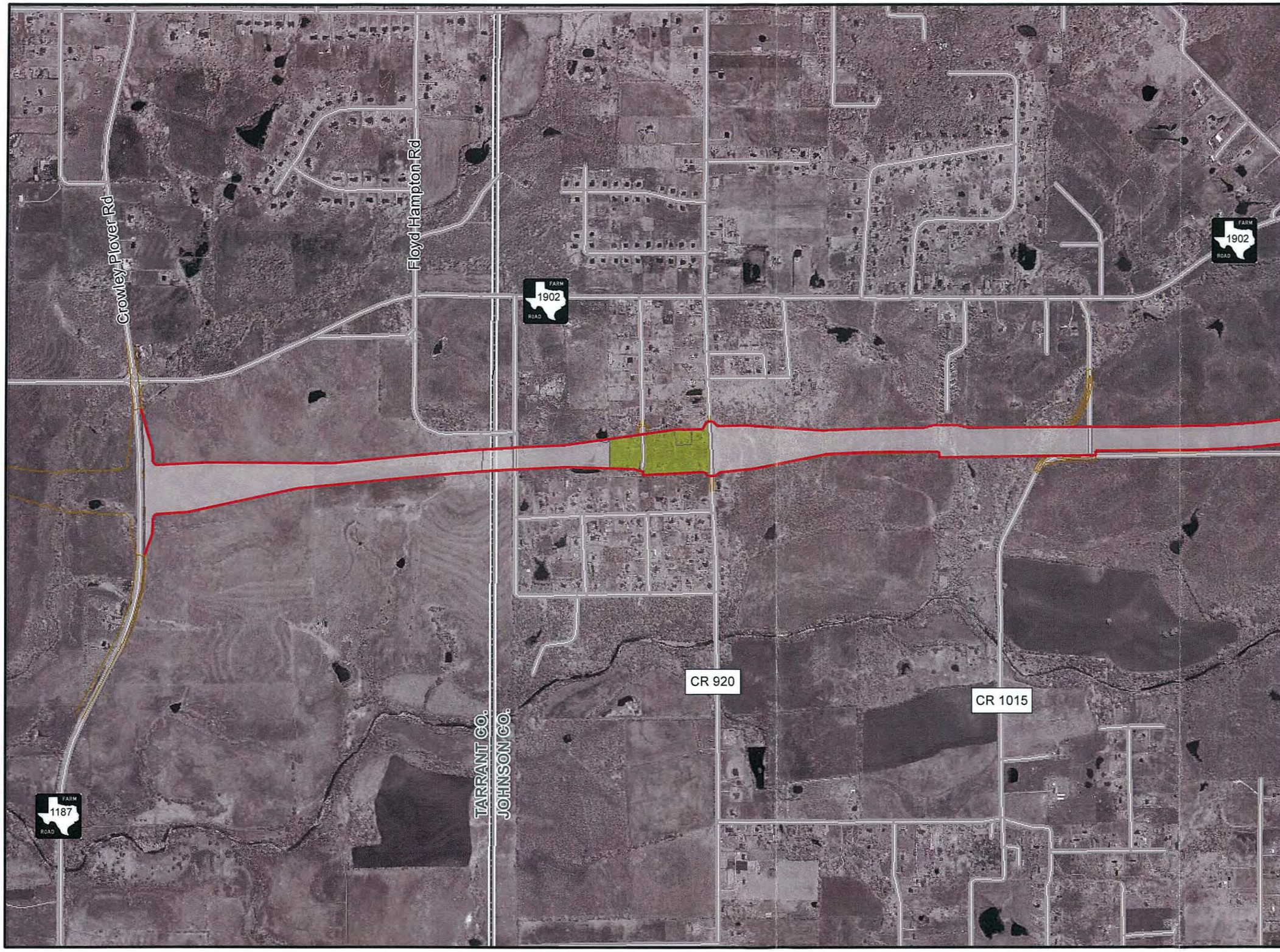
Right of Way Comparison

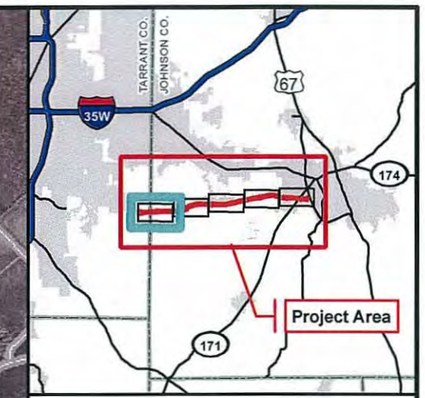
Figure 4

Texas Department of Transportation

SHEET 1 OF 1

LAST REVISED JULY 2009





Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary

Land Use Types

- Residential
- Retail
- Institutional
- Industrial
- Utilities
- Construction
- Vacant
- Water

Source: North Central Texas Council of Governments Land Use

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000 Feet

N

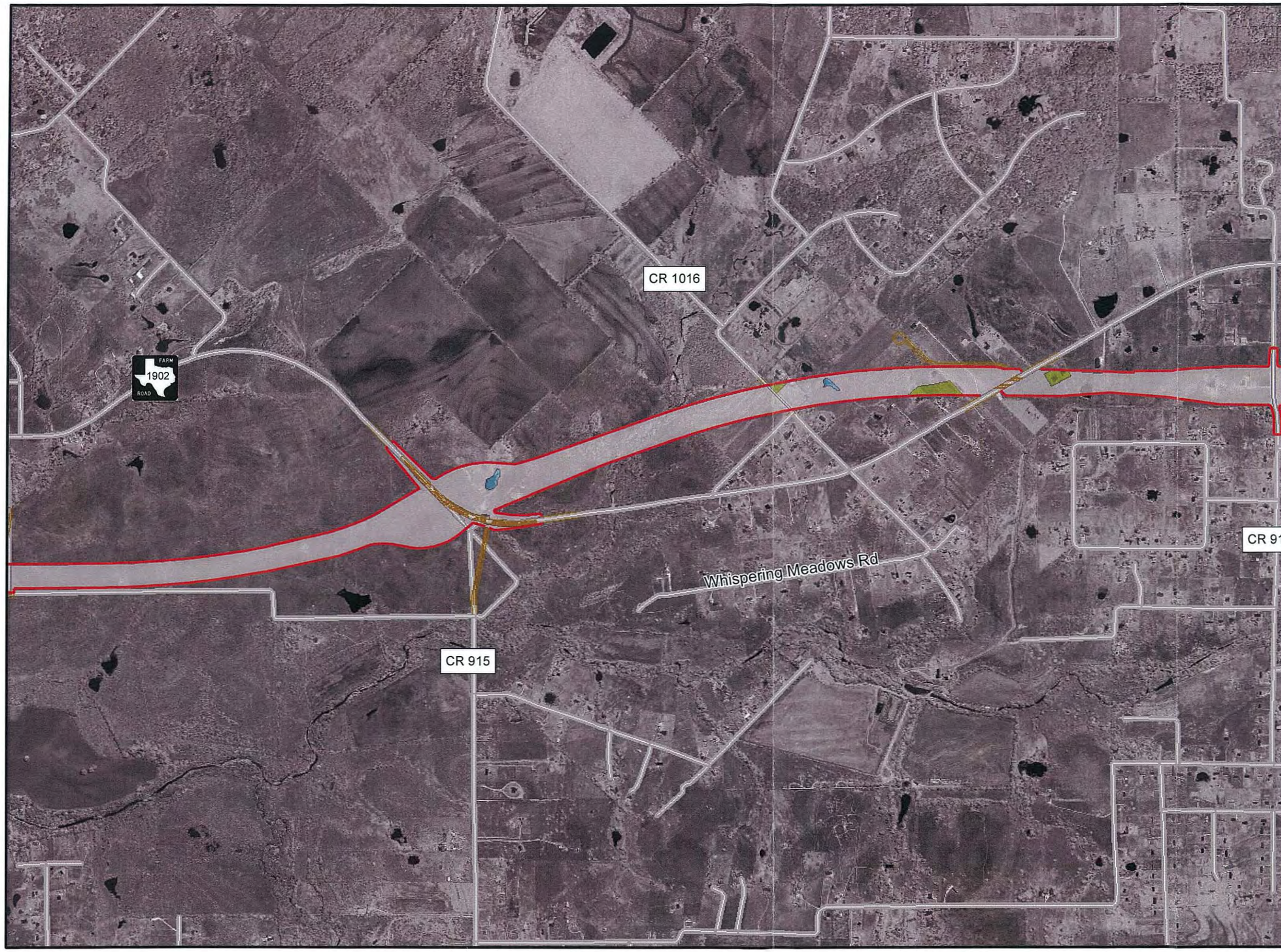
Land Use

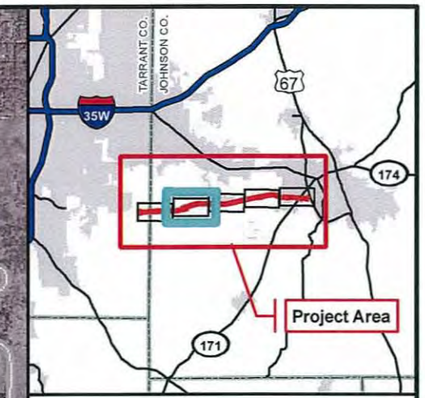
Figure 5

Texas Department of Transportation

SHEET 1 OF 5

LAST REVISED JULY 2009





Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary

Land Use Types

- Residential
- Retail
- Institutional
- Industrial
- Utilities
- Construction
- Vacant
- Water

Source: North Central Texas Council of Governments Land Use

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

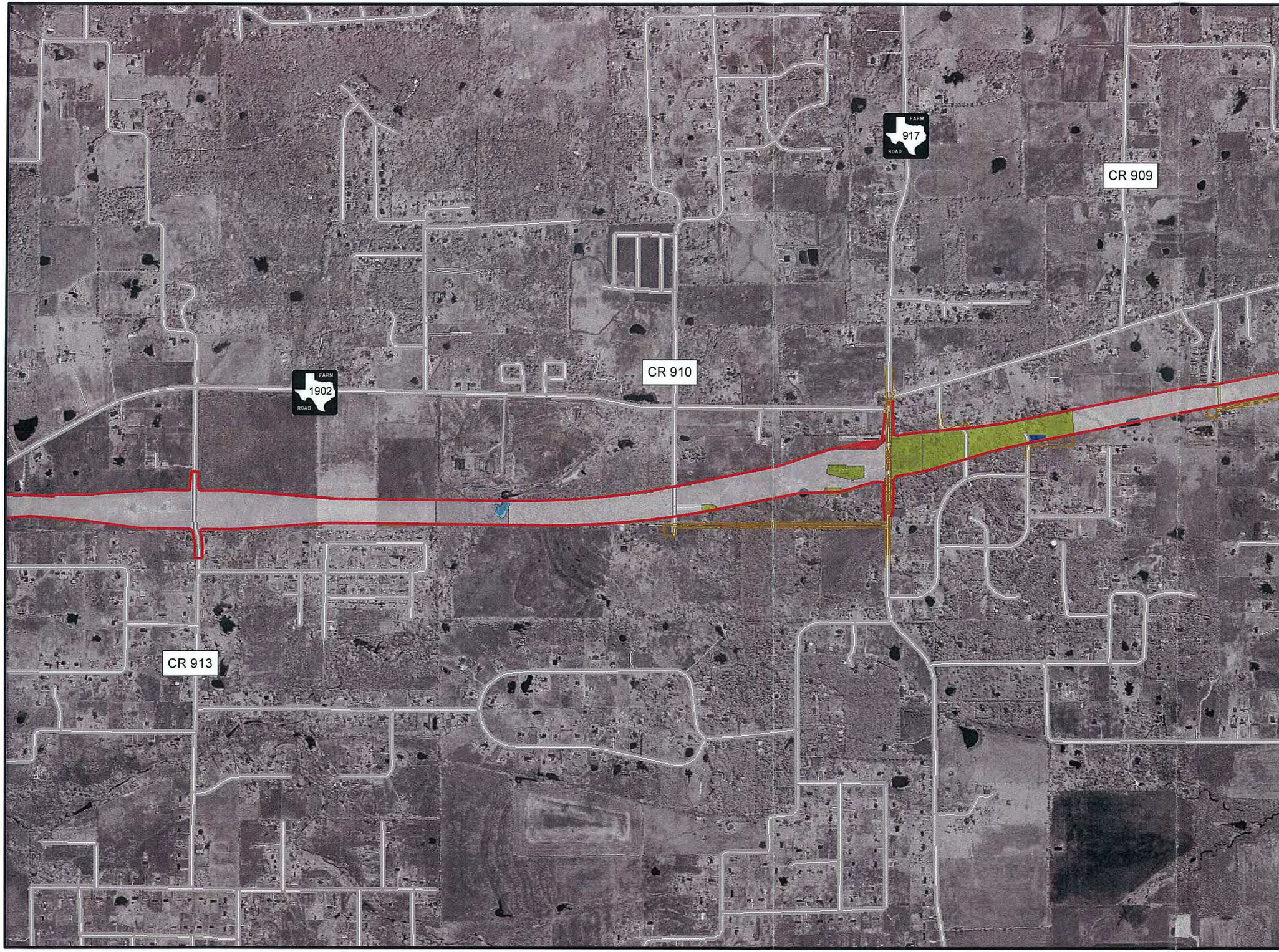
Land Use

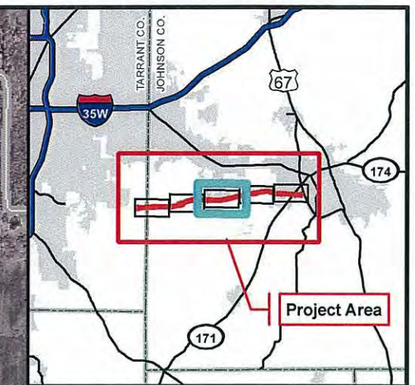
Figure 5

Texas Department of Transportation

SHEET 2 OF 5

LAST REVISED JULY 2009





Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary

Land Use Types

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- Water

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Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

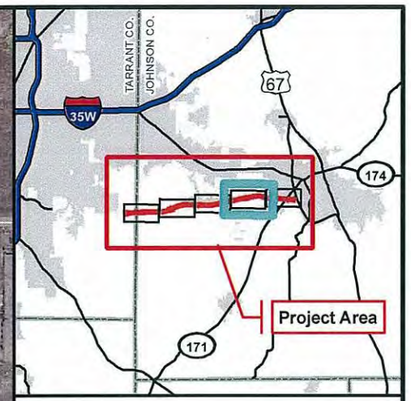
Land Use

Figure 5

Texas Department of Transportation

SHEET 3 OF 5

LAST REVISED JULY 2009



Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary

Land Use Types

- Residential
- Retail
- Institutional
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- Construction
- Vacant
- Water

Source: North Central Texas Council of Governments Land Use

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

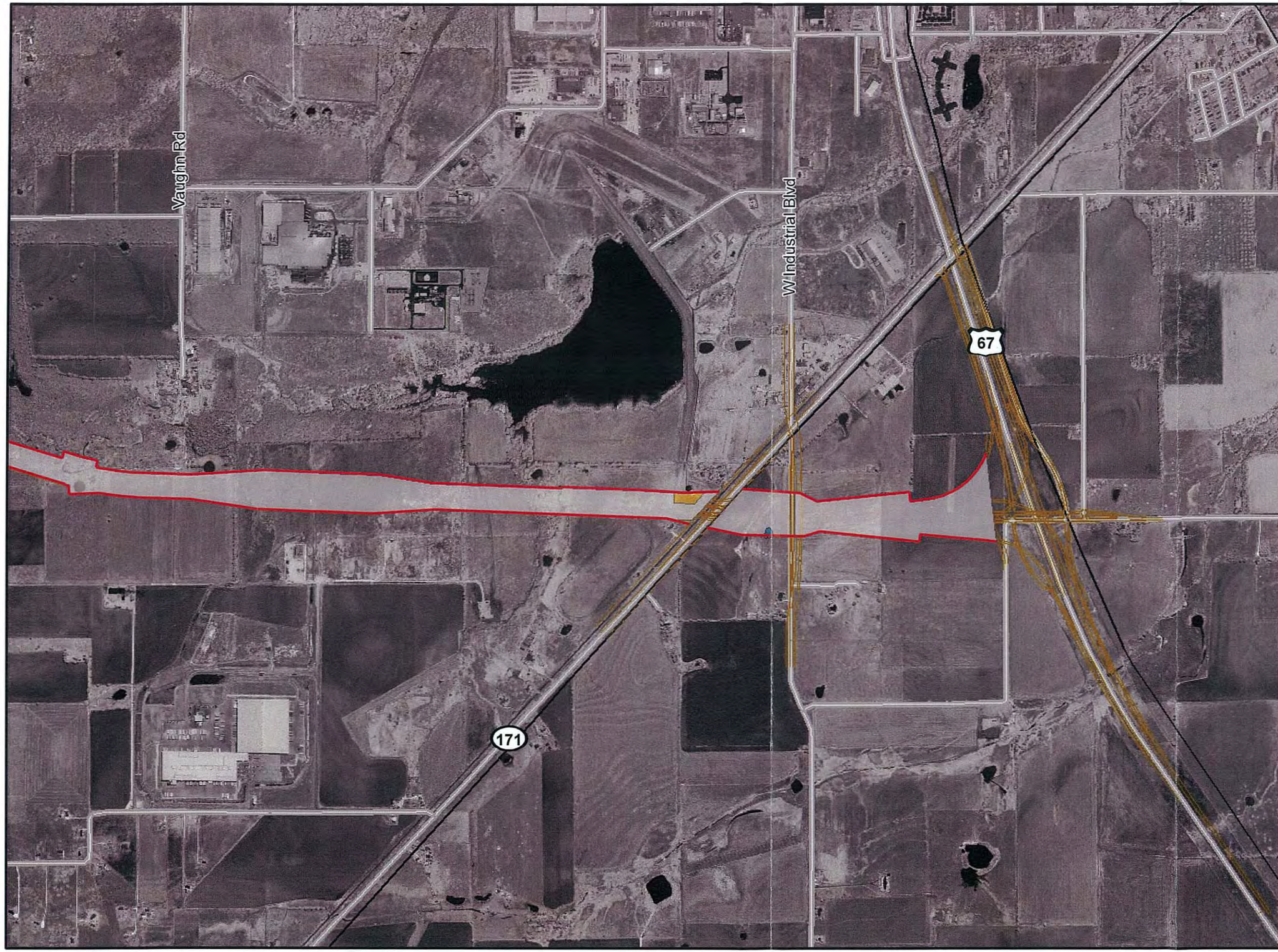
Land Use

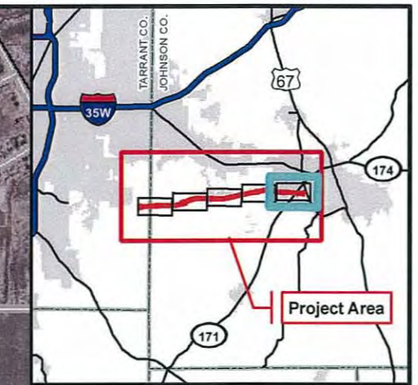
Figure 5

Texas Department of Transportation

SHEET 4 OF 5

LAST REVISED JULY 2009





Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary

Land Use Types

- Residential
- Retail
- Institutional
- Industrial
- Utilities
- Construction
- Vacant
- Water

Source: North Central Texas Council of Governments Land Use

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

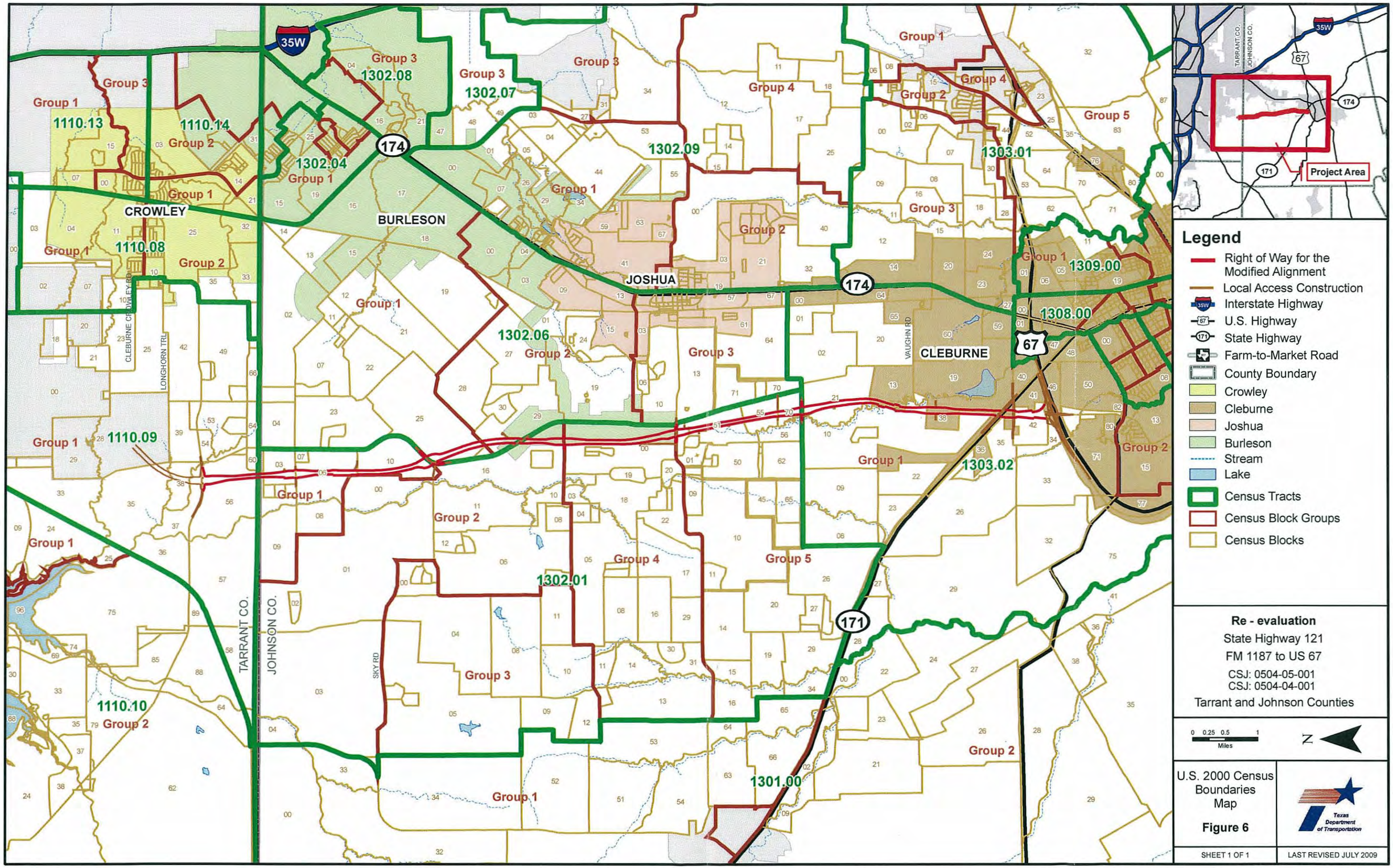
Land Use

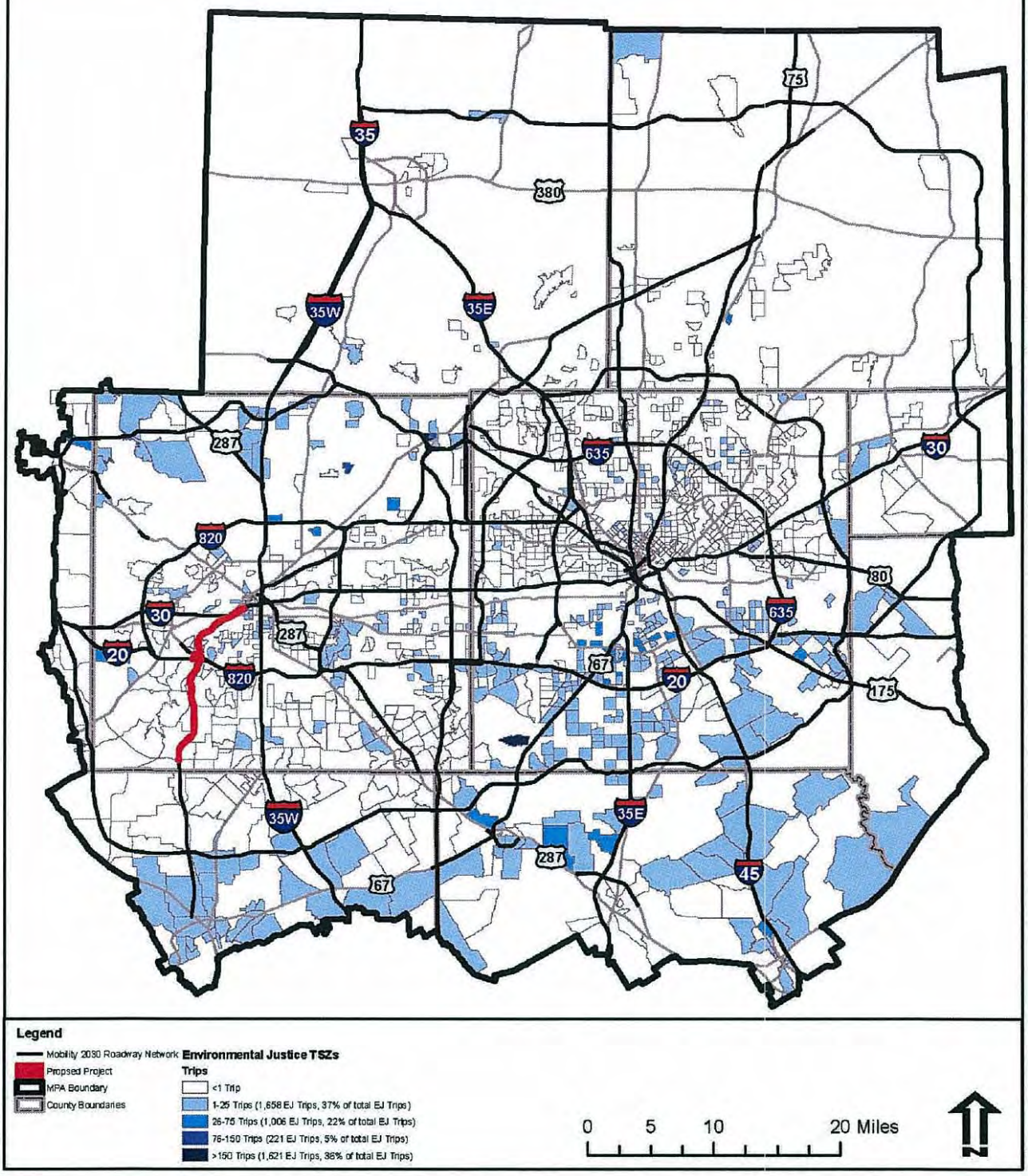
Figure 5

Texas Department of Transportation

SHEET 5 OF 5

LAST REVISED JULY 2009


CROWLEY
BURLESON
JOSHUA
CLEBURNE
TARRANT CO.
JOHNSON CO.
35W
174
67
171
1110.13
1110.14
1110.08
1110.09
1110.10
1302.08
1302.07
1302.04
1302.09
1302.06
1302.01
1303.01
1303.02
1309.00
1308.00
1301.00
Group 1
Group 2
Group 3
Group 4
Group 5
Project Area
Legend
Right of Way for the Modified Alignment
Local Access Construction
Interstate Highway
U.S. Highway
State Highway
Farm-to-Market Road
County Boundary
Crowley
Cleburne
Joshua
Burleson
Stream
Lake
Census Tracts
Census Block Groups
Census Blocks
Re - evaluation
State Highway 121
FM 1187 to US 67
CSJ: 0504-05-001
CSJ: 0504-04-001
Tarrant and Johnson Counties
0 0.25 0.5 1
Miles
N
U.S. 2000 Census Boundaries Map
Figure 6
Texas Department of Transportation
SHEET 1 OF 1
LAST REVISED JULY 2009



Texas Department of Transportation
Tarrant County

Environmental Justice
Traffic Survey Zones
2030 Daily Trips

SH 121 from IH 30 to FM 1187

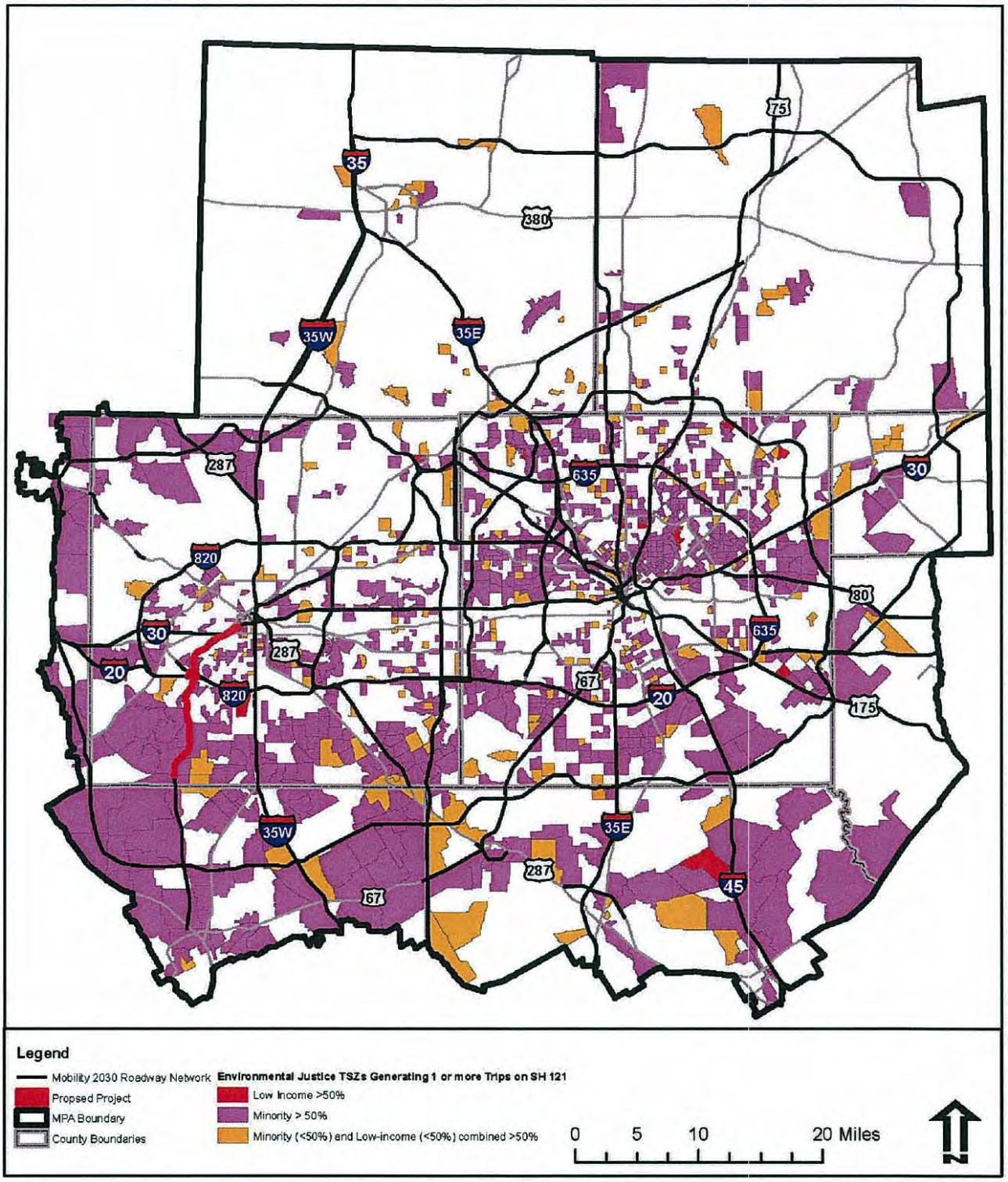
Exhibit 7

Date Created: August 2008

ENVIRONMENTAL ASSESSMENT RE-EVALUATION
SH 121 - FM 1187 to US 67
CSJ: 0504-04-001
CSJ: 0504-05-001

Figure 7

SHEET 1 OF 1



Texas Department of Transportation
Tarrant County

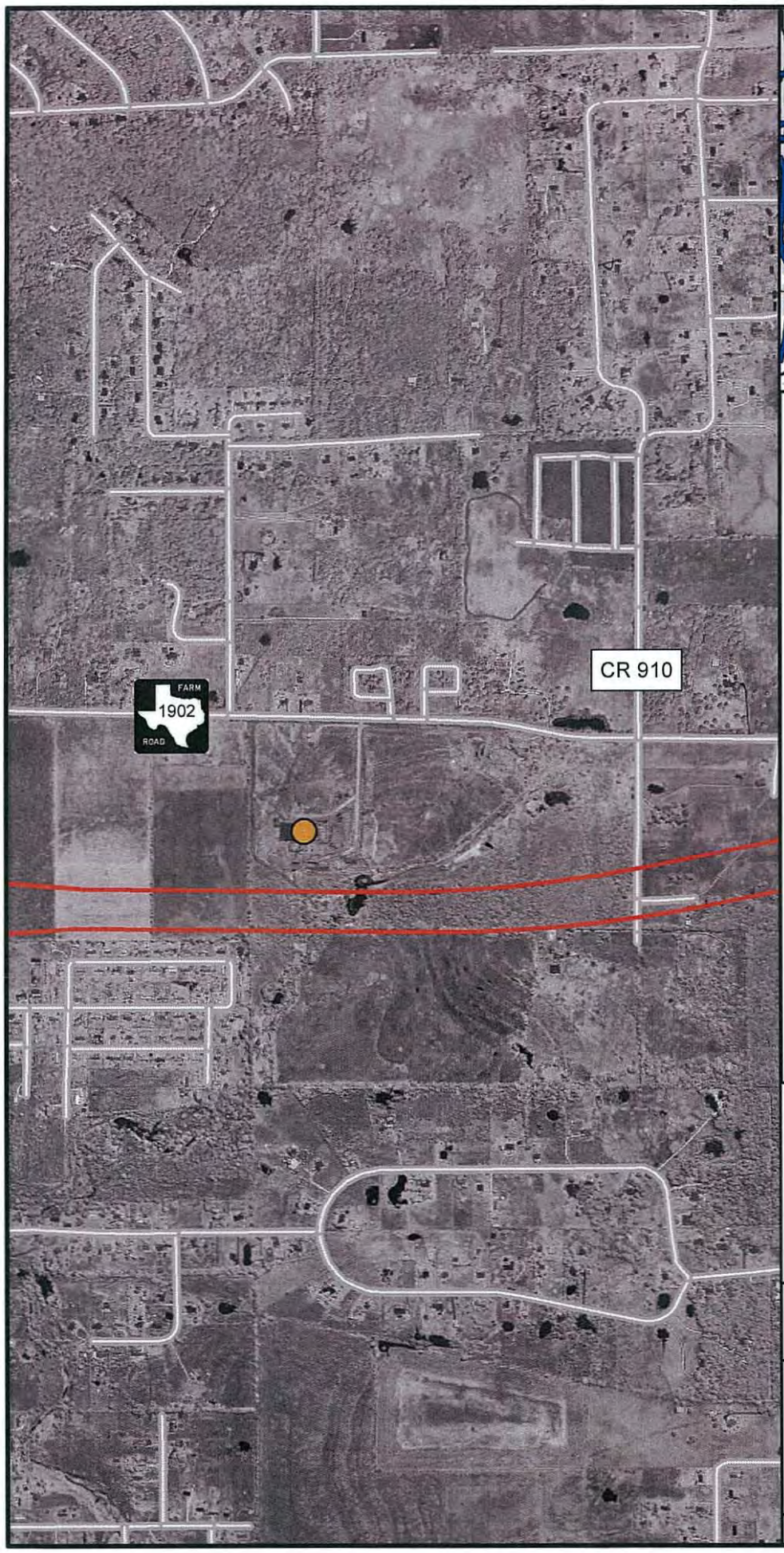
Environmental Justice Breakdown
SH 121 Environmental Justice
Traffic Survey Zones Utilization
SH 121 from IH 30 to FM 1187
Exhibit 8

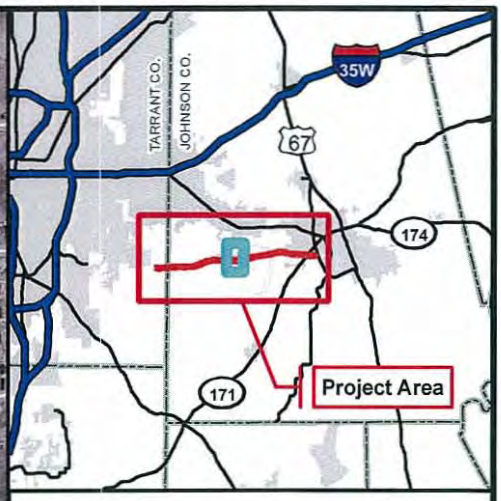
Date Created: August 2008

ENVIRONMENTAL ASSESSMENT RE-EVALUATION
SH 121 - FM 1187 to US 67
CSJ: 0504-04-001
CSJ: 0504-05-001

Figure 8

SHEET 1 OF 1





Legend

- Right of Way for the Modified Alignment
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary
- Noise Receptor

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

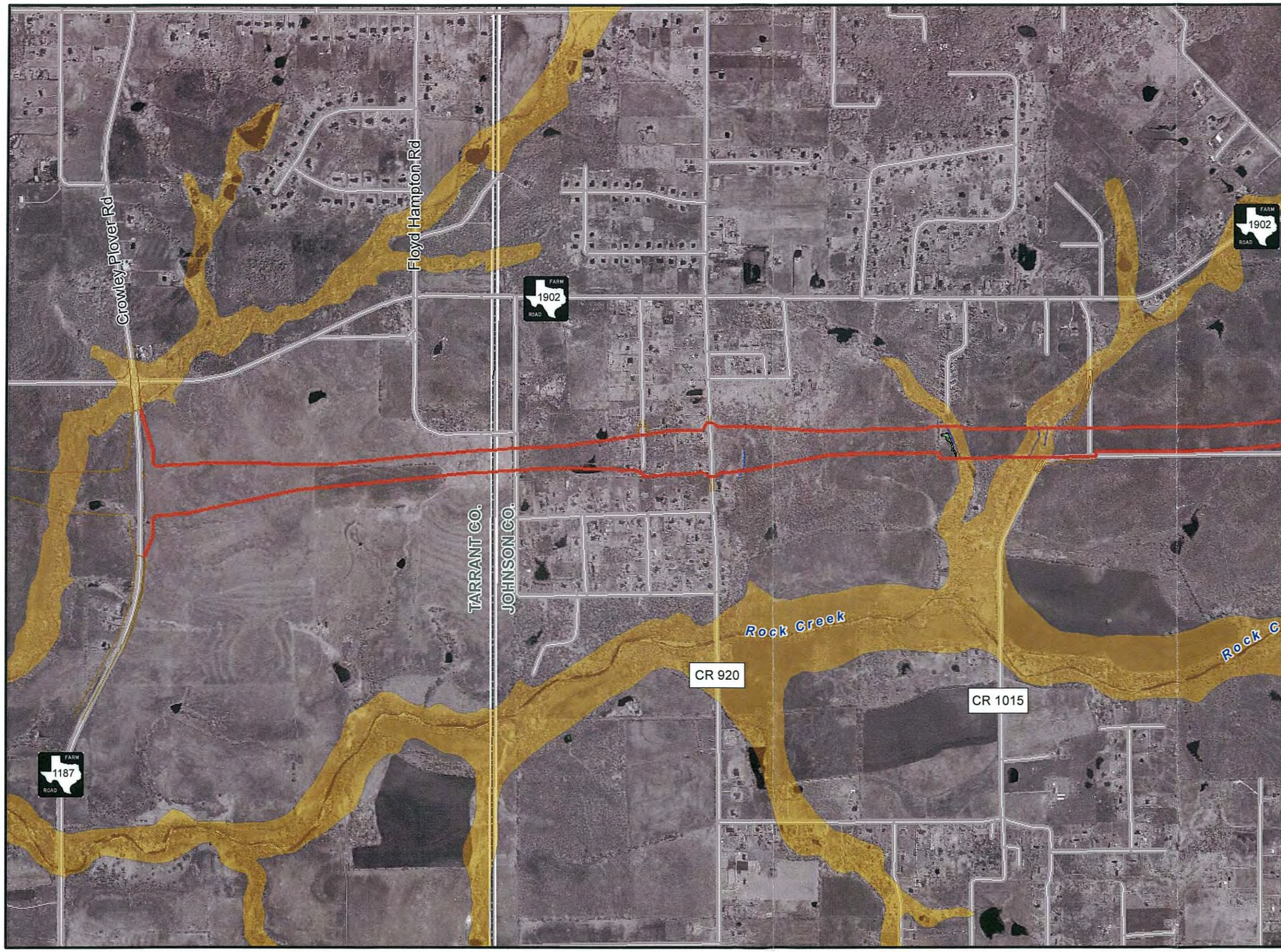
Noise Receptor

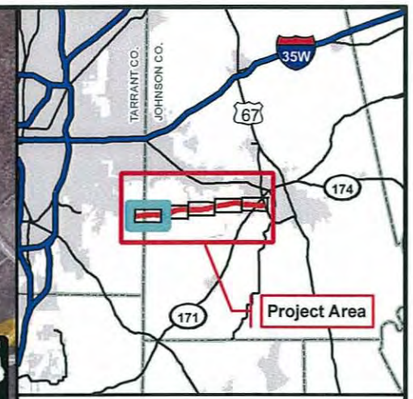
Figure 9

Texas Department of Transportation

SHEET 1 OF 1

LAST REVISED JULY 2009





Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary
- Floodplain Mitigation Area

Waters of the U.S.

- Stream
- Pond
- Wetland

Floodplain

- 100 - year zone
- 500 - year zone

Source: Federal Emergency Management Agency Floodplains

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000 Feet

N

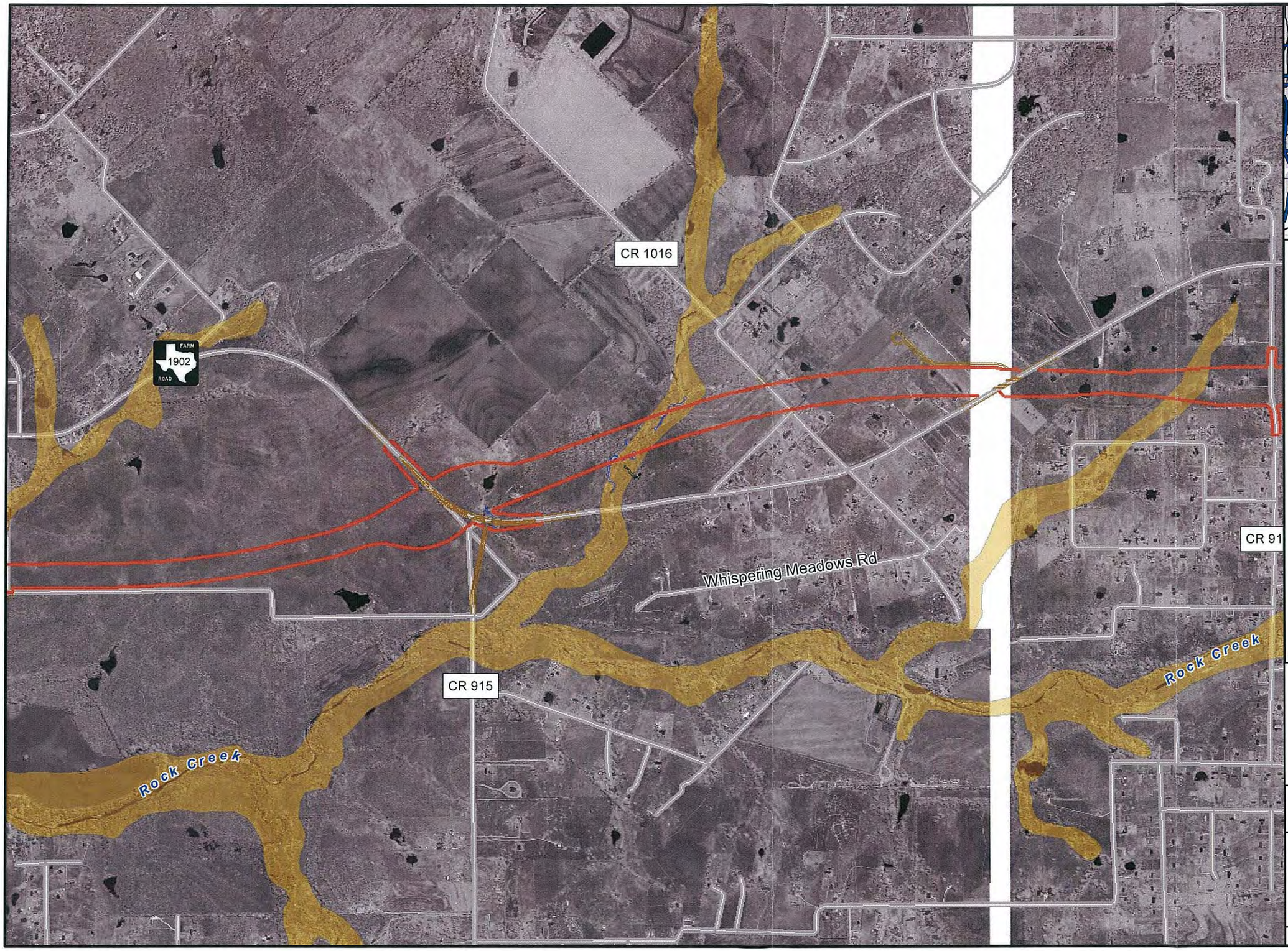
Waters of the U.S. and Floodplain

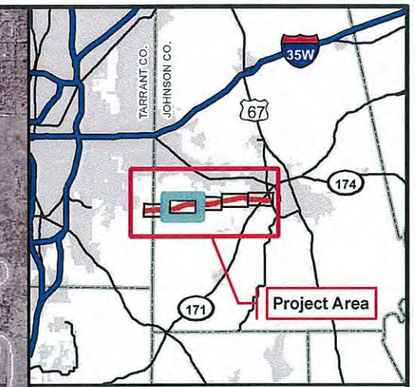
Figure 10

Texas Department of Transportation

SHEET 1 OF 5

LAST REVISED JULY 2009





Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
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- Minor Road
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- Floodplain Mitigation Area

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- Pond
- Wetland

Floodplain

- 100 - year zone
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Source: Federal Emergency Management Agency Floodplains

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

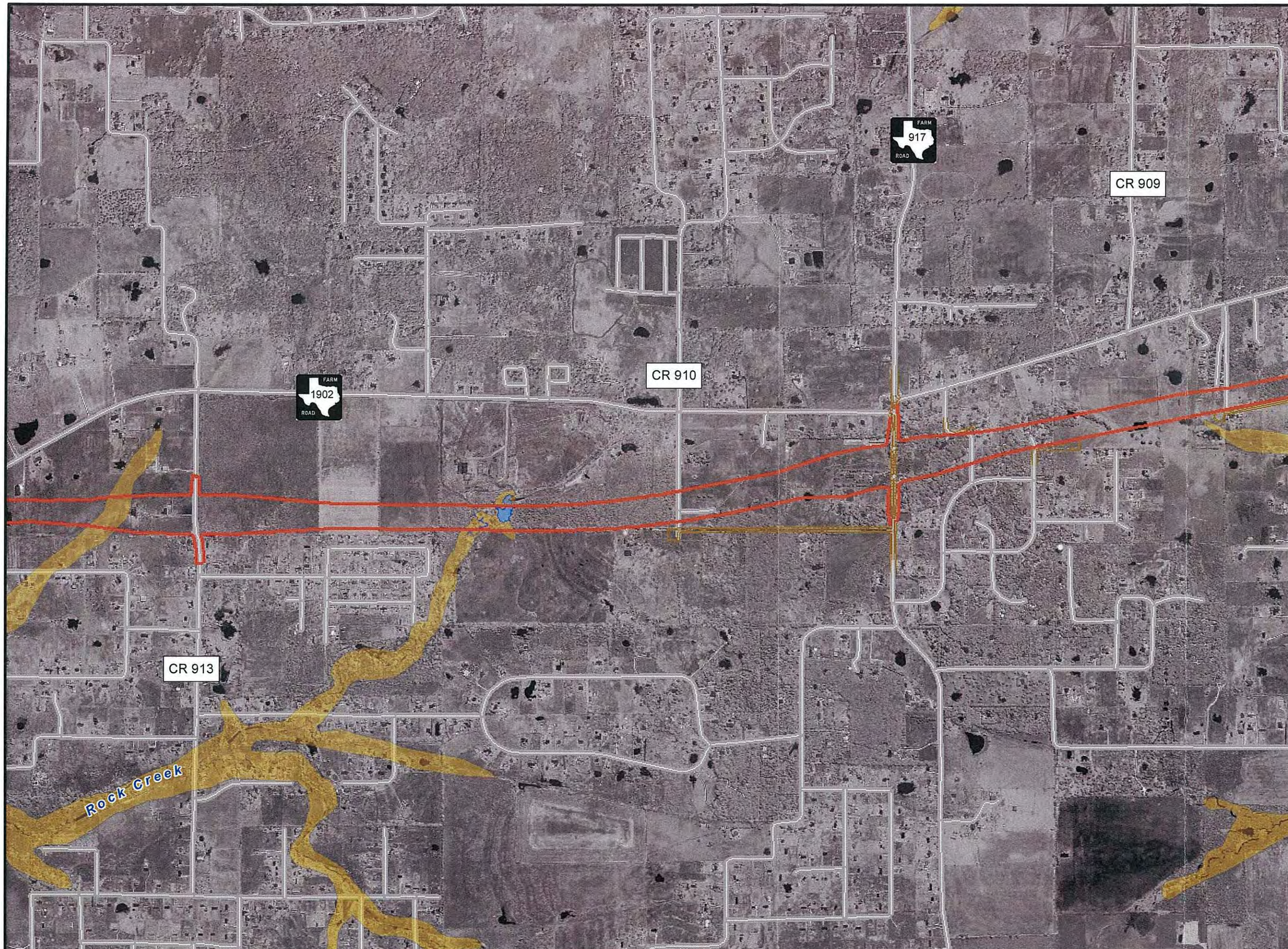
Waters of the U.S. and Floodplain

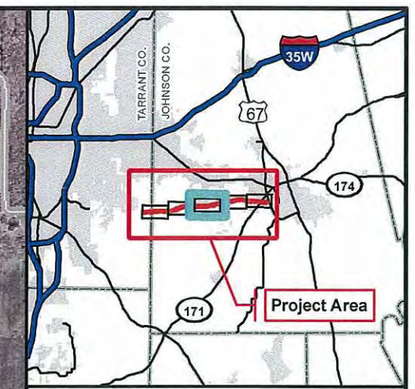
Figure 10

Texas Department of Transportation

SHEET 2 OF 5

LAST REVISED JULY 2009





Legend

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- U.S. Highway
- State Highway
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- Pond
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- 100 - year zone
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Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

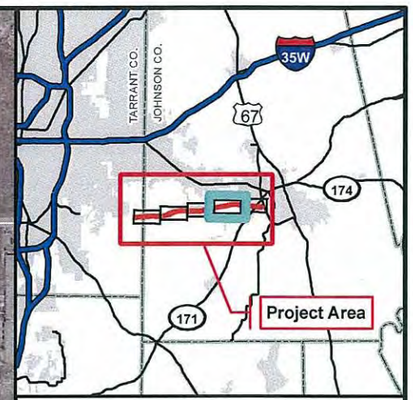
Waters of the U.S. and Floodplain

Figure 10

Texas Department of Transportation

SHEET 3 OF 5

LAST REVISED JULY 2009



Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary
- Floodplain Mitigation Area

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Source: Federal Emergency Management Agency Floodplains

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

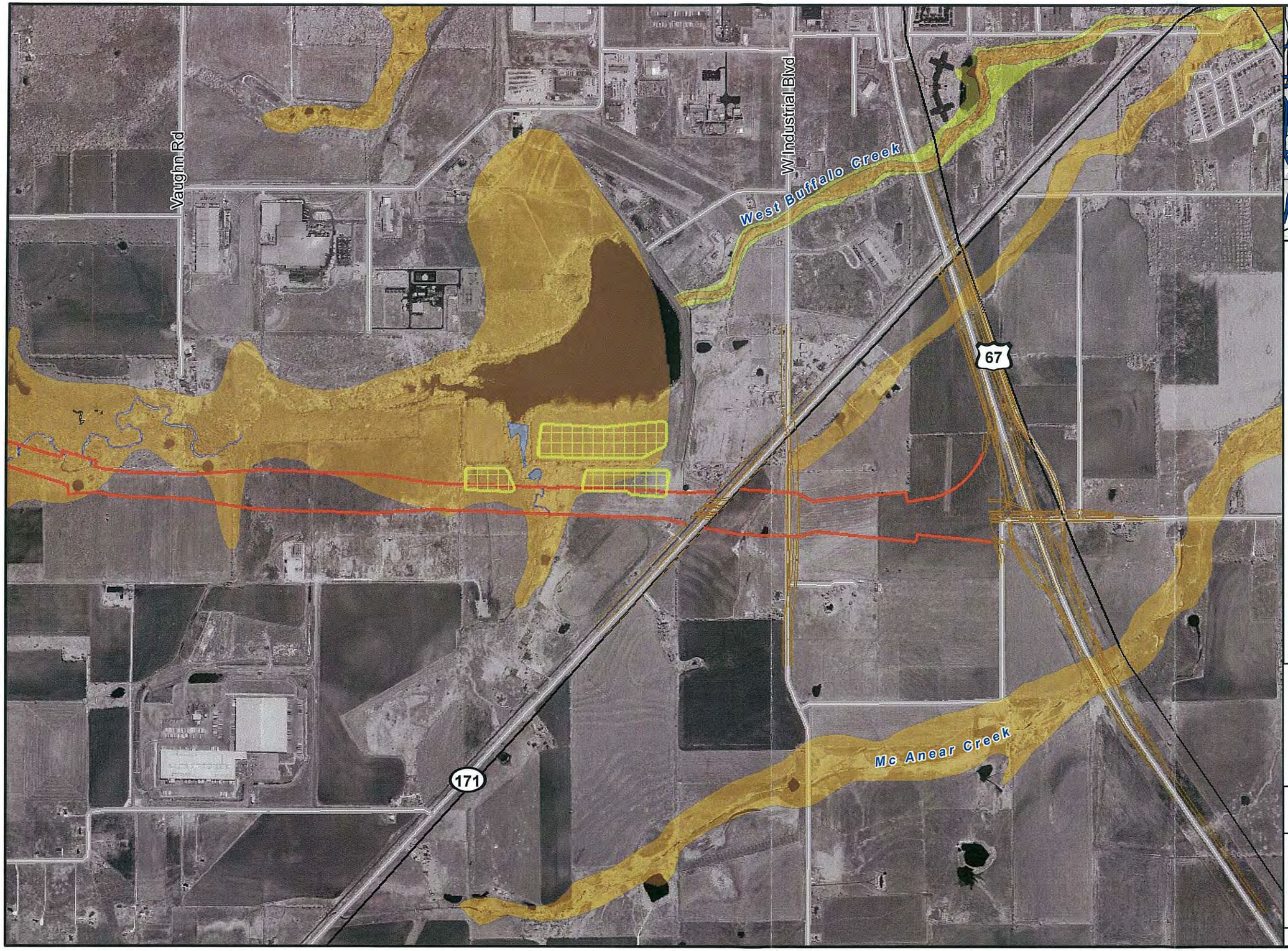
Waters of the U.S. and Floodplain

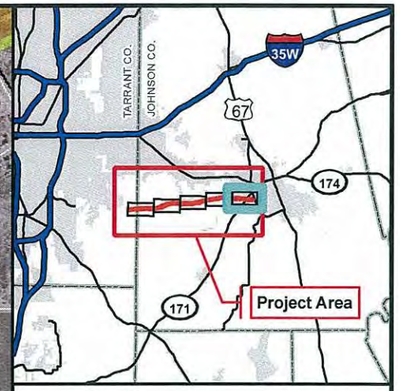
Figure 10

Texas Department of Transportation

SHEET 4 OF 5

LAST REVISED JULY 2009





Legend

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- U.S. Highway
- State Highway
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Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

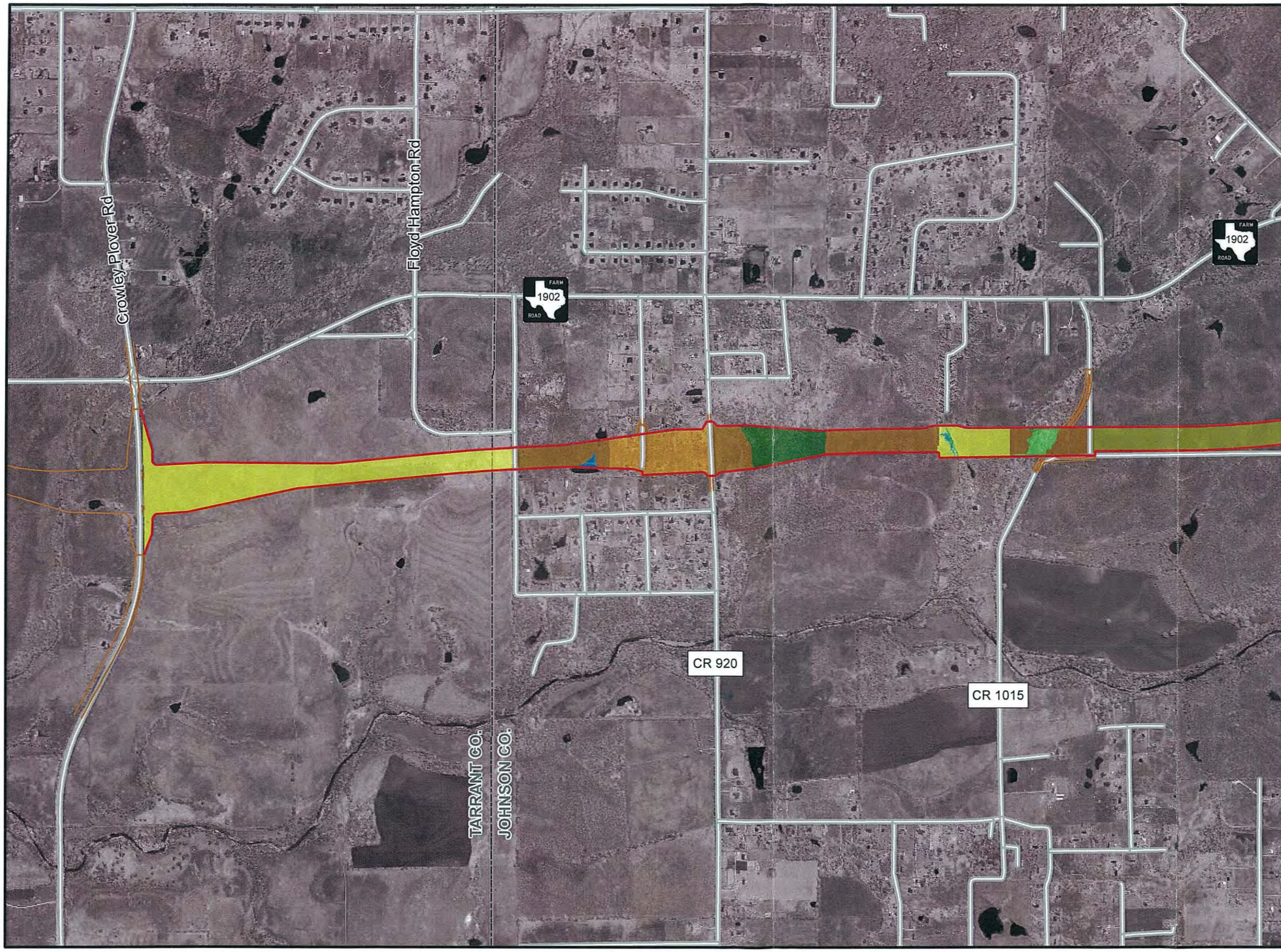
Waters of the U.S. and Floodplain

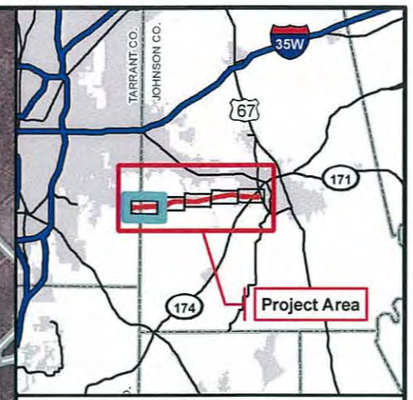
Figure 10

Texas Department of Transportation

SHEET 5 OF 5

LAST REVISED JULY 2009





Legend

- Right of Way for the Modified Alignment
- Local Access Construction
- Interstate Highway
- U.S. Highway
- State Highway
- Farm-to-Market Road
- Minor Road
- County Boundary

Cover Type

- Rural developed
- Mesquite pasture
- Pasture/grassland
- Regenerative
- Upland woods
- Riparian woods
- Water body

Source: HDR Cover Types

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

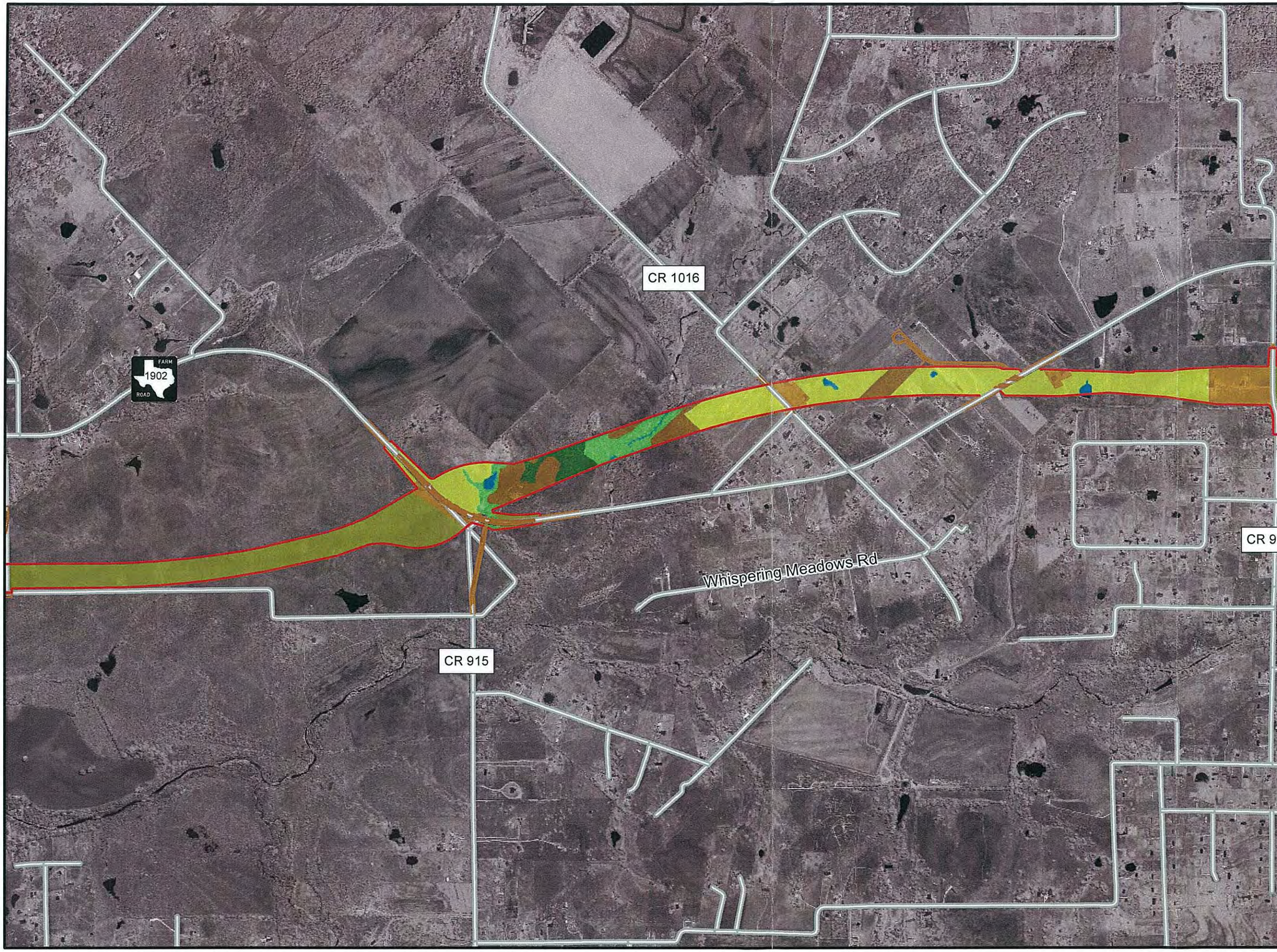
Cover Types

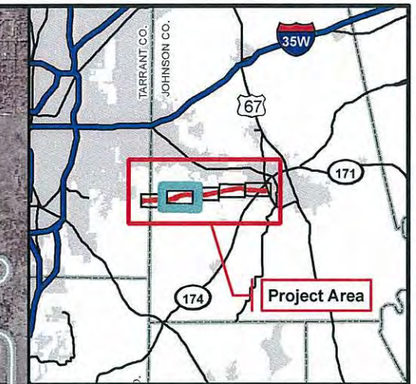
Figure 11

Texas Department of Transportation

SHEET 1 OF 5

LAST REVISED JULY 2009





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- Water body

Source: HDR Cover Types

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

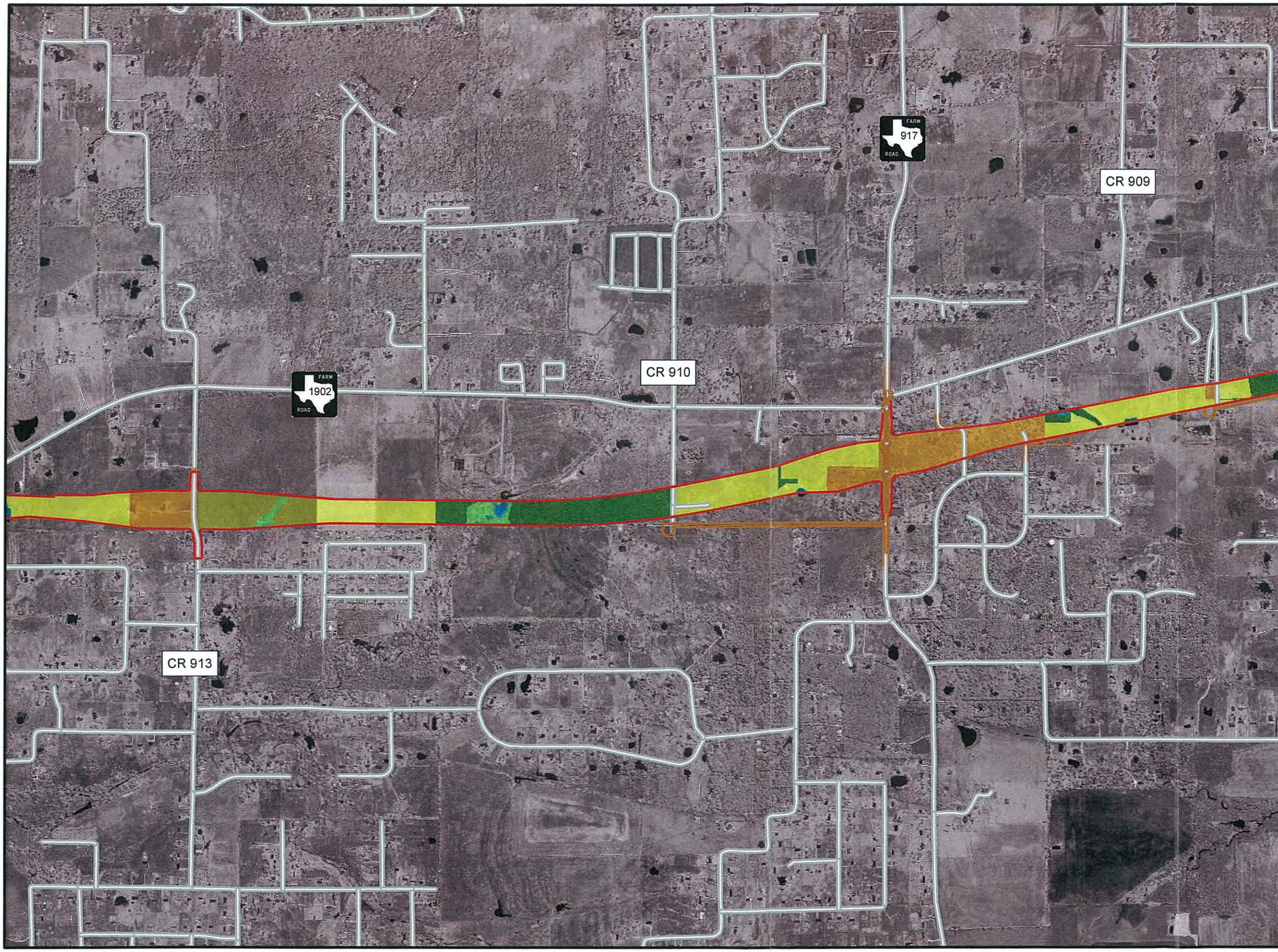
Cover Types

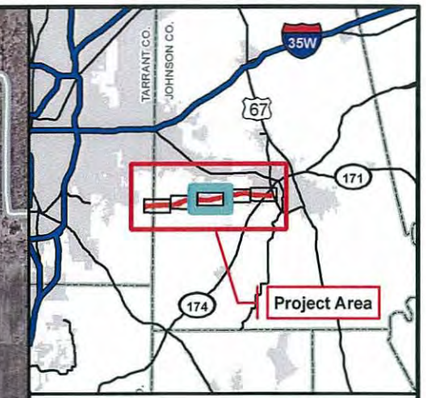
Figure 11

Texas Department of Transportation

SHEET 2 OF 5

LAST REVISED JULY 2009





Legend

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- State Highway
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- Minor Road
- County Boundary

Cover Type

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- Riparian woods
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Source: HDR Cover Types

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

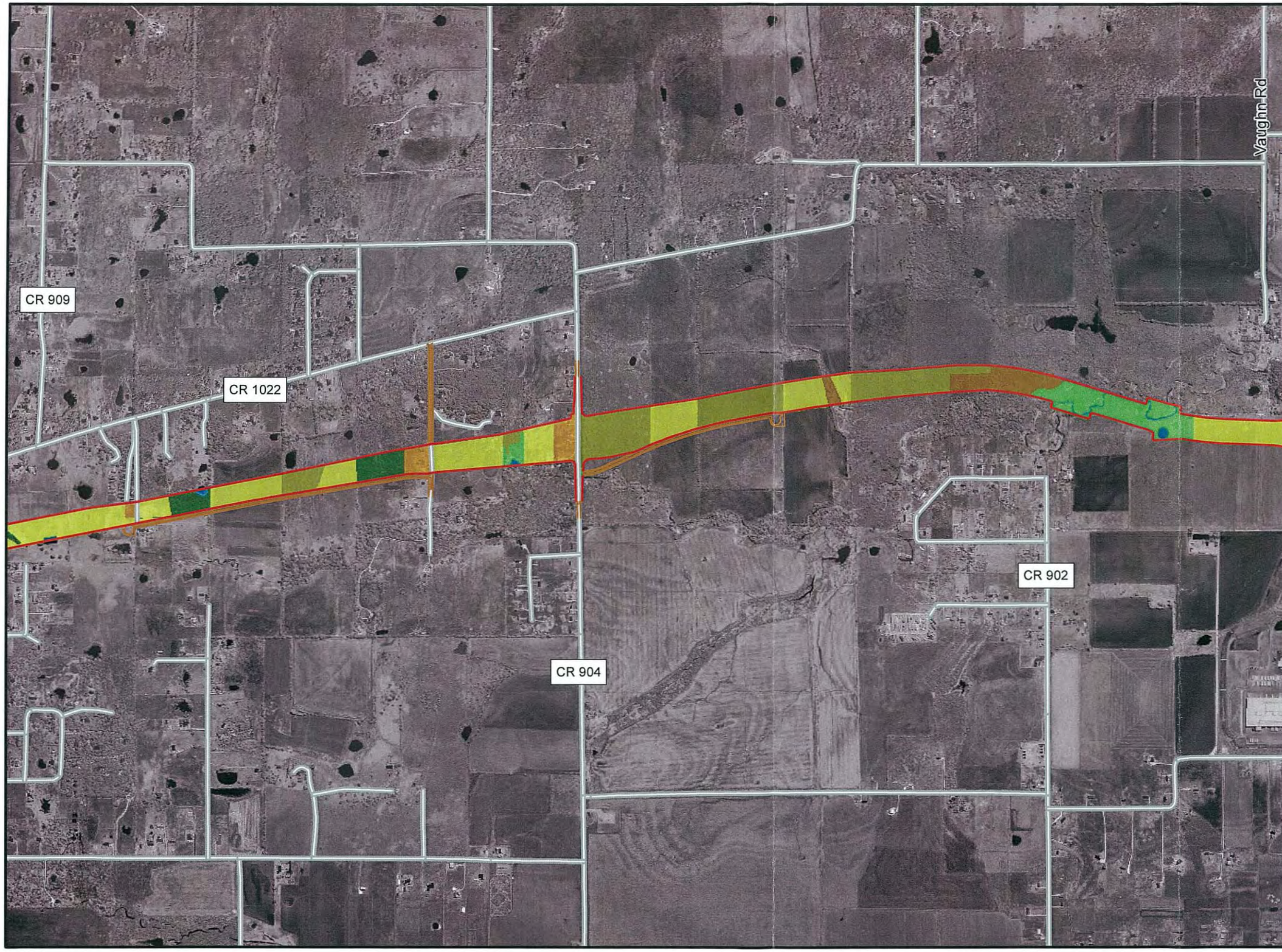
Cover Types

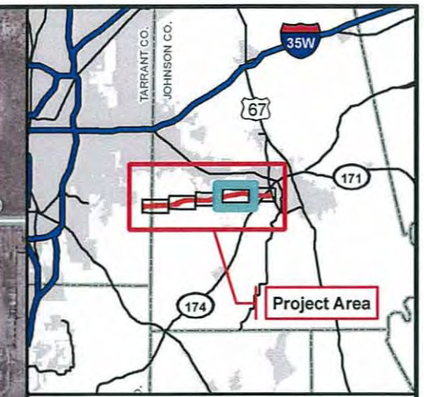
Figure 11

Texas Department of Transportation

SHEET 3 OF 5

LAST REVISED JULY 2009





Legend

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- State Highway
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Cover Type

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- Water body

Source: HDR Cover Types

Re - evaluation

State Highway 121

FM 1187 to US 67

CSJ: 0504-05-001
CSJ: 0504-04-001

Tarrant and Johnson Counties

0 250 500 1,000
Feet

N

Cover Types

Figure 11

Texas Department of Transportation

SHEET 4 OF 5

LAST REVISED JULY 2009