ENVIRONMENTAL ASSESSMENT

INTERSTATE HIGHWAY 35W

FROM STATE HIGHWAY 114 TO INTERSTATE HIGHWAY 820

CITIES OF FORT WORTH AND HASLET
TARRANT AND DENTON COUNTIES, TEXAS

CSJ Nos.
0014-16-252
0014-16-255
0081-12-041
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PREPARED BY:

UNITED STATES DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
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I. INTRODUCTION

This Environmental Assessment (EA) evaluates the social, economic, and environmental impacts resulting from the proposed improvements to Interstate Highway (IH) 35W and portions of United States (US) 81/287 and State Highway (SH) 170 in Fort Worth, Haslet, Tarrant County, and Denton County, Texas (**Figure 1**).

The proposed improvements are part of a larger highway improvement project, the North Tarrant Express (NTE). The NTE includes improvements to IH 35W, IH 820 and SH 121/183 for a total of 36 miles. The project is divided into seven segments: Segment 1 and Segment 2W have been approved and are under construction; Segments 2E, 3C and 4 are awaiting funding; Segment 3A is the focus of another EA document (0014-16-179) that is being prepared concurrently with this one; and, Segments 3B and 3C are the focus of this EA. Segment 3C (from US 81/US 287 to Eagle Parkway) is within the limits of the logical termini associated with the proposed project (SH 114 to IH 820); however, there is no funding for construction of Segment 3C. No improvements are proposed north of Eagle Parkway as part of this project. Currently Denton County in conjunction with the Texas Departmnet of Transportation (TxDOT)-Dallas District and the North Central Texas Council of Governments (NCTCOG) is conducting a preliminary engineering study along IH 35W corridor from SH 170 to IH 35E in Denton County. This study is being funded by Denton County. At this time, there is no funding for construction for this portion of IH 35W.

TxDOT proposes to improve a 10.5-mile long section of IH 35W and sections of US 81/287 and SH 170. The study limits for this EA extend along IH 35W from SH 114 to IH 820, along US 81/287 from IH 35W to Harmon Road, and along SH 170 from Old Denton Road to Harmon Road. The proposed project construction limits extend along IH 35W from just south of Eagle Parkway to just north of IH 820, along US 81/287 from IH 35W to just east of Harmon Road, and along SH 170 from Old Denton Road to 1,286 feet west of IH 35W.

The Federal Highway Administration (FHWA) has developed federal regulations for highway projects. These regulations, Title 23 of the Code of Federal Regulations (CFR) Part 771, provide instructions for assessing environmental impacts specific to federally funded transportation projects. This EA complies with the National Environmental Policy Act (NEPA) and allows the FHWA to determine whether an Environmental Impact Statement (EIS) is necessary. An EIS is required for projects or actions that may significantly affect the quality of the human environment. Examples of projects or actions that typically require an EIS include (1) any new controlled access freeway; (2) any highway project of four or more lanes on a new location; (3) new construction or extension of fixed guideway systems; or (4) new construction or extension of a separate roadway for buses or high occupancy vehicles (HOVs) not located within an existing highway facility.

Figure 1 shows the location of the proposed project. A US Geological Survey (USGS) 7.5-minute topographic quadrangle map which shows the proposed project is provided in **Figure 2**, an aerial photograph of the proposed project is provided in **Figure 3**, an environmental resources map is provided in **Figure 4,** and typical sections are provided in **Figure 5**.

A. Need and Purpose for the Proposed Project

The proposed project is needed to meet future travel demands stemming from projected population growth and traffic volumes, address operational and capacity deficiencies on IH 35W, US 81/287, and SH 170 and update the facility to current design standards. **Table 1** summarizes the population trends and forecasts for the Cities of Fort Worth and Haslet, Tarrant County, Denton County and the 12-county NCTCOG metropolitan planning area (MPA).

Table 1: Population Trends and Forecasts for Selected Locations

Location	1970 Census[1]	1980 Census[1]	1990 Census[1]	2000 Census[1]	2010 Census[1]	2030[2]/2035[3] Forecast	2040 Forecast	Growth Rate 2010-2040
City of Fort Worth	393,476	385,164	447,619	534,694	741,206	1,009,371[2]	1,236,870[2]	66.9%
City of Haslet	276	262	795	1,134	1,517	7,000[2]	7,000[2]	361.4%
Tarrant County	716,317	860,880	1,170,103	1,446,219	1,809,034	2,823,535[3]	3,046,531[3]	68.4%
Denton County	75,633	143,126	273,775	432,976	662,614	1,053,903[3]	1,147,493[3]	73.2%
12-County NCTCOG MPA	2,425,927	3,030,053	4,013,418	5,197,317	6,417,724	9,833,378[3]	10,543,336[3]	64.3%

Source:
[1] *U.S. Census 2010 PL94-171, NCTCOG (February 2011).*
[2] *Texas Water Development Board, 2011 Regional Water Plan Population Projections for 2000-2060 For Cities, Utilities, and County-Other by Region by County, Region C (July 2010).*
[3] *NCTCOG 2040 Demographic Forecast, http://www.nctcog.org/ris/demographics/forecast.asp (February 2011), available at county level only.*

The proposed project is needed to maintain pace with the cities of Fort Worth and Haslet's transportation needs as well as the transportation needs of Tarrant and Denton Counties. As shown in **Table 1**, the City of Fort Worth, the City of Haslet, Tarrant County, Denton County and the 12-county NCTCOG MPA have experienced continuous growth since 1980, and are forecasted to grow through 2040. Growth rates from 2010 to 2040 in the City of Fort Worth, City of Haslet, Tarrant County, Denton County, and the 12-county NCTCOG MPA are projected to be 66.9 percent, 361.4 percent, 68.4 percent, 73.2 percent, and 64.3 percent, respectively.

According to TxDOT Transportation Planning and Programming Division (TPP), IH 35W from IH 820 to US 81/287 has an estimated base year 2010 average daily traffic (ADT) volume of 174,900 vehicles per day (vpd), an estimated time of completion year 2030 ADT volume of 269,800 vpd, and a projected design year 2035 ADT volume of 284,900. This is a 63.0 percent increase over 2010 traffic volumes. IH 35W from US 81/287 to Westport Parkway has an estimated base year 2010 ADT volume of 115,000 vpd, an estimated time of completion year 2030 ADT volume of 178,700 vpd, and a projected design year 2035 ADT volume of 188,700 vpd. This is a 64.0 percent increase over 2010 traffic volumes. IH 35W from Westport Parkway to SH 114 has an estimated base year 2010 ADT volume of 92,300 vpd, an estimated time of completion year 2030 ADT volume of 141,000 vpd, and a projected design year 2035 ADT volume of 149,100 vpd. This is a 61.5 percent increase over 2010 traffic volumes.

Level of Service (LOS) is a qualitative measure describing operational conditions within a traffic stream and is generally described in terms of such factors as speed and travel time, freedom to maneuver, traffic interruptions, comfort and convenience, and safety. There are six LOS

designated A (best) through F (worst) that describe traffic operating conditions. General descriptions of the LOS are shown in **Table 2**.

Table 2: Level of Service Descriptions	
A	Free flow traffic operations. Vehicles are almost completely unimpeded in their ability to maneuver within the traffic stream. The average spacing between vehicles is about 22 car lengths, which affords the motorist a high level of physical and psychological comfort. The effects of minor traffic incidents or vehicular breakdowns are easily absorbed. Although there might be deterioration in LOS within the vicinity of a traffic incident, standing traffic queues will not form and traffic quickly returns to LOS A on passing the disruption.
B	Reasonably free flow traffic operations. Vehicles are only slightly restricted in their ability to maneuver within the traffic stream. The average spacing between vehicles is about 13 car lengths, which still affords the motorist a high level of physical and psychological comfort. The effects of minor traffic incidents or vehicular breakdowns are still easily absorbed; however, deterioration in LOS within the vicinity of a traffic incident would be more severe than for LOS A.
C	Stable traffic operations, but traffic flows approach the range in which small increases in flow will cause substantial deterioration in service. The average spacing between vehicles is about nine car lengths. Freedom to maneuver within the traffic stream is noticeably restricted and lane changes require additional care and vigilance. The driver experiences a noticeable increase in tension due to the additional vigilance required for safe operation. The effects of minor traffic incidents or vehicular breakdowns might still be absorbed, but the local deterioration in LOS will be substantial. Queues might be expected to form behind any significant blockage.
D	Unstable flow of traffic operations. Small increases in flow cause substantial deterioration of service. The average spacing between vehicles is about six car lengths. Freedom to maneuver within the traffic stream is severely limited, and the driver experiences drastically reduced physical and psychological comfort levels. Even minor traffic incidents can be expected to create substantial traffic queuing because the traffic stream has little space to absorb disruptions.
E	Extremely unstable traffic operations due to the absence of gaps in the traffic stream. The average spacing between vehicles is about four car lengths. Maneuverability within the traffic stream is extremely limited, and the level of physical and psychological comfort afforded to the driver is extremely poor. At capacity, the traffic stream has no ability to dissipate even the most minor disruptions and any incident can be expected to produce a serious breakdown with extensive queuing.
F	Forced or breakdown flow. This results in long queues behind breakdown points such as traffic incidents, merge or weaving areas, lane drops, or any location where traffic capacity exceeds the capacity of the location.
Source: *Highway Capacity Manual, Special Report 209, 3rd Edition, Transportation Research Board, 1994.*	

The proposed project is needed to address capacity deficiencies on IH 35W. An LOS analysis was conducted for the existing general purpose lanes (non-toll) along three sections of IH 35W: from SH 170 to IH 820, beginning of managed (toll) lanes to SH 170, and at the northern end of the project. Results of the analysis indicate that in 2030, all sections of IH 35W would have LOS F.

The proposed project is needed to address operational deficiencies on IH 35W and update the freeway to current design standards. Examples include the following:

- The distance from exit ramps to cross street intersections on IH 35W is too short in some instances. This results in excessive traffic queues which back up into the general purpose lanes (non-toll) and create congestion on IH 35W.
- The inside shoulders of IH 35W are substandard in some locations.

- The interchange between IH 35W, US 81/287, and SH 170 contains merging and weaving conditions that occur within general purpose lane (non-toll) traffic. The distances provided for these maneuvers are substandard and result in bottleneck situations.

All of these substandard roadway conditions create safety hazards for motorists using the IH 35W facility.

The purpose of the proposed project is to improve mobility within the IH 35W corridor and facilitate access to existing and future land uses along the proposed project. The purpose of implementing tolled concurrent managed/HOV lanes as part of the IH 35W project would be to provide congestion relief primarily within the peak hour travel times, and provide a revenue source to pay for the operational and maintenance costs of the facility and future rehabilitation or reconstruction of the facility. Historically, TxDOT has financed highway projects on a "pay-as-you-go" basis, using motor fuel taxes and other revenue deposited in the SH Fund. However, population increases and traffic demand have outpaced the efficiency of this traditional finance mechanism. The combination of traditional and toll funding would allow the proposed project to be completed earlier than previously programmed using traditional highway funds, thus adding general purpose lane and frontage road capacity to IH 35W earlier than originally programmed using traditional funding alone.

B. Accident Rates

As shown in **Table 3**, the traffic accident data for IH 35W shows the number of reported accidents that occurred between SH 114 and IH 820 during the period of 2006 to 2008. Of these, 212 (39 percent) resulted in injuries. The traffic accident data reports indicated four fatal accidents occurred during this time frame. As shown in **Table 3**, the number of accidents and injuries between 2006 and 2008 do not show a trend over the time frame. As traffic volumes increase in the study area roadways, the number of accidents is likely to increase. This is because increased congestion interrupts normal traffic flow, leading to a greater number of vehicle conflicts and accidents. Without improvements, study area roadways and intersections are likely to have higher accident rates in the future. In addition, as traffic continues to spread to other secondary roads to avoid highway congestion, the secondary roads are likely to experience deterioration in operation and safety.

Table 3: IH 35W Traffic Accident Data

Category	2006	2007	2008
Annual ADT	28,990 to 111,290	28,990 to 111,290	28,990 to 111,290
Injury Accidents	67	82	63
Fatal Accidents	0	3	1
Non-injury Accidents/Unknown	91	109	127
Total Accidents	158	194	191

C. Vehicle Hours of Congestion Delay Data

Table 4 summarizes the vehicle hours of congestion delay for different roadway types along the IH 35W North corridor. As shown in **Table 4**, all roadway types would see an increase in vehicle hours of congestion delay, but the increase is less in the 2035 Build Alternative versus the 2035 No-Build Alternative except for freeway ramps.

Table 4: Vehicle Hours of Congestion Delay for IH 35W North Daily Total Comparison of 2012, 2035 No-Build and 2035 Build Alternative					
Functional Class Description	**Daily Total**			**Daily % Difference**	
	2012	**2035 No-Build**	**2035 Build**	**2012-2035 Build**	**2035 No Build - Build**
Freeways	5,603	16,910	14,395	157%	-15%
Principal Arterials	229	1,198	909	297%	-24%
Minor Arterials	160	668	499	212%	-25%
Collectors	751	2,118	1,875	150%	-12%
Freeway Ramps	238	1,526	1,697	612%	11%
Frontage Roads	790	2,597	2,198	178%	-15%
Total Roadway Network	**7,771**	**25,017**	**21,573**	**178%**	**-14%**

Source: *NCTCOG Complete Performance Report. Performance Report – Perf Report Year 2012, 2035 Build and No-Build_IH35W_ (IH820_to_Eagle Parkway).*
Note: Comparison made between Existing, No-Build and Build Alternatives in the study areas. HOV lanes are excluded from comparison.

Table 5 compares the vehicle hours of congestion delay for the IH 35W North corridor for different roadway types during AM, PM, Off-Peak (OP), and Daily traffic between the existing 2012 Alternative and the 2035 Build Alternative. As shown in **Table 5**, the vehicle hours of congestion delay for the total roadway network during AM, PM, OP, and Daily traffic would nearly double between 2012 and the 2035 Build Alternatives.

Table 5: Vehicle Hours of Congestion Delay for IH 35W North Detailed Comparison of 2012 and 2035 Build Alternatives									
Functional Class Description	**AM**		**PM**		**OP**		**Daily Total**		**Daily % Difference**
	2012	**2035**	**2012**	**2035**	**2012**	**2035**	**2012**	**2035**	**2012-2035**
Freeways	1,470	4,367	1,978	5,368	2,153	4,661	5,603	14,395	157%
Principal Arterials	68	289	86	350	75	270	229	909	297%
Minor Arterials	38	153	64	187	57	159	160	499	212%
Collectors	160	665	265	706	326	50	751	1,875	150%
Freeway Ramps	81	616	96	649	61	432	238	1,697	612%
Frontage Roads	341	752	280	890	170	556	790	2,198	178%
Total Roadway Network	**2,158**	**6,840**	**2,769**	**8,149**	**2,844**	**6,583**	**7,771**	**21,572**	**178%**

Source: *NCTCOG Complete Performance Report. Performance Report – Perf Report Year 2012 and 2035_IH35W_ (IH820_to_Eagle Parkway).*
Note: Comparison made between 2012 Existing and 2035 Build Alternatives in the study area. HOV lanes are excluded from comparison.

Table 6 presents the difference between vehicle hours of congestion delay for the existing 2012 Alternative versus the 2035 Build Alternative for different roadway types along the IH 35W North corridor for AM, PM, OP and Daily traffic. As shown in **Table 6**, the total roadway network would experience a marked increase in vehicle hours of congestion delay during AM, PM, OP, and Daily traffic in the 2035 Build Alternative.

Table 6: Vehicle Hours of Congestion Delay for IH 35W North Comparison of 2012 and 2035 Build Alternatives				
Functional Class Description	**2012 and 2035 Build % Difference**			
	AM	**PM**	**OP**	**Daily**
Freeways	197%	171%	116%	157%
Principal Arterials	326%	307%	260%	297%
Minor Arterials	302%	191%	176%	212%
Collectors	316%	167%	54%	150%
Freeway Ramps	657%	574%	612%	612%
Frontage Roads	120%	218%	228%	178%
Total Roadway Network	**217%**	**194%**	**131%**	**178%**

Source: *NCTCOG Complete Performance Report. Performance Report – Perf Report Year 2012 and 2035_IH35W_ (IH820_to_Eagle Parkway).*
Note: Comparison made between 2012 Existing and 2035 Build Alternatives in the study area. HOV lanes are excluded from comparison.

Table 7 compares the vehicles hours of congestion delay between the 2035 No-Build versus the 2035 Build Scenarios for different roadway types along the IH 35W North corridor for AM, PM, OP, and Daily traffic. As shown in **Table 7**, the total roadway network would experience a decrease in vehicle hours of congestion delay during AM, PM, and OP times as well as Daily traffic in the 2035 Build Scenario from the 2035 No Build Scenario.

Table 7: Vehicle Hours of Congestion Delay for IH 35W North Comparison of 2035 No-Build and 2035 Build Alternatives				
Functional Class Description	**2035 No Build and Build % Difference**			
	AM	**PM**	**OP**	**Daily**
Freeways	-10%	-7%	-26%	-15%
Principal Arterials	-32%	-26%	-11%	-24%
Minor Arterials	-20%	-32%	-22%	-25%
Collectors	-19%	-13%	4%	-12%
Freeway Ramps	14%	19%	-2%	11%
Frontage Roads	-14%	-12%	-22%	-15%
Total Roadway Network	**-11%**	**-8%**	**-22%**	**-14%**

Source: *NCTCOG Complete Performance Report. Performance Report – Perf Report Year 2035 Build and No-Build_IH35W_ (IH820_to_Eagle Parkway).*
Note: Comparison made between No-Build and Build Alternatives in the study area. HOV lanes are excluded from comparison.

II. DESCRIPTION OF THE EXISTING FACILITY

A. Existing Facility Design / Conditions

IH 35W from SH 114 to IH 820 is a four-lane divided highway with limited access entrances and exits with discontinuous frontage roads. The existing right-of-way (ROW) width is ranges from 299 feet to 1,029 feet with a typical width of 350 feet.

IH 35W has been a major transportation corridor for over 40 years and is one of the busiest north-south highways in the Dallas-Fort Worth (DFW) Metropolitan Area. Currently, IH 35W

serves both local access (limited) traffic to businesses along the highway and pass-through traffic, particularly during commuter hours. In 1967, IH 35W opened from SH 114 to IH 820. In the last 10 years traffic has doubled. To address this growth, five new interchanges and 16-miles of frontage roads have been added since its initial construction. The frontage roads are in connection with the new interchanges at Eagle Parkway, Alliance Boulevard, SH 170, Heritage Trace Parkway, North Tarrant Parkway, Basswood Boulevard, and Western Center Boulevard.

Much of the original IH 35W facility remains in operation today and predates many of the requirements of current design standards.

B. Land Use

The land use along the project corridor consists of agricultural (pasture/cultivated), commercial, residential, retail, office, light industrial, and floodplain with some additional undeveloped areas. Zoning along the proposed project corridor is consistent with the described land use. The following describes the various land uses along the proposed project corridor from north to south.

- From SH 114 to Eagle Parkway the land use is agricultural or undeveloped. There are some commercial properties near SH 114 and a small residential area east of the highway. A Marriot Hotel and Golf Club are west of IH 35W. Notably, the Texas Motor Speedway is located in the northwest corner of IH 35W and SH 114.
- From Eagle Parkway to Keller Haslet Road/Westport Parkway, land use is primarily vacant (agricultural) with scattered retail locations. The Alliance Airport complex is located to the west of IH 35W between Eagle Parkway and Westport Parkway.
- Land use from Keller Haslet Road/Westport Parkway to Golden Triangle Boulevard consists of vacant land, retail, light industrial, and office/warehouse.
- Between Golden Triangle Boulevard and Basswood Boulevard land use is light industrial, office/warehouse, retail, and vacant land. Ground breaking has been initiated on 40 acres of vacant land for the construction of Texas Health Harris Methodist Hospital Alliance which will be completed in 2012.
- Between Basswood Boulevard and Western Center Boulevard the east side of the proposed project limits is primarily retail and vacant land. The west side of the proposed project limits is primarily retail, office/warehouse, residential, and vacant land.
- From Western Center Boulevard to IH 820, the land use is primarily retail and service oriented businesses and vacant tracts of land. Included among these are hotels, a gasoline service station, and a movie theater.
- A church is located on the west side of IH 35W and multi-family housing residential apartment complex in on the east side of IH 35W at the southern most limit of the project.

As listed in the US Department of Agriculture's (USDA) *Soil Survey of Tarrant County*, and *Soil Survey of Denton County*, there are 18 general soil types within the proposed project study area. Soil types existing along the proposed project corridor are Aledo gravelly clay loam, Altoga silty clay, Branyon clay, Chatt silty clay, Frio silty clay frequently and occasionally flooded, Lewisville clay loam, Lindale clay loam, Medlin clay, Mingo clay loam, Ponder clay loam, Purves clay, Sanger clay, Sanger Urban land complex, San Saba clay, Slidell clay, Speck clay loam, and Sunev clay loam.

III. DESCRIPTION OF THE PROPOSED FACILITY

TxDOT Fort Worth District proposes to improve a 10.5-mile section of IH 35W in Tarrant and Denton Counties, Texas. Although the study limits extend from SH 114 in Denton County to IH 820 in Tarrant County, funding is not available for the portion of the roadway between SH 114

and Eagle Parkway. The proposed improvements extend from Eagle Parkway to IH 820 (Segments 3B and 3C). No improvements are currently proposed between Eagle Parkway and SH 114. The various ultimate lane configurations of the three sections of the roadway are described as follows and displayed in **Figure 5**:

- From Eagle Parkway to US 81/287, the proposed project would consist of reconstructing and widening the roadway to a 10-lane facility consisting of three general purpose lanes (non-toll) in each direction and a barrier-separated four-lane concurrent managed (toll) lane facility (two lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/threelane frontage roads in each direction with bicycle accommodation would be constructed. Direct connectors from IH 35W to SH 170 would also be constructed.
- From US 81/287 to Basswood Boulevard, the proposed project would consist of reconstructing and widening the roadway to a 12-lane facility consisting of four general purpose lanes (non-toll) in each direction and a barrier-separated four-lane concurrent managed (toll) lane facility (two lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/three/four-lane frontage roads in each direction with bicycle accommodation would be constructed throughout this section. Direct connectors to/from US 81/287 from IH 35W managed (toll) lanes would be constructed.
- From Basswood Boulevard to IH 820, the proposed project would consist of reconstructing and widening the roadway to a 14-lane facility consisting of four general purpose lanes (non-toll) in each direction and a barrier-separated six-lane concurrent managed (toll) lane facility (three lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/three/four-lane frontage roads in each direction with bicycle accommodation would be constructed throughout this section.

The proposed improvements are part of the NTE which proposes to improve IH 35W and IH 820 in Tarrant County and includes a managed (toll) lane system on IH 35W from IH 30 north to SH 170; on IH 820 from IH 35W east to the Northeast Interchange; and, on SH 121/183 from the IH 820 Northeast Interchange to SH 161. The improvements to IH 820, from IH 35W east to the Northeast Interchange, proposed as part of NTE were approved by FHWA on December 30, 2008. The improvements to SH121/183 from the IH 820 Northeast Interchange to SH 161, proposed as part of NTE were approved by FHWA on November 4, 2009.

The proposed project does not include improvements to the IH 35W/IH 820 interchange. The interchange (extending from the centerline of IH 820 to 825 feet north of Fossil Creek Boulevard) would be constructed as part of the IH 820 improvement project that was approved by FHWA on December 30, 2008.

The proposed project has termini (SH 114 to IH 820) with independent utility. The proposed action is consistent with the area's financially-constrained Metropolitan Transportation Plan (MTP) *Mobility 2035,* and with the 2011-2014 Transportation Improvement Program (TIP) – 2011 Amendment. The U.S. Department of Transportation (FHWA/Federal Transit Administration [FTA]) found the MTP and the 2011-2014 TIP – 2011 Amendment to conform to the State Implementation Plan (SIP) on July 14, 2011. 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 in addressed in the programming of the TIP. The proposed improvements, as they appear in the MTP, are summarized in **Table 8**.

Table 8: Proposed Improvements in the Metropolitan Transportation Plan

Location	MTP ID #	MTP	Cost	CSJ
IH 35W from Eagle Parkway to US 81/287	FT1 – 5.20.2	6 general purpose (non-toll) lanes plus auxiliary lanes 4 concurrent managed (toll) lanes 4/6 frontage road lanes (that includes auxiliary lanes near ramp locations and cross streets)	$678 million	0081-12-041 0081-13-904
IH 35W from US 81/287 to Basswood Boulevard	FT1 – 5.40.1	8 general purpose (non-toll) lanes plus auxiliary lanes 4 concurrent managed (toll) lanes Managed (toll) lanes access to/from US 81/US 287 and Basswood Boulevard 4/8 frontage road lanes (that includes auxiliary lanes near ramp locations and cross streets)		0014-16-252 0014-16-255
IH 35W from Basswood Boulevard to IH 820	FT1 – 5.40.2	8 general purpose (non-toll) lanes plus auxiliary lanes 6 concurrent managed (toll) lanes Managed (toll) lanes access to/from Basswood Boulevard 4/8 frontage road lanes (that includes auxiliary lanes near ramp locations and cross streets)		

Source: *Mobility 2035*

IV. ALTERNATIVES INCLUDING THE PROPOSED ACTION

A. Planning Process

Because of anticipated traffic demand and congestion, possible delays in emergency services, and decreased safety, TxDOT performed a System Plan Analysis using the System Plan Tool to develop feasible plans for roadway improvements in the IH 35W corridor from SH 114 to IH 820. The TxDOT Fort Worth District coordinated with the NCTCOG, Texas Transportation Institute (TTI), TxDOT Dallas District, Tarrant County, and the cities of Haslet and Fort Worth to gather and assess their input concerning potential transportation improvements in the IH 35W corridor. TTI provided input on proposed alternative improvements to the corridor. The cities provided local thoroughfare plans, utility information, and development plans/plats for existing and proposed development within the corridor. The NCTCOG provided traffic projections and input related to the MTP.

Upon completion of data collection and development of initial alternative alignments, TxDOT presented initial findings in a public meeting on March 8, 2007 (see **Section VI – Public Involvement and Local Government Coordination**). Following the meeting, additional studies were performed by TxDOT to develop more detailed cross section alternatives, construction costs, ROW requirements, and potential environmental concerns for the alternatives being considered. The studies recommended a preferred Build Alternative based on the project's need and purpose.

B. No-Build Alternative

The No-Build Alternative represents the case in which the proposed project is not constructed. No improvements other than normal pavement, structure maintenance, and repair would occur. The No-Build Alternative is carried forward through this EA as a baseline of comparison against the Build Alternative.

Although the No-Build Alternative avoids construction impacts, the problems associated with a deficient roadway would remain. The projected growth in traffic demand would exceed the capacity of IH 35W, thereby increasing the length of peak traffic periods, leading to longer periods of congestion. The No-Build Alternative would not improve regional mobility and would not meet the proposed project need and purpose.

C. Build Alternative

The proposed improvements include the reconstruction and widening of a 10.5-mile long section of IH 35W between SH 114 and IH 820 (refer to actual construction limits provided in **Section I – Introduction**). The plan layout and typical sections showing the proposed improvements are provided in **Figures 4** and **5**. The proposed improvements to IH 35W are discussed in detail in **Section III – Description of the Proposed Facility.**

Bridges

The proposed project would construct 50 bridges throughout the project corridor. All of the bridges would be constructed in compliance with the *TxDOT Standard Specifications for the Construction and Maintenance of Highways, Streets, and Bridges*.

Bicycle and Pedestrian Accommodations

In 2000, the US Department of Transportation released a policy statement titled *Design Guidance Accommodating Bicycle and Pedestrian Travel: A Recommended Approach*. With this policy statement, the federal government indicated that all transportation projects would include bicycle and pedestrian accommodations unless exceptional circumstances exist. Bicycle and pedestrian accommodation cannot be provided on the proposed general purpose or managed lanes; however, the frontage roads would be constructed with a 14-foot wide outside shared lane for cyclists and six-foot wide sidewalks for pedestrians. On-street bike lanes were designed as part of cross-street bridges based on recommendations made in *Bike Fort Worth: A Comprehensive Bicycle Transportation Plan* (2009). Five cross-street bridges were modified to include the on-street bike lane, including Keller Hicks, Westport, Heritage Trace, North Tarrant Parkway and Basswood Boulevard. All other cross streets (at-grade facilities) would include either an on-street bike lane or a 14-foot wide shared use lane. Six-foot wide sidewalks would be provided on all cross streets.

Concurrent Managed (toll) Lanes

The proposed project would include a tolled four- to six-lane barrier-separated concurrent managed (toll) lane facility (two to three lanes in each direction) for the entire length of the

project. The managed (toll) lanes would be centered between the northbound and southbound general purpose lanes (non-toll).

There would be four concurrent managed (toll) lanes (two in each direction) from Eagle Parkway to Basswood Boulevard and six concurrent managed (toll) lanes (three in each direction) from Basswood Boulevard to IH 820. All of the concurrent managed (toll) lanes would occupy the median between the IH 35W general purpose lanes (non-toll). The managed (toll) lanes would be 12 feet wide with four-foot wide inside shoulders and 10-foot wide outside shoulders. All of the concurrent managed (toll) lanes would be separated from the general purpose lanes (non-toll) by concrete traffic barriers. All ramps would be 12 to 14 feet wide with four-foot wide inside shoulders and eight-foot wide outside shoulders (**Figure 5**). **Table 9** summarizes the entrance ramps merging onto the general purpose (non-toll) and managed (toll) lanes.

	Table 9: Entrance Ramps
	Eagle Parkway to IH 35W SB General purpose lanes (non-toll)
*	IH 35W SB General purpose lanes (non-toll) to IH 35W SB Managed (toll) Lanes
	Alliance Boulevard to IH 35W NB General purpose lanes (non-toll)
	IH 35W NB Managed (toll) Lanes to IH 35W NB General purpose lanes (non-toll)
	Westport Parkway to IH 35W NB General purpose lanes (non-toll)
	Alliance Boulevard to IH 35W SB General purpose lanes (non-toll)
	EB SH 170 to IH 35W NB General purpose lanes (non-toll)
*	EB SH 170 to IH 35W NB Managed (toll) Lanes
	Westport Parkway to IH 35W SB General purpose lanes (non-toll)
	Keller-Hicks Road to IH 35W NB General purpose lanes (non-toll)
	WB SH 170 to IH 35W SB General purpose lanes (non-toll)
	SH 170 to IH 35W SB General purpose lanes (non-toll)
	IH 35W NB Managed (toll) Lanes to IH 35W NB General purpose lanes (non-toll)
*	IH 35W SB General purpose lanes (non-toll) to IH 35W SB Managed Lanes
	Heritage Trace Parkway to IH 35W NB General purpose lanes (non-toll)
	Golden Triangle Boulevard to IH 35W SB General purpose lanes (non-toll)
*	Heritage Trace Parkway to IH 35W SB Managed (toll) Lanes
	Heritage Trace Parkway to IH 35W SB General purpose lanes (non-toll)
	North Tarrant Parkway to IH 35W SB General purpose lanes (non-toll)
	Basswood Boulevard to IH 35W NB General purpose lanes (non-toll)
*	EB US 287 to IH 35W SB Managed (toll) Lanes
*	Basswood Boulevard to IH 35W SB Managed (toll) Lanes
	Western Center Boulevard to IH 35W NB General purpose lanes (non-toll)
	Basswood Boulevard to IH 35W SB General purpose lanes (non-toll)
	IH 35W SB General purpose lanes (non-toll) to NB US 287
	IH 35W NB General purpose lanes (non-toll) to EB SH 170
Notes: ***** Entrance Ramps merging onto Managed (toll) Lanes SB – Southbound NB – Northbound	

Managed/HOV Lane Considerations

TxDOT and the Regional Transportation Council (RTC) currently define a managed (toll) lane facility as a facility that increases freeway efficiency by packaging various operation and design actions. The lane management options may be adjusted to maximize person moving capacity, optimize vehicle carrying capacity, provide travel options and increase flexibility, and achieve community and corridor goals. Managed (toll) lanes add lane capacity by combining HOV and new express lanes to improve highway efficiency.

Toll Pricing

For the IH 35W concurrent managed (toll) lanes, both HOVs and single occupancy vehicles (SOVs) would be charged a toll in accordance with the regional managed (toll) lanes policy. The amount of the toll has not been determined, but would be in accordance with the DFW Area Managed (toll) Lane Policy (**Appendix D**). Toll pricing would use value pricing (toll rates that vary by time of day, vehicle type and level of congestion) to regulate the number of vehicles on the tolled lanes. Transit vehicles and certain other exempt vehicles would not be charged a toll, which would allow riders and users to take advantage of the managed (toll) lane's reliability and predictability.

Electronic Toll Collection Systems

The toll collection system for the IH 35W concurrent managed (toll) lanes would operate under a fully electronic format. Vehicles would not have to stop to pay a toll, rather vehicles would pass through electronic readers and be assessed a toll charge. This is known as an electronic toll collection (ETC) system.

Recent advances have allowed another possible ETC method that would accommodate vehicles without a toll tag. In this method, license plates are photographed and scanned by computers or read by the toll operator. The registered vehicle owners are then sent a periodic billing statement based on activity, with an additional fee included for billing and handling. This video tolling program allows motorists to travel the tolled lanes without needing a transponder and without needing to stop and pay. However, it should be noted the video tolling method would be more expensive for users of the facility because of the additional fee associated with billing and handling of the periodic billing statements.

Some users may be confused by the ETC-only technology; however, other local toll facilities in the area utilize full ETC technology, which give roadway users an opportunity to become familiar with using this technology prior to implementation on the proposed project tolled lanes. TxDOT is implementing a marketing program aimed at educating the public on where to purchase electronic toll tags and how to use them on area toll roads and managed lanes.

TxDOT's objective is to establish interoperable toll accounts. Any ETC account set up with a toll facility operator in Austin, Dallas, Houston, or other cities in Texas would be able to access toll roads or managed (toll) lanes in any of the toll authority areas while having the tolls charged to the user's home account. To achieve this objective, toll tags or stickers issued by a toll authority in one area of the state would be capable of being read by the toll system in another area of the state. Each toll authority would be capable of registering toll transactions to the user's home toll account. Users from other states or international drivers would be billed similarly to users without toll tags.

Method of Toll Charge Collections

The toll collection system for the IH 35W concurrent managed (toll) lanes would be interoperable with other toll facilities in the State. The Texas Turnpike Authority (TTA) TxTag, the North Texas Tollway Authority (NTTA) TollTag, and the Houston area EZ TAG would be accepted. Toll charge collections would be automatically deducted from the user's prepaid credit or cash account. The user would be required to maintain sufficient funds in the account to cover incurred toll charges.

With the NTTA TollTag, for example, a prepaid credit card toll account user would pay a minimum amount of $40 as an initial deposit and receive a TollTag. The account would be reduced each time the user opts to pass through an operating TollTag lane. Currently, when the user's account reaches $10 or less, the user's credit card or debit card would be charged $40 to

automatically increase the available balance. With a cash toll account, in addition to the initial $40 minimum payment and replenishing the account when the balance reaches $10 or less, cash users must pay a deposit of $25 per TollTag. The cash user deposit would be refunded without interest if the user returns the TollTag to a TollTag Store or Customer Service Center (by mail or in person) in good condition, or if the user converts the cash account to a credit card account.

Transit Service

Transit service in the proposed project area is provided by the Fort Worth Transit Authority (the T), which serves the elderly, school districts, and public transportation needs within the area. The T's service is open to the public, and all persons desiring transit have an equal opportunity to schedule rides. Transit vehicles would not be charged a toll to utilize the IH 35W concurrent managed (toll) lanes, which allows riders and users to take advantage of the managed lanes reliability and predictability. Currently, two express bus routes with twice a day service operate along IH 35W between Western Center Boulevard and IH 820.

V. ENVIRONMENTAL ISSUES

A. Community Impacts Assessment

Regional and Community Growth

No-Build Alternative

Implementation of the No-Build Alternative would increase traffic congestion causing travel delay costs, which would be borne by roadway users and businesses that are dependent on corridor roadways for employment and commerce activities. This, in turn, may affect regional and community growth.

Build Alternative

The RTC, the Metropolitan Planning Organization (MPO), collects demographic data for the North Central Texas region. According to the 2010 Census, this region added nearly 1.2 million residents since the 2000 Census, accounting for nearly one-third of the total population growth in Texas. Regional and community growth in the vicinity of this project is expected to continue along present trends. **Table 10** summarizes the population forecasts for the City of Fort Worth and the City of Haslet, and population and employment forecasts for Tarrant and Denton Counties. Employment forecast data is not available at the city level.

Table 10: Population and Employment Forecasts

	2005[3]/2010[1]	**2030[2]/2035[3]**	**2040**
City of Fort Worth			
Population	741,206[1]	1,009,371[2]	1,236,870[2]
City of Haslet			
Population	1,517[1]	7,000[2]	7,000[2]
Tarrant County			
Population	1,809,034[1]	2,823,535[3]	3,046,531[3]
Employment	944,583[3]	1,644,463[3]	1,766,177[3]
Denton County			
Population	662,614[1]	1,053,903[3]	1,147,493[3]
Employment	189,349[3]	406,105[3]	448,229[3]

Source:
[1] *U.S. Census 2010 PL94-171, NCTCOG (February 2011).*
[2] *Texas Water Development Board, 2011 Regional Water Plan Population Projections for 2000-2060 For Cities, Utilities, and County-Other by Region by County, Region C (July 2010).*
[3] *NCTCOG 2040 Demographic Forecast, http://www.nctcog.org/ris/demographics/forecast.asp (February 2011), available at county level only.*

As shown in **Table 10**, the population of Fort Worth is expected to grow by 66.9 percent between 2010 and 2040. The City of Haslet population is expected to grow by 361.4 percent within the same time period. The population of Tarrant County is expected to grow by 68.4 percent between 2010 and 2040 and employment is expected to grow 87 percent between 2005 and 2040. In Denton County, the population is expected to grow 73.2 percent between 2010 and 2040 and employment is expected to grow 136.7 percent between 2005 and 2040. According to NCTCOG data, within the four zip codes encompassing the proposed project, there are 71 major employers that each employs over 250 people and combined employ 36,500 to 76,429 people (NCTCOG Employers Report, generated December 6, 2011).

Implementing the Build Alternative would improve traffic mobility and access through the study area and would likely increase commercial business opportunities along and near the proposed roadway. Adjacent and surrounding property values would be favorably affected by improved accessibility and mobility, thereby increasing the tax base and producing benefits that would accrue during the design life of the proposed project. A short-term benefit of the proposed action is employment for some area residents during the construction phase.

Right-of-Way Requirements, Relocations, and Displacements

No-Build Alternative

Implementation of the No-Build Alternative would not require ROW acquisition, relocations, or displacements.

Build Alternative

Implementing the Build Alternative would require ROW and drainage easement acquisition. The existing ROW is typically 350 feet wide with a width of up to 1,029 feet at interchanges. The proposed improvements to the roadway would require approximately 100 feet of new ROW for a usual width of 450 feet. However, the ROW would widen where intersections, ramps, managed lanes and auxiliary lanes are present, and where cuts or fills result in increased widths of side slopes. The plan view, as depicted in the schematic, is available for viewing at the TxDOT Fort Worth District Office located at 2501 SW Loop 820, Fort Worth, Texas 76133. **Figure 5** presents the typical sections which show the existing and proposed ROW. Approximately 97.4 acres of additional ROW and approximately 0.6 acre of drainage easements would be required to accommodate the proposed facility.

A total of 109 parcels would be impacted by ROW acquisition and potentially three commercial structures would be displaced by the proposed project. No residential displacements would occur. Information associated with these displacements is provided in **Table 11**.

Table 11: Right-of-Way Requirements and Displacements

Business Owner	Type of Structure	Total Area Land	Total Estimated Market Value
Club Vista Properties	Unused Commercial Building	1.0 ac	$229,293
Heritage Inn Wichita	Warehouse	0.89 ac	$84,642
Alliance #5 Building Partners	Mobil Gas Station and Convenience Store	2.2 ac	$2.2 M

No adverse impacts are expected because of the displacement of these structures. The displacement of an unused commercial structure (Club Vista Properties) could be considered a benefit by the owner because they would receive compensation for a building that currently is unused and probably not providing revenue for the owner. The warehouse that would be

displaced (Heritage Inn Wichita) could be moved to another part of the property and still be used by owner. Neither property appears to service a local community. The commercial building is unused and the warehouse is surrounded by 18-wheeler trucks. Its purpose is unknown.

Because the proposed ROW would impact the underground tanks of the Mobil gas station, it is likely the entire facility, both the pumps and convenience store, would be displaced. According to loopnet.com there are 11 existing gas stations in Fort Worth that are for sale. Additionally, vacant land zoned for commercial and industrial use is found along the project corridor, including the three remaining corners of the Westport/IH 35W intersection where the Mobil gas station is currently located. The gas station is located on the corner of a major highway and does not provide exclusive service to a particular group or community. The corners of intersections often are reserved for gas stations and it is very likely that this station will be able to reopen in the immediate area.

Both the U.S. and Texas Constitutions provide that no private land may be taken for public purposes without just compensation being paid. The TxDOT ROW Acquisition and Relocation Assistance Program would be conducted in accordance with the *Uniform Relocation Assistance and Real Property Acquisition Policy Act* of 1970, as amended.

Community Cohesion

No-Build Alternative

Implementation of the No-Build Alternative would not separate or isolate any distinct neighborhoods, ethnic groups, or other specific groups.

Build Alternative

IH 35W is an interstate corridor that has been present in the City of Fort Worth since 1967 and is a boundary for much of the existing development within the proposed project limits. Implementation of the Build Alternative (adding capacity to the existing roadway) would not change these conditions.

Three residential areas are directly adjacent to the proposed project but no new ROW would be required from these areas. The Santa Fe Enclave is located on the west side of IH 35W just south of Basswood Boulevard. This approximately 90-acre residential development has been under construction since 2007 and is approximately 50 percent complete. There are two entrances to the neighborhood – one off of Basswood Boulevard and one off the IH 35W southbound frontage road. The neighborhood does not connect to any other roadways or developments and traffic patterns should not change during construction or after completion of the proposed project. Twenty-three lots border the IH 35W frontage road and residences would experience noise impacts. Section V. E. analyses these impacts and potential mitigation.

Two apartment complexes are also located along the IH 35W corridor. Both complexes are on the east side of IH 35W approximately one mile apart and neither has an entrance onto the northbound IH 35W frontage road and ROW is not required from either property. No impacts to these apartment complexes are expected.

Each of the three residential communities is a self-contained, walled neighborhood with a community pool and limited access to IH 35W. Residents would continue to have full access to their neighborhood and amenities during construction and there would be no changes to their neighborhood after construction. The proposed improvements to IH 35W would not disturb the cohesiveness of any of these neighborhoods. The proposed improvements to the existing frontage roads include widening the outside lane to accommodate bicyclists. This improvement

would allow safer mobility for those individuals who desire to access businesses along the frontage road

Numerous developed and undeveloped commercial properties are adjacent to the proposed project. The section of IH 35W proposed for improvement has historically been surrounded by vacant land and commercial properties. Much of the development is associated with Alliance Airport which is located along the north section of the project. Alliance Texas is a development group that owns approximately 17,000 acres around the airport and a nearby rail facility. Texas Motor Speedway is also a commercial complex located in the northwest corner of IH 35W and SH 114. This 1,400-acre complex is a major traffic generator and supports major racing events. The commercial facilities and developers in the area are strong supporters of the proposed project and view the proposed roadway facility as a way to enhance their existing facilities.

Besides the developers that support the project, no community groups have been identified during the project planning process. Impacts to community cohesion are not expected. The proposed project would not separate or isolate any distinct neighborhoods, ethnic groups, or other specific groups.

Limited English Proficiency

Executive Order (EO) 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 LEP populations. The EO requires federal agencies to work to ensure that recipients of federal financial assistance provide meaningful access to their LEP applicants and beneficiaries. Failure to ensure that LEP persons can effectively participate in or benefit from federally assisted programs and activities may violate the prohibition under Title VI of the Civil Rights Restoration Act of 1987 and Title VI regulations against national origin discrimination. The populations (age five years and older) who speak English "less than very well" according to *2005-2009 American Community Survey (ACS) 5-Year Estimates* data are presented in **Table 12**.

Table 12: Project Area Population That Speaks English "Less Than Very Well"

Census Tract	LEP	Languages Spoken by LEP Populations			
		Spanish	Other Indo-European	Asian and Pacific Island	Other
203.01	2.3%	1.7%	0.5%	0.1%	0.0%
203.04	2.8%	1.5%	1.1%	0.2%	0.0%
1050.05	6.0%	2.9%	0.5%	2.3%	0.3%
1139.13	5.4%	3.1%	0.4%	1.7%	0.2%
1139.14	4.2%	2.0%	0.3%	1.7%	0.2%

Source: *U.S. Census Bureau; Legacy American FactFinder; 2005-2009 ACS 5-Year Estimates; <http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=>; generated December 6, 2011.*

Based on the data presented in **Table 12**, LEP populations are present within the proposed project area. A windshield survey, conducted on December 29, 2010, revealed that there are business signs or advertisements in non-English languages located along the project corridor. Based on the percentage of English speaking populations, public meetings for the proposed project have been and would continue to be conducted in English. Reasonable steps such as publication of bilingual (English and Spanish) announcements in local papers (*e.g., Star-Telegram* and *La Estrella*) which informs citizens of the opportunity to request an interpreter for language or other special needs to be present at the public meeting/hearing would be taken to ensure LEP populations have meaningful access to the programs, services, and information TxDOT provides. Therefore, the requirements of EO 13166, pertaining to LEP, are satisfied.

Environmental Justice

No-Build Alternative

Implementation of the No-Build Alternative would not have disproportionately high and adverse human health or environmental effects on minority populations and low-income populations.

Build Alternative

EO 12898 *Federal Actions to Address Environmental Justice (EJ) in Minority Populations and Low-Income Populations* requires each federal agency to "make achieving environmental justice part of its mission by identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations.

The FHWA has identified three fundamental principles of environmental justice:

1. To avoid, minimize or mitigate disproportionately high and adverse human health or environmental effects, including social and economic effects, on minority populations and low-income populations;
2. To ensure full and fair participation by all potentially affected communities in the transportation decision-making process;
3. To prevent the denial of, reduction in or significant delay in the receipt of benefits by minority populations and low-income populations.

Minority: means a person who is:

- Black (having origins in any of the black racial groups of Africa).
- Hispanic (of Mexican, Puerto Rican, Cuban, Central or South American, or other Spanish culture or origin, regardless of race).
- Asian American (having origins in any of the original peoples of the Far East, Southeast Asian, the Indian subcontinent, or the Pacific Islands).
- American Indian and Alaskan Native (having origins in any of the original people of North American and who maintains cultural identification through tribal affiliation or community recognition).

Low Income: means a household income at or below the Department of Health and Human Services poverty guidelines ($22,350 for a family of four in 2011).

Disproportionately high and adverse human health or environmental effects are defined by FHWA as adverse effects that:

1. are predominately borne by a minority population and/or a low-income population or
2. will be suffered by the minority population and/or low-income population and are appreciably more severe or greater in magnitude than the adverse effects that will be suffered by the non-minority population and/or non-low- income population.

For purposes of this EA, *Census 2010* data, *2005-2009 ACS 5-Year Estimates* data and windshield surveys have been used to identify areas with high minority concentrations and low incomes. According to *Census 2010* data, eight Census tracts consisting of 15 Census block groups encompass the proposed project and 55 Census blocks are adjacent to the proposed project area. Because northern Tarrant County and southern Denton County are rural in nature, the Census tracts, block groups, and blocks are large and extend up to eight miles away from the proposed project. In order to accurately present the presence of EJ groups near the proposed project, the 55 blocks adjacent to the proposed project ROW have been identified as

the minority population study area. Data obtained from these blocks, block groups, and Census tracts were analyzed to determine racial and ethnic characteristics in the proposed project area. A total of 2,271 persons were recorded within the Census blocks in 2010. The racial and ethnic distribution within these blocks and associated block groups and Census tracts is presented in **Table 13**. Thirty-nine of the 55 blocks do not contain any population and are not listed in the table. Data for the remaining 16 blocks and all block groups and Census tracts are provided. **Figure 6** provides the locations of the 2010 block groups and blocks.

Table 13: Demographic Data for Proposed Project Area

Census Data Level	Total Population	Hispanic or Latino alone	White alone	Black or African American alone	American Indian or Alaska Native alone	Asian alone	Native Hawaiian or Other Pacific Islander alone	Some Other Race alone	Two or More Races alone
CT 203.06	6,035	15.1%	75.0%	4.5%	0.8%	2.8%	0.1%	0.2%	1.5%
BG 2	4,580	10.8%	78.2%	5.0%	0.8%	3.3%	0.1%	0.2%	1.5%
Block 2140	16	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CT 203.08	10,354	16.2%	72.9%	5.9%	0.8%	1.8%	0.1%	0.1%	2.1%
BG 4	785	11.0%	76.7%	5.1%	0.6%	5.6%	0.0%	0.4%	0.6%
Block 4062	186	7.0%	78.5%	6.5%	0.0%	8.1%	0.0%	0.0%	0.0%
CT 1050.07	4,557	15.1%	65.5%	9.9%	0.5%	6.7%	0.0%	0.1%	2.1%
BG 1	1,856	16.2%	65.2%	10.9%	0.6%	4.5%	0.0%	0.1%	2.4%
Block 1021	304	19.1%	63.8%	10.9%	0.0%	2.3%	0.0%	0.0%	3.9%
BG 2*	2,701	14.3%	65.7%	9.3%	0.5%	8.1%	0.1%	0.1%	1.9%
CT 1050.08	7,381	30.8%	46.0%	12.1%	0.3%	7.9%	0.1%	0.2%	2.5%
BG 1*	2,615	20.2%	52.5%	14.8%	0.5%	9.4%	0.0%	0.0%	2.5%
CT 1139.22	17,787	16.6%	65.6%	7.5%	0.4%	7.3%	0.1%	0.2%	2.4%
BG 1	1,403	21.3%	73.2%	3.1%	0.1%	0.2%	0.1%	0.0%	2.0%
Block 1014	11	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
CT 1139.23	2,797	20.2%	54.2%	11.3%	0.5%	11.3%	0.1%	0.7%	1.7%
BG 1	2,050	21.3%	50.9%	12.9%	0.6%	11.7%	0.0%	1.0%	1.6%
Block 1004	182	13.2%	67.6%	8.8%	0.0%	9.9%	0.0%	0.5%	0.0%
BG 2	747	17.3%	63.3%	6.7%	0.0%	10.4%	0.4%	0.0%	1.9%
Block 2000	227	9.3%	74.0%	6.2%	0.0%	6.6%	0.9%	0.0%	3.1%
Block 2010	74	13.5%	66.2%	8.1%	0.0%	5.4%	0.0%	0.0%	6.8%
CT 1139.26	12,227	24.1%	56.9%	9.8%	0.4%	5.7%	0.2%	0.2%	2.6%
BG 1	4,300	28.7%	50.7%	11.1%	0.6%	5.8%	0.2%	0.2%	2.8%
Block 1034	*384*	*47.1%*	*28.6%*	*10.9%*	*0.3%*	*10.2%*	*0.0%*	*0.0%*	*2.9%*
BG 3	1,012	22.7%	57.6%	9.2%	0.3%	6.9%	0.7%	0.2%	2.4%
Block 3006	270	26.7%	57.4%	4.8%	0.4%	7.0%	2.6%	0.0%	1.1%
BG 4	2,259	24.7%	55.9%	10.2%	0.3%	6.1%	0.0%	0.1%	2.7%
Block 4010	341	24.6%	56.3%	13.8%	0.0%	1.2%	0.0%	0.0%	4.1%
Block 4023	154	18.8%	54.5%	14.9%	0.0%	9.7%	0.0%	0.6%	1.3%
Block 4043	66	10.6%	63.6%	4.5%	0.0%	16.7%	0.0%	0.0%	4.5%
BG 5	1,029	10.3%	84.4%	1.1%	0.3%	1.0%	0.2%	0.4%	2.4%
Block 5078	*9*	*0.0%*	*44.4%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*0.0%*	*55.6%*
BG 6*	2,453	22.0%	58.7%	8.6%	0.4%	6.9%	0.2%	0.4%	2.8%
CT 1139.27	11,260	16.7%	68.8%	7.6%	0.4%	4.0%	0.1%	0.1%	2.2%
BG 1	4,560	16.1%	68.7%	8.3%	0.4%	3.9%	0.2%	0.1%	2.4%

Table 13: Demographic Data for Proposed Project Area									
Census Data Level	Total Population	Hispanic or Latino alone	White alone	Black or African American alone	American Indian or Alaska Native alone	Asian alone	Native Hawaiian or Other Pacific Islander alone	Some Other Race alone	Two or More Races alone
Block 1021	29	6.9%	93.1%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Block 1031	4	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
Block 1061	14	0.0%	100.0%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%
BG 2*	1,573	16.1%	66.7%	9.5%	0.6%	5.0%	0.1%	0.0%	2.0%

* - Block groups that have non-populated blocks only within the proposed project area.
CT – Census Tract
BG – Block Group
Source: *NCTCOG Census 2010 GIS Shapefiles for Denton and Tarrant Counties - U.S. Census Bureau, 2010 Census. 2010 Census Redistricting Data (Public Law 94-171) Summary File, Tables P1 and H1*

The majority of populated blocks show similar demographic characteristics to their associated block group. In block 1034 of BG 1, CT 1139.26 and block 5078 of BG 5, CT 1139.26, 71.4 percent and 55.6 percent of the population are minority, respectively (italicized in **Table 13**). The percent minority in these two blocks exceeds that of their associated block groups and Census tract. Block 5078 only has a recorded population of nine people and Block 1034 has a recorded population of 384 people comprised of six racial and ethnic groups. While these two blocks do contain a minority population that exceeds 50 percent, they are not representative of the entire study area. Within the 16 populated blocks, 41 percent of the population is minority. Only 29 percent of the study area blocks have a recorded population. Six blocks have populations with less than 30 people and eight blocks have a population over 100 people. A windshield survey of the project area supports the Census data presented in **Table 13**. As noted in **Section II.B.**, agricultural/vacant land is the dominant land use with commercial, retail, office and some residential also present. The residential areas are in the southern portion of the project area and, as shown in **Table 13**, the majority of blocks in the project area do not exhibit a high minority population. Additionally, *Census 2010* data compiled by the Fort Worth City Manager's office on March 1, 2011 indicates that the areas with minority populations greater than 50 percent are in the central, eastern and southern portions of the city and not in the northern portion where the proposed project is located.

2005-2009 ACS 5-Years Estimates data was used to identify low-income populations within the study area. Because income data is not available at the block or block group level, the five Census tracts have been identified as the low-income population study area. It should be noted that redistricting occurred for Census 2010; therefore, identification numbers and boundaries have changed since *Census 2000* and the *2005-2009 ACS*. For this reason, the number of Census tracts in **Tables 13** and **14** differs. **Table 14** provides the 2009 median household income (in 2009 inflation-adjusted dollars) for the study area Census tracts. While low-income populations are present within the project area Census tracts, no readily identifiable low-income community was identified within the proposed project limits during the windshield survey.

Table 14: Income Data for the Proposed Project Area			
Census Data Level	**Total Population**	**2009 Median Household Income (in 2009 inflation-adjusted dollars)**	**Percent of Households in 1999 Below Poverty Level**
Census Tract 203.01	15,445	$71,179	5.8%
Census Tract 203.04	9,954	$75,202	5.7%
Census Tract 1050.05	9,429	$62,432	6.0%
Census Tract 1139.13	28,603	$82,896	3.1%
Census Tract 1139.14	42,253	$94,992	3.1%
Source: *U.S. Census Bureau; Legacy American FactFinder; 2005-2009 ACS 5-Year Estimates; <http://factfinder.census.gov/servlet/DatasetMainPageServlet?_program=ACS&_submenuId=&_lang=en&_ts=>; generated December 6, 2011.*			

Origin-Destination Analysis

Overview

Origin-destination (O&D) data secured from the NCTCOG was used for additional analysis of "user impacts" of the proposed IH 35W project on low-income and minority populations. Studying O&D data can determine 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). Assessing "user impacts" in the form of an O&D analysis is an integral component of the EJ analysis for the proposed tolling aspects of the proposed project.

As funding mechanisms for improving area roadways evolve, the trend toward tolling of facilities in this region may, through time, create "user impacts" as access to highway systems becomes an issue to the economically disadvantaged.

Traffic Survey Zones, Study Area, and Data Sources

The information associated with the O&D analysis is organized by traffic survey zones (TSZs) which are small geographic units of area that are developed as a basis for estimate of travel. TSZs may vary in size, are determined by the roadway network and homogeneity of development, and directly reflect demographic data generated by the U.S. Census Bureau. Delineated by state and/or transportation officials for tabulating traffic-related data, TSZs usually consist of one or more census blocks, block groups, or census tracts.

The O&D analysis was modeled under the NCTCOG 2035 MTP 12-county MPA that consists of 9,441 square miles and encompasses all of Collin, Dallas, Denton, Rockwall, Tarrant, Ellis, Johnson, Kaufman, Hunt, Wood, Wise, and Parker Counties. Given the regional operating characteristics of IH 35W, it is reasonable to assume the MPA contains the proposed project's daily users and therefore is considered the O&D study area. A total of 5,252 TSZs comprise the O&D study area.

TransCAD®, a GIS-based transportation planning software, was utilized by the NCTCOG to generate the traffic data analyzed during the O&D analysis. NCTCOG conducted a "select link analysis" based on 2035 AM peak period traffic to generate O&D data associated with the proposed project. Traffic data exported directly from TransCAD® select-link matrices was correlated with U.S. Census Bureau data to provide a demographic profile of users anticipated to utilize the proposed IH 35W facility. NCTCOG's O&D data for the IH 35W project provided data for the No-Build and Build Alternatives for the year 2035.

Analysis Assumptions and Limitations

To clarify the intent of the O&D analysis, it does not attempt to identify specific users (low-income and minority populations) but instead compares the origins and intensity of trips based on collective socio-economic characteristics at the TSZ level for the project alternatives mentioned above. In other words, the O&D analysis predicts the potential users of the IH 35W corridor in 2035 by correlating the general socio-economic characteristics of the future users based on 2005-2009 ACS census data and Census 2010 data to the intensity of use quantified by the number of trips per TSZ generated by TransCAD®. The correlation of 2005-2009 ACS census data, Census 2010 data, and TransCAD® data is the best available method to identify which TSZs would originate trips anticipated to utilize the IH 35W facility and the general demographics of the population associated with those TSZs. The model distinguishes between toll and non-toll alternatives by identifying the "toll links." These "toll links" are assigned a cost per mile for the toll alternative and no cost per mile for the non-toll alternative. The model then assigns vehicle trips based on user cost, trip distance, time of day, and other factors to achieve system equilibrium in the network. However, the vehicle trip assignment process does not consider relative income differences or the differences in relative costs to potential users in the population when making trip assignments. Because no definitive data exists on the future users of IH 35W or similar type facilities, the O&D analysis cannot predict the specific race, ethnicity, or economic status associated with the predicted trips on the toll or non-toll facilities. However, the O&D analysis can identify a potential difference in trip intensity by comparing the TSZ trip percentages of the No-Build and Build Alternatives.

Analysis of TSZs and Number of Trips Predicted to Utilize the IH 35W facility in 2035

Analysis of the O&D data for the 2035 Build and the 2035 No-Build Alternatives is discussed below.

- 2035 Build Main Lanes - Of the total 5,252 TSZs located within the O&D study area, 2,190 TSZs are anticipated to utilize the proposed IH 35W main lanes (i.e., general purpose lanes [non-toll]) with at least one trip per day (**Figure 7**). These TSZs are projected to generate 44,453 trips per day on the proposed main lanes. The number of projected trips from these TSZs varies from a high of 1,511 trips per day to a low of one trip per day in 2035. The TSZs were color-coded and mapped based on the number of trips per day from each TSZ that are predicted to utilize the proposed main lanes in 2035 (**Figure 8**).

- 2035 Build Managed Lanes - Of the total 5,252 TSZs located within the O&D study area, 533 TSZs are anticipated to utilize the proposed IH 35W managed (toll) lanes with at least one trip per day (**Figure 7**). These TSZs are projected to generate 3,117 trips per day on the proposed managed (toll) lanes. The number of projected trips from these TSZs varies from a high of 123 trips per day to a low of one trip per day in 2035. The TSZs were color-coded and mapped based on the number of trips per day from each TSZ that are predicted to utilize the proposed managed (toll) lanes in 2035 (**Figure 9**).

- 2035 No-Build - Of the total 5,252 TSZs located within the O&D study area, 2,060 TSZs would utilize the existing IH 35W facility in 2035 with at least one trip per day (**Figure 10**). These TSZs would generate 37,270 trips per day on the existing facility. The number of projected trips from these TSZs varies from a high of 1,098 trips per day to a low of one trip per day in 2035.

Data analysis indicates 42 percent of TSZs within the study area are expected to have at least one trip per day along the proposed IH 35W facility in 2035. The data also indicates that

approximately 10,300 additional trips per day would occur under the Build Alternative versus the No-Build Alternative.

Identification of Environmental Justice TSZs
A TSZ is defined as an EJ TSZ if one of the following conditions is met:

1. The minority population (any race/ethnicity except non-Hispanic white based on Census 2010 redistricting data) of the TSZ is greater than or equal to 50 percent.
2. The population of a TSZ was defined as having 50 percent or more of the TSZ population residing in a census block group where the 2009 median household income was below the 2009 poverty level of $22,050 established by the Department of Health and Human Services. Income data was based on 2005-2009 ACS data.
3. If the conditions of both 1 and 2 are met.

The cutoff of 50.0 percent was used to be consistent with federal guidelines. A total of 2,138 EJ TSZs were identified within the O&D study area. **Figures 11** and **12** show the EJ TSZs that would use the proposed main lanes (i.e., general purpose lanes [non-toll]) and managed (toll) lanes, respectively, of the IH 35W facility (originating at least one trip per day) per EJ type.

Analysis of EJ TSZs and Number of Trips Predicted to Utilize the IH 35W facility in 2035
Analysis of the O&D data for the 2035 Build and No-Build Alternatives focused on those EJ TSZs that are anticipated to utilize IH 35W with at least one trip per day in 2035. The analysis described below is summarized in **Table 15**.

- 2035 Build Main Lanes - Of the total 2,138 EJ TSZs within the O&D study area, there are 754 EJ TSZs anticipated to utilize the proposed IH 35W main lanes (i.e., general purpose lanes [non-toll]) with at least one trip per day (**Figure 7**). These EJ TSZs are projected to generate 6,530 trips per day on the main lanes (14.7 percent of total trips). The number of projected trips from these EJ TSZs varies from a high of 251 trips per day to a low of one trip per day in 2035. The EJ TSZs predicted to utilize the proposed main lanes in 2035 were color-coded and mapped based on the number of trips per day from each EJ TSZ (**Figure 13**).
- 2035 Build Managed Lanes - Of the total 2,138 EJ TSZs within the O&D study area, there are 111 EJ TSZs anticipated to utilize the proposed IH 35W managed (toll) lanes with at least one trip per day (**Figure 7**). These EJ TSZs are projected to generate 161 trips per day on the IH 35W managed (toll) lanes (5.2 percent of total trips). The number of projected trips from these EJ TSZs varies from a high of 23 trips per day to a low of one trip per day in 2035. The EJ TSZs predicted to utilize the proposed managed (toll) lanes in 2035 were color-coded and mapped based on the number of trips per day from each EJ TSZ (**Figure 14**).
- 2035 No Build - Of the total 2,138 EJ TSZs located within the O&D study area, 692 EJ TSZs would utilize the existing IH 35W facility in 2035 with at least one trip per day. These EJ TSZs are projected to generate 5,003 trips per day on the existing facility (13.4 percent of total trips). The number of projected trips from these EJ TSZs varies from a high of 214 trips per day to a low of one trip per day in 2035. The EJ TSZs predicted to utilize the existing facility in 2035 were color-coded and mapped based on the number of trips per day from each EJ TSZ (**Figure 15**).

Summary Analysis Results

Table 15 compares the 2035 Build and the 2035 No-Build O&D results and provides further information regarding users of the managed (toll) lanes versus the main lanes (i.e., general purpose lanes [non-toll]).

Table 15: Comparison of IH 35W Origin-Destination Data

Alternatives	Total TSZs Anticipated to Utilize IH 35W	Total TSZ Trips	Total EJ TSZs Anticipated to Utilize IH 35W	Total EJ TSZ Trips	% of EJ TSZ Trips of Total Trips
2035 Build Main Lanes	2,190	44,453	754	6,530	14.7
2035 Build Managed (toll) Lanes	533	3,117	111	161	5.2
2035 No-Build	2,060	37,270	692	5,003	13.4

Source: *NCTCOG TransCAD® data for 2035 Build and No-Build Alternatives*
The O&D study area (NCTCOG MPA) is comprised of 5,252 total TSZs and 2,138 EJ TSZs.

Data analysis indicates that of 47,570 total trips which originate from TSZs anticipated to utilize the proposed IH 35W facility; approximately 14.1 percent (6,691 trips) of the total trips originate from EJ TSZs. The total number of trips generated by TSZs anticipated to utilize the existing facility in 2035 is 37,270 trips. Approximately 13.4 percent, or 5,003 trips, originating from EJ TSZs are projected to utilize the existing IH 35W in 2035.

The EJ TSZ trip percentage indicates that a smaller proportion of managed (toll) lane users would originate from EJ TSZs compared to the Build main lane and No-Build users. The projected EJ TSZ Build main lane and No-Build overall trip percentages indicate EJ populations may utilize IH 35W in similar proportions in each scenario. The low EJ TSZ trip percentage for the Build managed (toll) scenario suggest that a majority of trips anticipated to utilize the proposed managed (toll) lanes would not originate from areas identified with high concentrations of EJ populations within the O&D study area. However, the total EJ TSZ trips would increase by 1,688 trips on the proposed Build facility (main and managed [toll] lanes) compared to the No-Build (existing) facility in 2035.

Tolling Effects to EJ Populations

HOV and SOV users of the IH 35W managed (toll) lanes would be tolled based on the regional tolling policy (**Appendix D**). The toll rate would vary and would likely use congestion pricing (toll rates that vary by time of day and level of congestion) to regulate the number of users on the facility.

There would be an economic impact to any motorist who utilizes the IH 35W managed (toll) lanes. The economic impact would be higher for low-income populations because the cost of paying tolls would represent a higher percentage of household income than for non-low-income populations.

Because of the greater economic burden of paying a toll, low-income populations would likely use the general purpose lanes (non-toll) and frontage roads. Motorists who use the general purpose lanes (non-toll) during peak hours may experience longer travel times than motorists using the managed (toll) lanes. Motorists using the frontage roads may experience longer travel times due to lower posted speed limits and traffic signals along the frontage roads.

The difference in travel times between the IH 35W managed (toll) lanes compared to the general purpose lanes (non-toll) would likely be highest during peak hours of travel when traffic

congestion within the IH 35W corridor would be the greatest. The adjacent general purpose lanes (non-toll) and frontage roads would be available for use; however, these lanes may be flowing at a slower speed than the tolled lanes due to posted speeds, signalization, or congestions.

The proposed added capacity from the general purpose lanes (non-toll), frontage roads, and managed (toll) lanes is intended to improve traffic mobility and reduce congestion as compared to the existing conditions. This benefit would be a positive effect to all motorists using the facility.

Access
Access to the main lanes of IH 35W would be available to all users. Access to the managed (toll) lanes would be limited to those who elect or can only on occasional basis afford to pay the toll. The IH 35W frontage road lanes would vary from four to eight travel lanes (two to four in each direction, See Table 8 for further information) and would provide a non-toll alternative, in addition to the six to eight general purpose lanes (non-toll), for motorists who do not elect or can only on occasional basis afford to travel the managed (toll) lanes. Under normal operating conditions, motorists (including emergency vehicles) using the frontage roads would experience longer travel times than motorists using either the non-toll main lanes or the managed (toll) lanes due to a lower posted speed limit and traffic signals along the frontage roads.

The difference in travel times between the managed (toll) lanes and the non-tolled main lanes would be the highest during peak periods of travel when traffic congestion within the IH 35W project limits would be the greatest. The RTC Managed Lane Policy (**Appendix D**), adopted in May 2006, requires a “speed guarantee” of 50 mph; therefore in conditions of congestion, the non-tolled main lanes would likely operate at speeds lower than 50 mph creating longer travel times for motorists utilizing the non-tolled main lanes compared to motorists traveling a minimum of 50 mph along the managed (toll) lanes. However, the overall added capacity the proposed project provides would relieve traffic congestion for all motorists using IH 35W whether they use the non-toll main lanes or frontage roads compared to the existing facility. Furthermore, motorists would have access to a greater number of non-toll main lanes within the project limits than currently exist (increase from four lanes to six/eight non-toll main lanes).

Non-Toll Alternatives
Although the proposed project would not distribute the benefits of time cost savings associated with the tolled managed/HOV lanes among all income groups evenly because lower income groups would pay a higher proportion of their income for tolls as compared to middle and higher income groups, alternative non-toll routes currently exist or would at the time the managed/HOV lanes would be open to traffic. The additional main lanes and frontage road lanes would provide non-tolled alternatives for motorists who do not elect or can only on an occasional basis afford to travel the tolled managed/HOV lanes. Motorists using the frontage road may experience longer travel times than motorists using the non-toll main lanes due to a lower posted speed limit and signalization. This difference in travel times between the tolled managed/HOV lanes and the non-tolled mainlanes and frontage roads would be the highest during peak periods of travel when traffic congestion within the proposed project limits would be greatest.

Transit Usage
The proposed project is not expected to adversely affect transit usage. IH 35W is located within The T service area. The T is a regional transportation authority that serves Tarrant County’s public transportation needs. Regularly scheduled trips service the proposed project limits.

Per RTC policy, should The T vehicles utilize the IH 35W managed (toll) lanes, no toll charges would be applied to The T. Transit vehicles would be exempt from toll charges along IH 35W. Managed (toll) lane users, including EJ populations (consisting of minority and/or low-income individuals), might decide to reduce their personal economic impact of tolls by using transit, where tolls would be waived for the transit provider. (See **Appendix D**: Managed Lane Policy.)

Economic Impacts of Tolling

Toll Rate

As mentioned previously, utilizing managed/HOV lanes would require toll collection for both single occupancy and HOV users. Policies for managed/HOV lane facilities were approved by the RTC in 2006 and are included in **Appendix D**.

According to this policy, a fixed-fee schedule would be applied during the first six months of operation and dynamic-fee pricing would be applied thereafter. Toll rates would be updated monthly during the fixed-fee schedule phase. The toll rate could be set up to $0.75 per mile during the fixed-fee schedule phase in accordance with current policy; however, that toll rate is not likely to be established as further discussed in the alternatives described below that correspond with the anticipated opening year of 2030. The actual established rate would be evaluated and adjusted, if warranted, with RTC approval.

Dynamic-fee pricing allows operators to set market-based toll rates based on corridor demand, and those rates could fluctuate at any time throughout the day, even in real time, in response to changing traffic conditions. The toll rate would be established to maintain a minimum average corridor speed of 50 mph. The policy includes a reduced toll rate (half price) that would be applied toward HOV users (two or more occupants [HOV2+]) and publicly operated vanpools during the AM and PM peak periods (weekday periods from 6:30 a.m. to 9:00 a.m. and from 3:00 p.m. to 6:30 p.m., respectively). This discount would phase out after the region reaches attainment for air quality.

The current regional long-range transportation plan, *Mobility 2035*, identifies and recommends a need to begin the transition to a managed lane system, while at the same time reviewing current policies regarding a possible shift in the occupancy definition from “2+” to “3+”, and also reviewing the need for additional management techniques which includes dynamic pricing. This is currently being studied with the desire that these changes begin as early as mid- to late 2013, to coincide with the phased opening of the region’s first permanent managed lanes as part of the LBJ Express project. The implementation of this change could shift to ensure the completion of appropriate technical analyses, environmental documentation, operational studies, and public notification and involvement.

For managed lanes with dynamic pricing, current policy (found at http://www.nctcog.org/trans/committees/rtc/ManagedLanePolicies_091307.pdf) stipulates that rebates would be paid if the average speed in a managed lane facility drops below 35 miles per hour over a predetermined amount of time. However, rebates would not apply if the speed reduction is out of the control of the operator of the managed lane (i.e., accidents, incidents, weather conditions). Current technical limitations exist which will prevent individual travelers or vehicles from receiving these rebates directly. Instead, the intent of the policy is that the rebate will likely be in the form of a specific corridor or system-level rebate, where monies collected will go back into improving the overall system, benefiting all drivers. Policies are being reviewed and developed by regional transportation agencies and the RTC which will further clarify and determine how the rebate is to be applied. This rebate language is included in the managed lane policies adopted by the RTC in 2006 (and subsequently modified).

Users of the tolled Managed/HOV lanes would be notified of the toll rate before entering the designated lanes by an electronic message board. Clearly posted overhead signage would designate the lane that drivers should use to enter and exit the facility. Mainlanes and frontage roads, including the proposed added capacity, would remain as non-tolled options for all users.

Express Lanes Demonstration Program Tolling Agreement
The IH 35W corridor (South and North Sections) from IH 30 to SH 114 has been approved as a demonstration project associated with the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) Express Lanes Demonstration Program (ELDP). The ELDP agreement between TxDOT and FHWA allows TxDOT (directly or through a third party public authority or private entity) to establish a toll that varies in price according to time of day or level of traffic, as appropriate, to manage congestion or improve air quality. TxDOT must audit the records of the managed lanes annually for compliance with the provisions of the ELDP and report the results to FHWA. In accordance with SAFETEA-LU, the performance goals and monitoring/reporting program set forth in the ELDP agreement may be amended as deemed desirable. As part of the monitoring and reporting program, TxDOT will prepare a document that describes the information to be collected, the methodology for identifying baseline values and approach for developing the annual reports that will assess facility performance. An annual report will be prepared by TxDOT and submitted to FHWA by March 31st of each year that documents processes and procedures and will include 1) project information; 2) performance highlights; 3) performance summary; and 4) performance details.

Toll rates for the IH 35W managed/HOV lanes would be determined prior to opening the facility to traffic. A toll revenue study, *Draft – Level 2 Traffic and Toll Revenue Study: North Tarrant Express Managed Lanes,* has been prepared to represent a range of toll revenue outcomes. Within this study, six alternatives were analyzed that represented the construction of various segments of the NTE project. Certain assumptions were identified in the Level 2 study in order to maintain consistency in the analysis and present measurable results. Alternative 4 was presented as the construction of all segments of the NTE, including the proposed project. The results associated with Alternative 4 will be used in the following analysis. Three scenarios will be utilized to illustrate the potential impacts associated with toll rates. Each scenario provides assumptions and an explanation of input variables used to arrive at the total cost impact to users of the proposed tolled managed/HOV lanes.

Anticipated toll rates and total cost impacts to users are provided for each scenario for the assumed opening year (2030). For each scenario, the average travel distance per household that would use the proposed tolled managed/HOV lanes on IH 35W from IH 820 to SH 114 would be 6 miles out of the total 10.5-mile section and would equate to 12 miles for a round trip. The 6-mile assumption of average travel distance using the proposed tolled managed/HOV lanes along the 10.5-mile length of the proposed project limits is derived from travel patterns identified in the traffic model of the *Draft – Level 2 Traffic and Toll Revenue Study: North Tarrant Express Managed Lanes*. These travel patterns were compared to O&D survey data collected from travelers using license plate matching methods, as needed. Toll rates applied to each scenario on the proposed tolled managed/HOV lanes are the optimum per mile toll rates calculated in the *Draft – Level 2 Traffic and Toll Revenue Study: North Tarrant Express Managed Lanes* based on revenue maximization and free-flow conditions in the managed lanes. Toll rates reflect the dynamic pricing concept of the tolled managed/HOV lanes associated with the proposed project and are a function of balancing the demand to use them, the value of time cost savings of their use to users, and users' willingness to pay to use the tolled managed/HOV lanes versus the cost of congestion experienced on the non-tolled lanes. The optimum toll rates fall within the RTC Managed Lanes Policy guidelines.

An assumed number of round trips are provided for each scenario that reflects the likely frequency of household use during the stated period based on O&D survey data collected from travelers using the IH 35W corridor and a similar analysis done for the IH 35E corridor in Dallas and Denton counties. The trip frequency data provided from the Level 2 study indicates that 3.8 trips per week for the afternoon peak scenario and 2.2 trips per week for the off-peak scenarios is the average number of trips made by users of the IH 35W corridor. However, the IH 35E analysis considered 2.5 trips per week for the afternoon peak scenario and 2 trips per week for the off-peak scenarios reasonable and indicative of the patterns shown with regard to existing high occupancy/toll (HOT) lane facilities. This determination was made based on four case study observations of similar operating projects involving HOT lane facilities. HOT lanes are those that give motorists in SOVs access to HOV lanes and implement a charge for their use of the lanes that varies based on the level of congestion in those lanes. The greater the level of congestion in HOT lanes, the higher the charge to use them. The goal of HOT lanes is to minimize traffic congestion by pricing the use of the lanes. From case study observations, it was revealed that most travelers only use the toll lanes when the perceived benefits of time cost savings and less congestion are equal to or exceed the toll charges. Because the managed lanes require payment for use, it is likely that the number of trips per week would be lower than what was identified by users of the existing facility through the O&D surveys. In order to keep this analysis comparable to the IH 35E analysis and other HOT case studies, 2.5 trips per week for the afternoon peak scenario and 2 trips per week for the morning peak and off-peak scenarios will be used.

Scenario 1 (Afternoon Peak, 4:30pm – 6:30pm)
Scenario 1 assumes that the toll rate at the time IH 35W would open to traffic in 2030 would be 63 cents per mile (pro-rated from the optimum toll rates reported in the *Level 2 Traffic and Toll Revenue Study: North Tarrant Express Managed Lanes*) and reflects the highest priced period for use of the tolled managed/HOV lanes among the three scenarios. Scenario 1 also assumes the average household would make 2.5 round trips per week during this peak period or 130 round trips per year. Under this scenario, the annual cost to the user based on the stated assumptions would be approximately $982.80 per year. A user with a Consumer Price Index (CPI)-adjusted (1.6 percent[1]) annual household income in 2030 of $75,970 based on the 2006-2010 ACS 5-Year Estimates reported median household income (in 2010 inflation-adjusted dollars) for Tarrant County ($55,306) would spend approximately 1.3 percent of his or her annual household income on IH 35W managed/HOV lane tolls. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $97,009 based on the ACS reported median household income for Denton County ($70,622) would spend approximately 1.0 percent of his or her annual household income on IH 35W managed/HOV lane tolls. However, households with CPI-adjusted incomes in 2030 of $30,217 based on the 2011 DHHS-established poverty level of $22,350 (for a family of four) would spend approximately 3.3 percent of their annual household income on IH 35W managed/HOV lane tolls, which would account for approximately 2.0 percent and 2.3 percent more of total household income than the median for Tarrant and Denton County households, respectively.

Scenario 2 (Morning Peak, 6:30am – 8:00am)
Scenario 2 assumes that the toll rate at the time IH 35W would open to traffic in 2030 would be 58 cents per mile and reflects the second highest priced period for use of the tolled managed/HOV lanes among the three scenarios. Scenario 2 also assumes the average household would make 2 round trips per week during this period or 104 round trips per year. Under this scenario, the annual cost to the user based on the stated assumptions would be

[1] http://www.bls.gov/news.release/cpi.nr0.htm; Consumer Price Index Survey – January 2011, previous 12-month increase for all items, pre-seasonal adjustment

approximately $723.84 per year. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $75,970 based on the ACS reported median household income for Tarrant County ($55,306) would spend approximately 0.6 percent of his or her annual household income on IH 35W managed/HOV lane tolls. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $97,009 based on the ACS reported median household income for Denton County ($70,622) would spend approximately 0.7 percent of his or her annual household income on IH 35W managed/HOV lane tolls. However, households with CPI-adjusted incomes in 2030 of $30,217 based on the 2011 DHHS-established poverty level of $22,350 (for a family of four) would spend approximately 2.4 percent of their annual household income on IH 35W managed/HOV lane tolls, which would account for approximately 1.8 percent and 1.7 percent more of total household income than the median for Tarrant and Denton County households, respectively

Scenario 3 (Off-Peak, 7:30pm – 6:30am)
Scenario 3 assumes that the toll rate at the time IH 35W would open to traffic in 2030 would be 12 cents per mile and reflects the lowest priced period for use of the tolled managed/HOV lanes among the three scenarios. Scenario 3 also assumes the average household would make 2 round trips per week during this period or 104 round trips per year. Under this scenario, the annual cost to the user based on the stated assumptions would be approximately $149.76 per year. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $75,970 based on the ACS reported median household income for Tarrant County ($55,306) would spend approximately 0.2 percent of his or her annual household income on IH 35W managed/HOV lane tolls. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $97,009 based on the ACS reported median household income for Denton County ($70,622) would spend approximately 0.2 percent of his or her annual household income on IH 35W managed/HOV lane tolls. However, households with CPI-adjusted incomes in 2030 of $30,217 based on the 2011 DHHS-established poverty level of $22,350 (for a family of four) would spend approximately 0.5 percent of their annual household income on IH 35W managed/HOV lane tolls, which would account for approximately 0.3 percent more of total household income than the median for Tarrant and Denton County households.

Under the three scenarios, all users of the tolled managed/HOV lanes at all income levels would realize a travel time savings benefit as opposed to using mainlanes along the IH 35W corridor. This travel time savings benefit would be more pronounced under the peak period scenarios in which increased traffic congestion on the mainlanes during that time would more pointedly warrant the use of the tolled managed/HOV lanes, which would be less congested. Under the off-peak scenario, a travel time savings benefit would still exist, although the benefit would be less profound during these periods when mainlanes are less congested. Changes in the toll rate along the facility are designed to balance the toll rate with the value of travel time cost savings. Tolled managed/HOV lane users could also decide to reduce their personal financial impact of tolls by carpooling or using transit in which tolls would be divided among many travelers or waived for the transit provider. Although the proposed project would not distribute the benefits of time cost savings associated with the tolled managed/HOV lanes among all income groups evenly because lower income groups would pay a higher proportion of their income for tolls as compared to middle and higher income groups, alternative project-specific non-toll options currently exist or would at the time the managed/HOV lanes would open. As discussed, project-specific non-toll options available to all groups, including low-income populations, would assist in offsetting the unequal distribution of travel time cost savings benefits based on income.

An ETC system would be implemented along the IH 35W managed/HOV lanes. The managed/HOV lanes would not offer “on-site” or automated cash payment options through toll

booths, toll plazas, toll stations, or toll gates. Instead, other methods of toll collection would be implemented as described below.

Methods of Toll Charge Collection

TxDOT TxTag® stickers, the NTTA TollTag® (Dallas area), and the Harris County Toll Road Authority (HCTRA) EZ TAG® (Houston area) would be accepted on the IH 35W tolled managed/HOV lanes. Toll charges could be automatically deducted from a prepaid credit account or would be mailed as a monthly statement to the driver if the video billing method is utilized. 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. The account would be a prepay account which means 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.

TxTag® Account Payment Methods

With a TxTag® "AutoPay" account, the user would pay a minimum installment of $29.65 ($20 credit and a $9.65 one time fee for the TxTag®) through a credit or debit card. The account would then be established with a $20 credit, which would be reduced each time the transponder passes through an operating toll gantry. The account holder's credit or debit card would be automatically charged when the funds in the "AutoPay" account exceed a pre-set threshold value. There is no fee for this service. A user can sign up for "AutoPay" by accessing the account online and providing credit or debit card information or by calling the TxTag® Customer Service Center.

For those who choose to maintain a prepaid TxTag® "Manual Pay" account, an initial deposit of $9.65 would be required for the toll transponder, as well as a $20 payment to establish the account. The account would then be established with a $20 credit, which would be reduced each time the transponder passes through an operating toll gantry. The user would be responsible for maintaining sufficient funds in his/her account to cover incurred toll charges. Toll rates would be the same as "AutoPay" account toll rates. "Manual Pay" accounts can be replenished via credit card, debit card, cash, or check/money order. Paying by credit or debit card can be handled online (http://www.TxTag.org), via the phone (1-888-468-9824), or at the TxTag® Customer Service Center located in Austin, Texas. Cash payments must be made at the TxTag® Customer Service Center in Austin. Check or money orders can be taken or mailed to the TxTag® Customer Service Center in Austin.

The TxTag® sticker must be permanently placed on the windshield and cannot be moved between vehicles without damaging the toll transponder. If a user has more than one vehicle, the user can order more transponders and manage them all through one account. Regardless of the user type, TxTag® accounts may be monitored free of charge via the internet. Should the user request a monthly invoice, a $1.00 charge per five pages invoiced would be incurred each month.

TollTag® Account Payment Methods

With a NTTA TollTag® prepaid "credit user" account, the driver would pay a minimum amount of $40 installment through a credit or debit card. The account would then be established with a $40 credit, which would be reduced each time the transponder passes through an operating toll gantry. When the driver's account reaches $10 or less, the "credit user" credit or debit card would again be charged $40 to automatically increase the available balance. Should the "credit user" lose or fail to surrender the TollTag® when the account is closed, the credit or debit card would be charged $25 to cover the cost of the transponder.

Similar to the TxTag® "Manual Pay" account, the NTTA also allows cash payments. 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. Per NTTA policy, this automatic deposit is 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. Cash payments can be made at the NTTA's TollTag® Store in Dallas, at the TollTag®, Customer Center in Plano or at any of the ACE Cash Express, Inc. locations in the DFW area. 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. The NTTA must receive payment at one of the TollTag® locations before the account reaches $0 to avoid the incurrence of toll violations.

The TollTag® may only be displayed in the vehicle specifically assigned to that TollTag®. The license plate number of a vehicle listed on the TollTag® account can not be registered on another TollTag® account. Regardless of the user type, TollTag® accounts may be monitored free of charge via the internet. Should the user request a monthly invoice, a $1.50 charge would be incurred each month.

Video Billing Payment Methods

Through a system known as video billing, it would still be possible to drive the tolled managed/HOV lanes of IH 35W without an electronic toll transponder or prepaid user account. The user's license plate would be recorded and matched to the state's vehicle registration file, and a monthly bill would be mailed to the registered owner of the vehicle for the accumulated toll charges. The toll rates for drivers without a toll transponder would include an additional percentage toll rate premium plus an incidental administrative fee commensurate with the costs related to processing the vehicle registration information.

The owner of the vehicle may be charged a toll rate premium of up to 45 percent, which is to offset the costs related to processing license plate information. In addition to this premium, incidental administrative fees would be incurred. These include such things as costs to prepare and mail the monthly statements.

In order to identify the potential economic impact to users of the managed lanes, the three scenarios analyzed for costs related to ETC have been analyzed as video billing scenarios by accounting for the assumed 45 percent surcharge to cover the anticipated additional cost of processing toll transactions. Each scenario provides assumptions and an explanation of input variables used to arrive at a total cost impact to users of the proposed tolled managed/HOV lanes. Anticipated toll rates and total cost impacts to users are provided for each scenario for the assumed opening year of 2030. For each scenario, the same assumptions related to average user travel distance on the tolled managed/HOV lanes, toll rate, and number of round trips as provided for the ETC scenarios also apply to the following three video billing scenarios.

Scenario 1 (Afternoon Peak, 4:30pm – 6:30pm)

Scenario 1 assumes that the toll rate at the time IH 35W would be open to traffic in 2030 would be 63 cents per mile and reflects the highest priced period for use of the tolled managed/HOV lanes among the three scenarios. Scenario 1 also assumes the average household would make 2.5 round trips per week during this peak period or 130 round trips per year. Under this scenario, the annual cost to the user based on the stated assumptions in addition to a 45 percent surcharge would be approximately $1,425.06 per year. A user with a CPI-

adjusted (1.6 percent) annual household income in 2030 of $75,970 based on the ACS reported median household income for Tarrant County ($55,306) would spend approximately 1.9 percent of his or her annual household income on IH 35W managed/HOV lane tolls. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $97,009 based on the ACS reported median household income for Denton County ($70,622) would spend approximately 1.5 percent of his or her annual household income on IH 35W managed/HOV lane tolls. However, households with CPI-adjusted incomes in 2030 of $30,217 based on the 2011 DHHS-established poverty level of $22,350 (for a family of four) would spend approximately 4.7 percent of their annual household income on IH 35W managed/HOV lane tolls, which would account for approximately 2.8 percent and 3.2 percent more of total household income than the median for Tarrant and Denton County households, respectively.

Scenario 2 (Morning Peak, 6:30am – 8:00am)
Scenario 2 assumes that the toll rate at the time IH 35W would open to traffic in 2030 would be 58 cents per mile and reflects the second highest priced period for use of the tolled managed/HOV lanes among the three scenarios. Scenario 2 also assumes the average household would make 2 round trips per week during this period or 104 round trips per year. Under this scenario, the annual cost to the user based on the stated assumptions in addition to a 45 percent surcharge would be approximately $1,049.57 per year. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $75,970 based on the ACS reported median household income for Tarrant County ($55,306) would spend approximately 1.4 percent of his or her annual household income on IH 35W managed/HOV lane tolls. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $97,009 based on the ACS reported median household income for Denton County ($70,622) would spend approximately 1.1 percent of his or her annual household income on IH 35W managed/HOV lane tolls. However, households with CPI-adjusted incomes in 2030 of $30,217 based on the 2011 DHHS-established poverty level of $22,350 (for a family of four) would spend approximately 3.5 percent of their annual household income on IH 35W managed/HOV lane tolls, which would account for approximately 2.1 percent and 2.4 percent more of total household income than the median for Tarrant and Denton County households, respectively.

Scenario 3 (Off-Peak, 7:30pm – 8:00am)
Scenario 3 assumes that the toll rate at the time IH 35W would be open to traffic in 2030 would be 12 cents per mile and reflects the lowest priced period for use of the tolled managed/HOV lanes among the three scenarios. Scenario 3 also assumes the average household would make 2 round trips per week during this period or 104 round trips per year. Under this scenario, the annual cost to the user based on the stated assumptions in addition to a 45 percent surcharge would be approximately $217.15 per year. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $75,970 based on the ACS reported median household income for Tarrant County ($55,306) would spend approximately 0.3 percent of his or her annual household income on IH 35W managed/HOV lane tolls. A user with a CPI-adjusted (1.6 percent) annual household income in 2030 of $97,009 based on the ACS reported median household income for Denton County ($70,622) would spend approximately 0.2 percent of his or her annual household income on IH 35W managed/HOV lane tolls. However, households with CPI-adjusted incomes in 2030 of $30,217 based on the 2011 DHHS-established poverty level of $22,350 (for a family of four) would spend approximately 0.7 percent of their annual household income on IH 35W managed/HOV lane tolls, which would account for approximately 0.4 percent and 0.5 percent more of total household income than the median for Tarrant and Denton County households, respectively.

The scenarios above demonstrate that not maintaining a pre-paid TxTag®, TollTag® or EZ TAG® account results in higher costs for those who utilize the video billing option. There is no

interest charged on unpaid tolls; however, there are delinquent penalty fees associated with an unpaid or delinquent bill. Common penalties are listed below:

Returned Check (Insufficient Funds)	$25.00
Administrative Fee - Violation Notice *	$5.00
Administrative Fee - Violation in Collections *	$25.00
Administrative Fee - Violation Sworn Complaint Issued *	$100.00

* Fee amounts are pending final determination and will be adjusted annually per Texas Administrative Code.

If the registered owner does not have a toll transponder, he/she would receive a bill every month for the balance. There is no minimum threshold for video billing to occur. As with the prepaid account, video billing would allow for cash, credit or debit payments.

Comparison of Payment Methods

Not maintaining a prepaid account would impact any user, including low-income users, because the cost of paying the accumulated toll charges without an account would represent a higher toll rate than toll charges affiliated with a prepaid account. Cash payment options are available for each payment method; however, only those users who maintain automatic and manual pay prepaid accounts would benefit from reduced toll rates compared to the video billing policy. Paying for the TxTag® by credit or debit card can be handled online (http://www.TxTag.org), via the phone (1-888-468-9824), or at the TxTag® Customer Service Center located in Austin, Texas. Cash payments can be made at the TxTag® Customer Service Center in Austin. Check or money orders can be taken or mailed to the TxTag® Customer Service Center in Austin.

In summary, toll rates are generally 45 percent higher 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.

Summary of Impacts to Environmental Justice Populations

No EJ populations were identified by Census data, through discussions with local planners or during the windshield survey. Impacts related to tolling have been analyzed and there would be an economic impact to low-income users of the proposed managed (toll) lanes, and the potential for longer travel times on the general purpose lanes (non-toll) or frontage roads compared to the managed (toll) lanes. However, the improved capacity on the proposed facility would improve mobility for all users compared to the existing facility. Based on the data provided, there are no disproportionately high or adverse impacts on minority or low-income populations; therefore, the requirements of EO 12898, pertaining to EJ, are satisfied.

Public Facilities and Services

No-Build Alternative

Implementation of the No-Build Alternative would not require displacement or relocation of any public facilities. Some community services, such as police and fire protection, may be negatively affected due to predicted increased traffic congestion resulting in reduced accessibility and increased travel time.

Build Alternative
Community resources along the proposed project boundaries (within a 0.25 mile radius) include one police storefront on Westport Parkway.

Implementing the Build Alternative would not displace any public facilities including schools, hospitals, police, or fire stations. Emergency public services would have a safer and more efficient facility to use in the performance of their various duties. Interruptions to public facilities and services during construction of the proposed project would be minimized through the use of appropriate traffic control and sequencing procedures. Enforcement and emergency vehicles would not be subjected to tolling on the managed lanes.

Detours
No-Build Alternative
Implementation of the No-Build Alternative would not require detours related to new construction. However, normal pavement and structure maintenance and repair would occur under this alternative. Temporary reduction of capacity and detour of traffic may occur as these maintenance procedures were implemented.

Build Alternative
Implementing the Build Alternative would require temporary detour and handling of traffic during construction. This would be planned during the construction plan preparation stage and coordinated during the construction stage. Traffic control planning and design would include efforts to maintain existing traffic capacity during peak travel periods and minimize detours. The temporary reduction of capacity and detour of traffic would be coordinated to ensure that substantial reduction in capacity and delay would not occur. Access to properties would be maintained at all times.

Utility Relocations / Adjustments
No-Build Alternative
Implementation of the No-Build Alternative would not require utility relocations or adjustments.

Build Alternative
Implementation of the Build Alternative may require the relocation and adjustment of utilities such as water lines, sewer lines, gas lines, telephone cables, electrical lines, and other subterranean and aerial utilities. The relocation and adjustment of any utilities would be coordinated with the affected utility provider to ensure that no substantial interruption of service would take place.

B. Natural Resources

Description of Natural Regions and Vegetation Type
The proposed project area is located within the Cross Timbers region and the Grand Prairie sub-region of Texas (Omernik, 1987). According to the Texas Parks and Wildlife Department's (TPWD) *Vegetation Types of Texas* (1984) maps, the proposed project area is within the Crops physiognomic region. Crops vegetation type is a statewide vegetation category that includes cultivated cover-crops and row crops utilized for food and/or fiber for humans or domesticated animals. However, the vegetation in portions of the proposed project area is not entirely consistent with the Crops physiognomic region. Urban regions reflect major metropolitan areas with vegetation usually restricted to road ROW areas, building landscapes, or undeveloped areas, and may be expected to include remnants of the land cover types that predate urbanization.

Portions of the study corridor have been developed over the past 10 years (**Figure 3**). Most of the native habitat has been replaced through the steady urban development (industrial, commercial, and residential). Land-use within the proposed project area is a mix of urban development with interspersed open fields; portions are cultivated, portions used for grazing, and portions left fallow. The dominant vegetation type is maintained vegetation in the form of mowed ROW and urban landscaping. Few areas of natural vegetation occur within or immediately adjacent to the proposed project area. Vegetation encountered during the survey was secondary growth following various types of man-made disturbances.

Non-maintained vegetation within or immediately adjacent to the proposed project area included fencerow vegetation and open undeveloped areas (exhibiting grassland and scattered sapling-shrub vegetation, pasture, and cultivated fields). Project area photographs provided in **Figure 16** provides a sample of the vegetation types along the proposed project corridor. Scattered small, low quality riparian areas are present at two of the stream crossings. The dominant vegetation observed in these areas consisted of a mix of native and non-native woody and herbaceous species. Predominant fencerow species are sugarberry (*Celtis laevigata*), bois d'arc (*Maclura pomifera*), and Eastern red cedar (*Juniperus virginiana*). Riparian species comprise sugarberry saplings, eastern cottonwood (*Populus deltoides*), and black willow (*Salix nigra*). Scattered landscape trees along the project corridor consist of live oak (*Quercus fusiformis*), Shumard's oak (*Quercus shumardii*), cedar elm (*Ulmus crassifolia*), crape myrtle (*Lagerstroemia indica*), and Eastern redbud (*Cercis canadensis*). The sapling-shrub-grassland areas were scattered with species of mesquite (*Prosopis glandulosa*), black locust (*Robinia pseudoacacia*), sugarberry, and bois d' arc. Herbaceous vegetation includes Bermuda grass (*Cynodon dactylon*), Johnson grass (*Sorghum halepense*), perennial rye grass (*Lolium perenne*), little bluestem (*Schizachyrium scoparium*), switchgrass (*Panicum virgatum*), wild mustard (*Sinapis arvensis*), hairyfruit chervil (*Chaerophyllum tainturieri*), stickywilly (*Galium aparine*), common sunflower (*Helianthius annuus*)), giant ragweed (*Ambrosia trifida*), annual ragweed (*Ambrosia artemisiifolia*), western ragweed (*Ambrosia psilostachya*), and Canada goldenrod (*Solidago canadensis*).

Vegetation Description and Impacts

No-Build Alternative

Implementation of the No-Build Alternative would not impact native and non-native vegetation in the proposed project area. If the No-Build Alternative were implemented, the existing facilities and clear zones would be mowed and maintained at the current maintenance intervals. The No-Build Alternative would not result in any conversion of land to transportation use.

Build Alternative

Field surveys of vegetation in the proposed project corridor showed that the vegetation within the existing and proposed ROW is more consistent with a predominantly urban environment, interspersed with remnants of pre-urbanization woodland scrub-shrub and to a limited extent, prairie-type vegetation.

Maintained vegetation: Nearly all of the vegetation (406.5 acres; approximately 86.7 percent) within the existing and proposed ROW is mowed and maintained grassland, at times interspersed with a variety of broadleaf herbaceous plants. The dominant species throughout the ROW is Bermuda grass. The most commonly occurring associated grass species observed include Johnson grass, little bluestem, dallis grass (*Paspalum dilatatum*), perennial ryegrass, hairy crabgrass (*Digitaria sanguinalis*), and silver bluestem (*Bothriochloa saccharoides*). Common forbs identified in the maintained ROW are henbit (*Lamium amplexicaule*), sow thistle (*Sonchus asper*), wood sorrel (*Oxalis dillenii*), Carolina geranium (*Geranium carolinianum*), meadow garlic (*Allium canadense*), western ragweed, giant ragweed, and annual ragweed.

Maintained areas are dominated by Bermuda grass. Scattered ornamental landscaped trees are live oak, Shumard oak, eastern redbud, and crape myrtle. The diameter at breast height (dbh) for these trees range from 1 to 14 inches dbh (6-inch average dbh). These tree landscaped areas are sporadic and isolated along the length of the proposed project; primarily present where development has occurred. There are two large sugarberry trees located within this section that exhibit dbh's for 28-inch and 32-inches respectively. The locations of these two trees are shown on **Figure 4**. Maintained grasses and landscaped trees similar to those previously described comprise the majority of vegetation along the proposed project. Larger, 12- to 14-inch dbh live oak and Shumard oak (average dbh is 13 inches) are more frequent, particularly bordering retail and restaurant areas such as Wendy's, Denny's and 7-11 (**Figure 16, Photograph 7**). The trees range in height from 25 to 75 feet and percent canopy cover is approximately 15 to 20 percent.

Woody vegetation comprises a portion of the proposed project including fencerow vegetation, one riparian area, and areas of scattered tree/scrubby/sapling, shrub, and herbaceous vegetation (unmaintained). Flora consists of the previously mentioned vegetation in addition to bushy bluestem (*Andropogon glomeratus*), love grass (*Eragrostis intermedia*) and switchgrass, Additional broadleaf herbaceous plants commonly observed are broom weed (*Amphiachyris dracunculoides*), Queen Anne's lace (*Daucus carota*), meadow garlic, thistle species (*Carduus* or *Cirsium spp*.), nightshade species (*Solanum spp.*), Canada goldenrod, numerous aster species (*Aster spp*), common sunflower, Texas prickly pear (*Opuntia lindheimeri*), eryngo (*Eryngium leavenworthii*), buffalo bur (*Solanum rostratum*), curly dock (*Rumex crispus*), cockle-bur (*Xanthium strumarium*), and southern dewberry (*Rubus trivialis*). Scattered woody vegetation in the unmaintained grassland was previously discussed. Dominant fencerow species were previously discussed. Dominant understory species are saw greenbrier (*Smilax bona-nox*), poison ivy (*Toxicodendron radicans*), and Johnson grass.

Impacts of the proposed project on the habitat types within the study area corridor are provided in **Table 16**. These impacts are associated with clearing of existing vegetation cover as required for the construction of the travel lanes, frontage roads, ramps, connectors, safety clear zone, and bridges. The wooded and riparian vegetation would be permanently impacted due to not only the aforementioned activities, but additionally by construction phasing, storage, and staging activities. The impacts are summarized separately for areas within the proposed ROW and drainage easements and for areas within existing ROW.

Table 16: Vegetation Impacts

Habitat Type	Approximate Acres Within Existing ROW	Approximate Acres Within Proposed ROW and Drainage Easements	Total Acreage Impacted	% of Total Impacts
Maintained Vegetation	371.5	35.0	406.5	86.7
Unmaintained Vegetation[1]	4.2	57.9	62.1	13.1
Riparian Vegetation	0.3	0.2	0.2[2]	0.1
Total	**376.0**	**93.1**[3]	**468.8**	**100%**

[1]Unmaintained vegetation is comprised of grassland and scattered sapling-scrub-shrub vegetation, pasture, cultivated fields, and fencerow vegetation.
[2]An additional 0.3 acre of riparian area is located within the existing ROW but would not be impacted by the proposed project.
[3]The total amount of proposed ROW and easements is 98 acres; however, approximately 4.9 acres are waters of the U.S. and not vegetation.

Unusual habitat features as outlined in the TxDOT-TPWD Memorandum of Agreement (MOA) for the *Finalization of the 1998 Memorandum of Understanding (MOU) Concerning Habitat Descriptions and Mitigation*, were observed in areas that are expected to be impacted by the

proposed project. The only special habitat features (as defined in the MOA) occurring in the study area are water bodies.

Unmaintained vegetation: Vacant unmaintained land within the existing and proposed ROW and drainage easements is comprised of upland semi-wooded areas. These areas are dominated by scrubby scattered tree growth. These areas are primarily open with some scattered trees such as mesquite, black locust, eastern red cedar, bois d'arc, and sugarberry. There is one area dominated by Roosevelt weed (*Baccharis neglecta*). Dominant herbaceous species are consistent with those previously described.

Fencerow vegetation: The fencerow vegetation is consistently narrow (three feet wide) with the dominant species being sugarberry, bois d'arc, and occasionally eastern red cedar (**Figure 16, Photograph 6**). Understory vegetation is primarily saw greenbrier, poison ivy, and Johnson grass. **Figure 4** provides the locations of these woody fencerow areas. Approximately 7 acres of fencerow vegetation are present along the proposed project. Size of these fencerow trees range from sapling to 12–inch dbh with the average dbh being 6 inches. Tree height ranges from 25 to 50 feet and the percent canopy cover is approximately 15 percent.

Riparian vegetation:
Two small areas of low quality riparian habitat are present within the proposed ROW comprising approximately 0.2 acre (**Figure 4, sheets 14 & 26**). These areas are dominated by sugarberry, 2 to 8 inches dbh; black willow, 2 to 6 inches dbh; and eastern cottonwood saplings to 12-inch dbh (**Figure 16, photos 13 & 14**). Average dbh is 6 inches. Tree height ranges from 25 to 60 feet and percent canopy cover is approximately 15 percent. Herbaceous species are predominantly southern cattail (*Typha domingensis*), switchgrass, and bushy bluestem. An additional 0.3 acre of riparian area is located within the existing ROW but would not be impacted by the proposed project. Non-woody riparian areas at water crossings are dominated by Canada goldenrod, Johnson grass, Bermuda grass, giant ragweed, and annual ryegrass. These areas are captured on the wetland data forms provided in **Appendix A**.

Water bodies:
The proposed project crosses 15 water bodies. Eight of these water bodies have wetland areas within the ordinary high water mark (OHWM). Three of the water bodies would not be impacted.

- Three unnamed intermittent tributaries to Henrietta Creek – no impacts;
- One perennial stream (Henrietta Creek) and on-channel wetland area;
- One on-channel wetland at Buffalo Creek;
- Two unnamed intermittent tributaries to Buffalo Creek;
- One on-channel wetland area at the unnamed intermittent tributary to Big Bear Creek;
- One intermittent stream (Big Bear Creek) and on-channel wetland area;
- One unnamed intermittent tributary to Big Fossil Creek and on-channel wetland area;
- Two on-channel wetland areas at the unnamed intermittent tributaries to Big Fossil Creek;
- One unnamed intermittent tributary to Big Fossil Creek and on-channel wetland area;
- One perennial stream (Big Fossil Creek); and,
- One intermittent tributary to Big Fossil Creek.

Each water body is identified on **Figures 2** and **4.** Permanent impacts within the OHWM are expected to occur within 12 of these water bodies during roadway, culvert and bridge widening and construction. All waters and their expected impacts are presented in **Table 19**. Vegetative

habitat features are discussed by sections as described in **Section III – Description of Proposed Facility**.

Mitigation for the loss of riparian habitat and other unique or special features (large trees in woodland habitat) would be in accordance with Provision (4) (A) (ii) of the MOA between TxDOT and TPWD. This states that some habitats may be given consideration for non-regulatory mitigation during project planning (at the TxDOT District's discretion). Habitats given consideration for non-regulatory mitigation during project planning include the following:

- Habitat for federal candidate species (impacted by the proposed project) if mitigation would assist in prevention of the listing of the species;
- Rare vegetation series (S1, S2, or S3) that also provides habitat for a 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 sites; and,
- Any other habitat feature considered locally important that the TxDOT District chooses to consider.

The only habitats located within the proposed project corridor given consideration for non-regulatory mitigation are the two riparian areas of the ephemeral streams. Impacts to these areas would be limited to approximately four trees that are 6 to 12-inch dbh or greater. Compensatory mitigation for these impacts is not being offered because impacts would be minor (approximately 0.2 acre) and the riparian areas are poor quality with low species composition. Riparian vegetation observed adjacent to the proposed project that would not be disturbed is similar in composition and structure to that which would be removed.

During construction, TxDOT would minimize the amount of wildlife habitat disturbed. During final design, portions of the riparian areas and landscaped trees may not require clearing if they are beyond the safety clear zone, or in areas where guard fencing may be used, or if other design options are found practicable for preserving these areas and trees.

Invasive Species/Beneficial Landscaping

Permanent soil erosion control features would be constructed as soon as feasible during the early stages of construction through proper sodding and/or seeding techniques. Disturbed areas would be restored and stabilized as soon as the construction schedule permits and temporary sodding would be considered where large areas of disturbed ground would be left bare for a considerable length of time. In accordance with EO 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping, seeding and replanting with TxDOT approved seeding specifications that are in compliance with EO 13112 would be done where possible. Moreover, abutting turf grasses within the ROW are expected to re-establish throughout the proposed project length. Soil disturbance would be minimized to ensure that invasive species would not establish in the ROW.

Threatened and Endangered Species

No-Build Alternative

Implementation of the No-Build Alternative would have no effect on any federally listed species, its habitat, or designated critical habitat, nor would it adversely affect any state listed species or species of concern.

Build Alternative

The Natural Diversity Database (NDD), available through the TPWD, was consulted on December 8, 2011 to determine if any threatened/endangered or rare species, or managed areas have been recorded within the proposed project area. According to NDD data, no sightings are recorded within 1.5 miles of the proposed action. The Grapevine Lake Management Area is located approximately 1.2 miles northeast of the proposed project. The proposed expansion would not impact this managed area. Sightings recorded greater than 1.5 miles, but less than 10 miles from the proposed action can be found in **Table 17**. The proposed expansion would not impact these communities. The Eagle Mountain Lake State Recreation Area, a managed area, is recorded greater than 1.5 miles, but less than 10 miles from the proposed action. The proposed project would not impact this managed area. Due to the limitations of NDD information, the results of the database search cannot be interpreted as presence/absence data.

Table 17: Element Occurrence List

EO ID	Scientific Name	Common Name
2868	*Carya illinoensis-Celtis laevigata* series	Pecan-sugarberry series
7015	*Dalea reverchonii*	Comanche Peak prairie-clover
997	*Quercus buckleyi* series	Texas oak Series
4990	*Quercus fusiformis/Schizachyrium scoparium* series	Plateau live oak/little bluestem series
2127	*Quercus stellata-Quercus marilandica* series	Post oak-blackjack oak series
2746	*Quercus stellata-Quercus marilandica* series	Post oak-blackjack oak series
1726	*Quercus stellata-Quercus marilandica* series	Post oak-blackjack oak series
7373	*Rookery*	
3282	*Rookery*	
3077	*Schizachyrium scoparium-Sorghastrum nutans* series	Little bluestem-Indiangrass series
502	*Schizachyrium scoparium-Sorghastrum nutans* series	Little bluestem-Indiangrass series
5905	*Schizachyrium scoparium-Sorghastrum nutans* series	Little bluestem-Indiangrass series
2766	*Ulmus crassifolia-Celtis laevigata* series	Cedar elm-sugarberry series

Source: *TxNDD December 8, 2011*

Absence of information in an area does not mean absence of occurrence. Given the small proportion of public versus private land in Texas, the NDD does not include a representative inventory of rare resources in the state. Data from the NDD do not provide a definitive statement as to the presence, absence, or condition of special species, natural communities, or other significant features within your project area. These data cannot substitute for an on-site evaluation by qualified biologists.

A review of state and federal lists of threatened and endangered species for Tarrant and Denton Counties was performed. On December 18 and 19, 2008 and January 20, 2011, qualified biologists conducted field reconnaissance. The federal and state-listed threatened and endangered species of Tarrant and Denton Counties are shown in **Table 18**. A discussion of the species that might be affected or impacted by the Build Alternative, if implemented, follows the table.

Table 18: Federal, State Listed Threatened/Endangered Species, and Texas Parks and Wildlife Department's Species of Concern, Tarrant and Denton Counties						
SPECIES	FEDERAL STATUS	STATE STATUS	DESCRIPTION OF SUITABLE HABITAT	HABITAT PRESENT	SPECIES EFFECT	SPECIES IMPACT
BIRDS						
American Peregrine Falcon *Falco peregrinus anatum*	—	T	Year-round resident and local breeder in west Texas, nests in tall cliff eyries; also, migrant across state from more northern breeding areas in US and Canada, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No	--	There is no habitat present such as cliff eyries. No impacts are anticipated.
Arctic Peregrine Falcon *Falco peregrinus tundrius*	—	—	Migrant throughout state from subspecies' far northern breeding range, winters along coast and farther south; occupies wide range of habitats during migration, including urban, concentrations along coast and barrier islands; low-altitude migrant, stopovers at leading landscape edges such as lake shores, coastlines, and barrier islands.	No	- -	There is no habitat present such as lake shores, coastlines, and barrier islands. No impacts are anticipated.
Bald Eagle *Haliaeetus leucocephalus*	—	T	Found primarily near rivers and large lakes; nests in tall trees or on cliffs near water; communally roosts, especially in winter; hunts live prey, scavenges, and pirates food from other birds.	No	- -	There is no habitat present such as large lakes and cliffs. No impacts are anticipated.
Henslow's Sparrow *Ammodramus henslowii*	—	—	Wintering individuals (not flocks) found in weedy fields or cut-over areas where lots of bunch grasses occur along with vines and brambles; a key component is bare ground for running/walking.	No	--	There is no habitat present such as bunch grasses with vines and brambles. No impacts are anticipated.

Table 18: Federal, State Listed Threatened/Endangered Species, and Texas Parks and Wildlife Department's Species of Concern, Tarrant and Denton Counties						
SPECIES	FEDERAL STATUS	STATE STATUS	DESCRIPTION OF SUITABLE HABITAT	HABITAT PRESENT	SPECIES EFFECT	SPECIES IMPACT
Interior Least Tern *Sterna antillarum athalassos*	E	E (Tarrant County only)	Subspecies is listed only when inland (more than 50 miles from a coastline); nests along sand and gravel bars within braided streams, rivers; also know to nest on man-made structures (inland beaches, wastewater treatment plants, gravel mines, etc); eats small fish and crustaceans, when breeding forages within a few hundred feet of colony.	No	No effect	There is no habitat present such as gravel barriers within braided streams. No impacts are anticipated.
Peregrine Falcon *Falco peregrinus*	—	T	Both subspecies migrate across the state from more northern breeding areas in US and Canada to winter along coast and farther south; subspecies (*F. p. anatum*) is also a resident breeder in west Texas; the two subspecies' listing statuses differ, thus the species level shows this dual listing status; because the subspecies are not easily distinguishable at a distance, reference is generally made only to the species level; see subspecies for habitat.	No	--	There is no habitat present such as cliff eyries. No impacts are anticipated.
Piping Plover *Charadrius melodus*	E, T (Denton County only)		Wintering migrant along the Texas Gulf Coast: beaches and bayside mud or salt flats.	No	No effect	There is no habitat present such as beaches and bayside mud or salt flats. No impacts are anticipated.
Sprague's Pipit *Anthus spragueii*	C*		Only in Texas during migration and winter, mid September to early April; short to medium distance, diurnal migrant; strongly tied to native upland prairie, can be locally common in coastal grasslands, uncommon to rare further west; sensitive to patch size and avoids edges.	No	No effect	There is no habitat present such native upland prairie and coastal grasslands.
Western Burrowing Owl *Athene cunicularia hypugaea*	—		Open grasslands, especially prairie, plains, and savanna, sometimes in open areas such as vacant lots near human habitation or airports; nests and roosts in abandoned burrows.	No	--	Species is primarily found in the western 2/3 of the state. No impacts are anticipated.

Table 18: Federal, State Listed Threatened/Endangered Species, and Texas Parks and Wildlife Department's Species of Concern, Tarrant and Denton Counties						
SPECIES	FEDERAL STATUS	STATE STATUS	DESCRIPTION OF SUITABLE HABITAT	HABITAT PRESENT	SPECIES EFFECT	SPECIES IMPACT
White-faced Ibis *Plegadis chihi*	—	T (Denton County only)	Prefers freshwater marshes, sloughs, and irrigated rice fields, but will attend brackish and saltwater habitats; nests in marshes, in low trees, on the ground in bulrushes or reeds, or on floating mats.	No	--	There is no habitat present such as freshwater marshes and sloughs. No impacts are anticipated.
Whooping Crane *Grus americana*	E, EXPN	E	Potential migrant via plains throughout most of state to coast; winters in coastal marshes of Aransas, Calhoun, and Refugio counties.	No	No effect	There is no habitat present, such as coastal marshes. No impacts are anticipated.
Wood Stork *Mycteria americana*	—	T (Denton County only)	Forages in prairie ponds, flooded pastures, or fields, ditches, and other shallow standing water, including salt-water; usually roosts communally in tall snags, sometimes in association with other wading birds; breeds in Mexico and birds move into the Gulf States in search of mud flats and other wetlands, even those associated with forested areas; formerly nested in Texas, but no breeding records since 1960.	No	--	There is no habitat present such as prairie ponds or flooded pastures. No impacts are anticipated.
FISHES						
Shovelnose sturgeon *Scaphirhynchus platorynchus*	—	T (Tarrant County only)	Open, flowing channels with bottoms of sand or gravel; spawns over gravel or rocks in an area with a fast current; Red River below reservoir and rare occurrence in Rio Grande.	No	--	There is no habitat present. No impacts are anticipated.
MAMMALS						
Gray wolf *Canis lupus*	E* (Tarrant County only)	E (Tarrant County only)	Extirpated; formerly known throughout the western two-thirds of the state in forests, brushlands, or grasslands.	No	No effect	Extirpated species, last known occurrences in Texas was Brewster County in 1970. No impacts are anticipated.

Table 18: Federal, State Listed Threatened/Endangered Species, and Texas Parks and Wildlife Department's Species of Concern, Tarrant and Denton Counties						
SPECIES	FEDERAL STATUS	STATE STATUS	DESCRIPTION OF SUITABLE HABITAT	HABITAT PRESENT	SPECIES EFFECT	SPECIES IMPACT
Plains spotted skunk *Spilogale putorius interrupta*	—		Catholic; open fields, prairies, croplands, fence rows, farmyards, forest edges, and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Yes	--	Some suitable habitat noted; however, no known occurrences have been documented in Tarrant County. No impacts are anticipated.
Red wolf *Canis rufus*	E*	E	Extirpated; formerly known throughout eastern half of Texas in brushy and forested areas, as well as coastal prairies.	No	No effect	There is no habitat present. No impacts are anticipated.
MOLLUSKS						
Fawnsfoot *Truncilla donaciformis*	—		Small and large rivers especially on sand, mud, rocky mud, and sand and gravel, also silt and cobble bottoms in still to swiftly flowing waters; Red (historic), Cypress (historic), Sabine (historic), Neches, Trinity, and San Jacinto River basins.	No	--	There is no habitat present such as rivers. No impacts are anticipated.
Little spectaclecase *Villosa lienosa*	—		Creeks, rivers, and reservoirs, sandy substrates in slight to moderate current, usually along the banks in slower currents; east Texas, Cypress through San Jacinto River basins.	Yes	--	May impact. Individuals could be adversely impacted during construction; however, best management practices (BMPs) would minimize potential impacts. There is potential habitat present such as creeks, rivers, or reservoirs.

Table 18: Federal, State Listed Threatened/Endangered Species, and Texas Parks and Wildlife Department's Species of Concern, Tarrant and Denton Counties						
SPECIES	FEDERAL STATUS	STATE STATUS	DESCRIPTION OF SUITABLE HABITAT	HABITAT PRESENT	SPECIES EFFECT	SPECIES IMPACT
Louisiana pigtoe *Pleurobema riddellii*	—	T	Streams and moderate-size rivers, usually flowing water on substrates of mud, sand, and gravel; not generally known from impoundments; Sabine, Neches, and Trinity (historic) River basins.	Yes	--	May impact. Individuals could be adversely impacted during construction; however, BMPs would minimize potential impacts. There is potential habitat present such as streams and moderate sized rivers.
Texas heelsplitter *Potamilus amphichaenus*	—	T	Quiet waters in mud or sand and also in reservoirs. Sabine, Neches, and Trinity River basins.	Yes	--	May impact. Individuals could be adversely impacted during construction; however, BMPs would minimize potential impacts. There is potential habitat present such as quiet perennial streams.
Wabash pigtoe *Fusconaia flava*	—	(Denton County only)	Creeks to large rivers on mud, sand, gravel from all habitats except deep shifting sands; found in moderate to swift current velocities; east Texas River basins, Red through San Jacinto River basins; elsewhere occurs in reservoirs and lakes with no flow.	No	--	There is no habitat present such as creeks to large rivers with moderate to swift current velocities. No impacts are anticipated.
REPTILES						
Texas garter snake *Thamnophis sirtalis annectens*	—		Wet or moist microhabitats are conducive to the species occurrence, but are not necessarily restricted to them; hibernates underground or in or under surface cover; breeds March-August.	Yes	--	May impact. There is potential habitat present such as wet or moist microhabitats within the construction limits of the Build Alternative.

Table 18: Federal, State Listed Threatened/Endangered Species, and Texas Parks and Wildlife Department's Species of Concern, Tarrant and Denton Counties						
SPECIES	FEDERAL STATUS	STATE STATUS	DESCRIPTION OF SUITABLE HABITAT	HABITAT PRESENT	SPECIES EFFECT	SPECIES IMPACT
Texas horned lizard *Phrynosoma cornutum*	—	T	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; burrows into soil, enters rodent burrows, or hides under rock when inactive; breeds March-September.	Yes	--	May impact. There is potential habitat present such as open areas with sparse vegetation within the construction limits of the Build Alternative.
Timber/ Canebrake rattlesnake *Crotalus horridus*	—	T	Swamps, floodplains, upland woodlands, riparian zones, abandoned farmland; prefers dense ground cover, i.e., grapevines or palmetto.	No	--	There is no habitat present such as swamps, upland woodlands or dense ground cover. No impacts are anticipated.
PLANTS						
Glen Rose yucca *Yucca necopina*	—		Texas endemic; grasslands on sandy soils and limestone outcrops; flowering April-June.	No	--	There is no habitat present such as clayey soil on top of limestone. No impacts are anticipated.
E – Endangered T – Threatened EXPN – Experimental C – Candidate "–" – No designation occurring within identified county "blank" – Rare, but with no regulatory listing status "- -" – No determination of effect or impact required because species lacks federal and/or state listing status "*" – TPWD T&E species list indicates species could be present in identified county; however, USFWS T&E species list does not indicate a listing status for the species in the county.						
Source: *U.S. Fish & Wildlife Service (November 1, 2011), Texas Parks & Wildlife Department, Wildlife Division, Diversity and Habitat Assessment Programs, County Lists of Texas Special Species (Tarrant and Denton, February 28, 2011), and Field Visit (December 18 and 19, 2008 and January 20, 2011).*						

After reviewing habitat requirements and conducting a field reconnaissance, it was determined that the proposed Build Alternative, if implemented, would have no effect on any federally listed species, its habitat, or designated critical habitat. However, construction of the Build Alternative, if implemented, would have the potential to impact the following state-listed or rare species and their habitats as shown in **Table 18**. Coordination with TPWD resulted in concurrence in that a more comprehensive survey is not needed for state-listed species. Therefore, no further action is warranted.

Mollusks

No mollusks or broken shells were observed during the field reconnaissance of the creeks and tributaries within the limits of the proposed Build Alternative; however, a comprehensive biological survey for the presence of mollusks was not conducted. Based on the mollusk habitat requirements shown in **Table 18**, it is assumed that all of the creeks and tributaries shown in **Table 19** could contain habitat capable of supporting the following mollusks:

- Little spectaclecase
- Louisiana pigtoe
- Texas Heelsplitter

During construction of the proposed Build Alternative, if implemented, there is the potential for temporary impacts to the mollusks and habitats from adverse water quality conditions from construction area storm water runoff. However, BMPs would minimize potential impacts. It is anticipated that cofferdams and associated dewatering activities would be conducted so that heavy equipment could be placed on the streambeds to construct the bridges. Construction of the 10 culvert crossings associated with the proposed Build Alternative, if implemented, would permanently impact mollusks and habitat at the proposed culvert locations.

If the proposed Build Alternative is implemented, mitigation for project impacts that might occur to mollusk habitats would consist of the water quality measures discussed in **Section V.B. – Water Quality Issues**. The proposed project Storm Water Pollution Prevention Plan (SW3P) would specify temporary and permanent erosion control measures, as well as drainage and discharge control. The SW3P would include erosion, sediment, and post-construction Total Suspended Solids (TSS) control better management practicies (BMP) such as the application of temporary vegetation for erosion control, installation of silt fences combined with rock berms for sedimentation control, and installation of vegetative filter strips and vegetation lined drainage ditches control post-construction TSS. To further protect water quality, soil disturbances would be limited to minimize excessive erosion and avoid sedimentation outside of the ROW and drainage easements. The existing vegetation would be preserved wherever possible.

The contractor would take appropriate measures to prevent, minimize and control spillage of hazardous materials in the construction staging area so that these materials do not migrate into creeks and streams. Efforts would also be made to prevent permanent water pollution by reducing fertilizer and pesticide use during the installation and maintenance of landscaping. These water quality measures would minimize impacts to mollusk habitats.

Texas Garter Snake

No Texas garter snakes were observed during the field reconnaissance of the proposed Build Alternative; however, a comprehensive biological survey for the presence of the Texas garter snake was not conducted. Based on the Texas garter snake's habitat requirements shown in **Table 18**, all of the water crossings shown in **Table 19** could contain wet or moist microhabitats that might serve as Texas garter snake habitat.

During construction of the proposed Build Alternative, if implemented, there would be temporary impacts to streams which could serve as Texas garter snake habitat. After construction, the impacted areas of these streams would be returned to preconstruction contours and any Texas garter snake habitat would reestablish itself. There are also ample streams and wetlands outside of the proposed construction limits of the proposed Build Alternative that could serve as Texas garter snake habitat to replace the permanently impacted habitat.

Texas Horned Lizard

No Texas horned lizards were observed during the field reconnaissance within the limits of the proposed Build Alternative; however, a comprehensive biological survey for the presence of Texas horned lizard was not conducted. Based on the Texas horned lizard's habitat requirements shown in **Table 18**, the proposed project has the potential to contain Texas horned lizard habitat (open areas with sparse vegetation).

During construction of the proposed Build Alternative, if implemented, there would be temporary impacts to open areas with sparse vegetation which could serve as Texas garter snake habitat. After construction, the impacted areas would be returned to preconstruction contours. There are also ample of open areas with sparse vegetation outside of the proposed construction limits of the proposed Build Alternative that could serve as Texas garter snake habitat to replace the permanently impacted habitat.

Migratory Birds

No-Build Alternative

Implementation of the No-Build Alternative would have no effect on migratory birds, their nests, eggs, or young.

Build Alternative

The Migratory Bird Treaty Act states that it is unlawful to kill, capture, collect, possess, buy, sell, trade, or transport any migratory bird, nest, young, feather, or egg in part or in whole, without a federal permit issued in accordance within the Act's policies and regulations. Migration patterns would not be affected by the proposed project. The contractor would remove all old migratory bird nests from any structure where work would be done from September 1 through the end of February. In addition, the contractor would be prepared to prevent migratory birds from building nests between March 1 and August 31, per the Environmental Permits, Issues and Commitments (EPIC) plans. In the event that migratory birds are encountered on-site during project construction, adverse impacts on protected birds, active nests, eggs, and/or young would be avoided.

Farmland Issues

No-Build Alternative

Implementation of the No-Build Alternative would require no displacement, relocation, or division of farm operations.

Build Alternative

In accordance with the Farmland Protection Policy Act, the additional ROW has been scored using the USDA's Farmland Conversion Impact Rating Form (Form CPA-106). The resulting score was below that required to cause coordination with the National Resource Conservation Service.

Water Quality Issues

No-Build Alternative

Implementation of the No-Build Alternative would have no effect on lakes, rivers, and streams, existing water quality, threatened and impaired waters, floodplains, and wetlands. This alternative would have no channel impacts. No additional permitting would be required.

Build Alternative

The analysis of implementing the Build Alternative on lakes, rivers, streams, water quality, threatened and impaired waters, floodplains, wetlands, channel impacts, and permitting is presented in the following sections.

a. Watershed / Basin Information

Storm water runoff from the proposed project would flow into Henrietta Creek, unnamed tributaries of Henrietta Creek, Buffalo Creek, unnamed tributaries of Buffalo Creek, Big Bear Creek, an unnamed tributary of Big Bear Creek, Big Fossil Creek, and unnamed tributaries of Big Fossil Creek. According to the Texas Commission on Environmental Quality (TCEQ) Water Quality Inventory, Henrietta Creek, unnamed tributaries of Henrietta creek, Buffalo creek, and

unnamed tributaries of Buffalo creek flow into Segment 0826C. Big Bear Creek and an unnamed tributary of Big Bear Creek are part of Segment 0841D. Big Fossil Creek and unnamed tributaries of Big Fossil Creek are part of Segment 0806C. According to the 2008 Clean Water Act (CWA) Section 303(d) list, segment 0841D (an 8-mile stretch running upstream from the confluence with Little Bear Creek to SH 26 in Tarrant County) is impaired due to bacteria. The proposed project is not within 5 miles upstream of the threatened or impaired segment; therefore, coordination with the TCEQ is not required for total maximum daily loads. The water quality of wetlands and waters in the state shall be maintained in accordance with all applicable provisions of the Texas Surface Water Quality Standards including the General, Narrative and Numerical Criteria.

b. Federal Emergency Management Agency Floodplain Information

According to the USGS 7.5 Minute topographic Quadrangle Maps (Haltom City, Keller, and Justin, Texas) and the Federal Emergency Management Agency (FEMA) Flood Insurance Rate Maps for Tarrant and Denton Counties, Texas and Incorporated Areas (Map Panel Nos. 48439C0055K (September 25, 2009), 48439C0060K (September 25, 2009), 48439C0065K (September 25, 2009), 48439C0180K (September 25, 2009), 48439C0185K (September 25, 2009), 48121C0495G (April 18, 2011), and 48121C0635G (April 18, 2011), the proposed project crosses 15 water bodies and seven flood zones. Denton and Tarrant Counties and the Cities of Fort Worth and Haslet are participants in the National Flood Insurance Program (NFIP). A portion of the proposed project is within the Regulated Floodway Zone. The water bodies along the proposed project corridor can be found in **Table 19** of the Waters of the U.S.

The project is located within the FEMA designated 100-year floodplain (Zones A and AE). The hydraulic design for this project would be in accordance with current FHWA and TxDOT design policies. The facility would permit conveyance of the 100-year flood, inundation of the roadway being acceptable, without causing substantial damage to the facility, stream, or other property. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations and ordinances. Coordination with the local Floodplain Administrator would be required.

c. Trinity River Corridor Development Certificate

The project is not within the Trinity River Corridor Development Regulatory Zone; therefore, a Corridor Development Certificate (CDC) would not be required.

d. Waters of the U.S. (including Wetlands) and Channel Impacts

Pursuant to EO 11990 (Protection of Wetlands) and Section 404 of the CWA, a field reconnaissance was conducted to identify waters of the US within the proposed project limits. According to the US Army Corps of Engineers (USACE), the Federal agency having authority over waters of the US, wetlands must possess three essential characteristics. Under normal circumstances, these characteristics include the presence of hydrophytic vegetation, wetland hydrology, and hydric soils. Waters of the U.S. within the proposed project ROW and drainage easements were identified, characterized, and delineated in order to evaluate the waters of the U.S. status of the locations in question. Fifteen areas were identified containing 15 waters of the U.S. Seven of these waters of the US have wetlands within the OHWM. Waters of the U.S. are located within the existing and proposed ROW and drainage easements, having a total delineated area of approximately 4.98 acres (3.95 acres of streams and 1.03 acre of wetlands). The locations of the wetland data points are presented in **Figure 4** and the associated USACE Wetland Determination Data Forms are included in **Appendix A**. Potential impacts to these areas are detailed in **Table 19**. Open waters beyond the ROW and drainage easements of the proposed project were not included in the calculations.

Mitigation measures that have been considered include:

- Avoidance, where practicable, by spanning jurisdictional areas with bridges;
- Minimization of impacts by limiting excavation and/or fill quantities; and
- Compensatory mitigation for impacts would occur onsite when possible.

Permits

As shown in **Table 19**, impacts to Area Crossings 1 through 3, 5 through 13, and 15 would be authorized under Nationwide Permit (NWP) 14 - *Linear Transportation Projects.* Because impacts to Area Crossings 5, 8, 9, 10, 11, 12, and 13 exceed the 0.1 acre impact threshold and/or a discharge in wetlands, a Pre-Construction Notifications (PCN) would be required. If temporary fills are needed in jurisdictional waters then the affected areas would be returned to their pre-construction elevations. Impacts to Area Crossings 4 and 14 would be authorized under NWP 25 – *Structural Discharges*. Channelization would not be required to construct the proposed project. Compensatory mitigation for Section 404 impacts would be coordinated with the USACE and performed in accordance with the terms of the approved permit(s).

Table 19: Waters of the U.S. Within Proposed ROW and Drainage Easements

Area Crossings	Type of Potential Impact	Name	Crossing Type	WOUS in the Proposed ROW and Drainage Easement[1] (Acre)	Impact to WOUS: Proposed ROW (Acre)	Proposed Activity: Proposed ROW	Impacts to WOUS: Drainage Easement (Acre)	Proposed Activity: Drainage Easement	TOTAL IMPACT to WOUS: Proposed ROW and Drainage Easement (Acre)	Proposed 404 Permit
1	Open Water	Unnamed Tributary Henrietta Creek	Single and complete	0.0[2]	0.0[3]	None	0	None	0	–
2	Open Water	Unnamed Tributary Henrietta Creek	Single and complete	0.0[2]	0.0[3]	None	0	None	0	–
3	Open Water	Unnamed Tributary Henrietta Creek	Single and complete	0.0[2]	0.0[3]	None	0	None	0	–
4	Open Water	Henrietta Creek	Single and complete	0.69	0.01	Installation of additional bridge columns	0	None	0.01	NWP 25
	Wetland	Henrietta Creek	Associated with Water 4	0.46[4]	0.01[4]		0	None	0.01[4]	
5	Open Water	Buffalo Creek	Single and Complete	0.30[5]	0.0[5]	Culvert extension	0	None	0.0[5]	NWP 14 with a PCN
	Wetland	Buffalo Creek	Associated with Water 5	0.02[4]	0.02[4]		0	None	0.02[4]	
6	Open Water	Unnamed Tributary Buffalo Creek	Single and Complete	0.01	0.01	Culvert extension	0	None	0.01	NWP 14
7	Open Water	Unnamed Tributary Buffalo Creek	Single and Complete	0.04	0.04	Culvert extension	0	None	0.04	NWP 14
8	Wetland	Unnamed Tributary Big Bear Creek	Single and Complete	0.01[4]	0.01[4]	Culvert extension	0	None	0.01[4]	NWP 14 with a PCN
9	Open Water	Big Bear Creek	Single and Complete	0.11	0.11	Relocation of an	0	None	0.11	NWP 14 with a

Table 19: Waters of the U.S. Within Proposed ROW and Drainage Easements										
Area Crossings	Type of Potential Impact	Name	Crossing Type	WOUS in the Proposed ROW and Drainage Easement[1] (Acre)	Impact to WOUS: Proposed ROW (Acre)	Proposed Activity: Proposed ROW	Impacts to WOUS: Drainage Easement (Acre)	Proposed Activity: Drainage Easement	TOTAL IMPACT to WOUS: Proposed ROW and Drainage Easement (Acre)	Proposed 404 Permit
	Wetland	Big Bear Creek	Associated with Water 9	0.22[4]	0.22[4]	existing culvert	0	None	0.22[4]	PCN
10	Open Water	Unnamed Tributary Big Fossil Creek	Single and Complete	0.02	0.02	Culvert extension	0	None	0.02	NWP 14 with a PCN
	Wetland	Unnamed Tributary Big Fossil Creek	Associated with Water 10	0.04[4]	0.04[4]		0	None	0.04[4]	
11	Open Water	Unnamed Tributary Big Fossil Creek	Single and Complete	1.05	0.0[5]	Culvert extension	0	None	0.0[5]	NWP 14 with a PCN
	Wetland	Unnamed Tributary Big Fossil Creek	Associated with Water 11	0.17[4]	0.17[4]		0	None	0.17[4]	
12	Wetland	Unnamed Tributary Big Fossil Creek	Single and Complete	0.11[4]	0.07[4]	Culvert extension	0.04	Drainage grading	0.11	NWP 14 with a PCN
13	Open Water	Unnamed Tributary Big Fossil Creek	Single and Complete	0.38	0.29	Culvert extension	0.02	Drainage grading	0.31	NWP 14 with a PCN
14	Open Water	Big Fossil Creek	Single and Complete	1.34	0.01	Installation of additional bridge columns	0	None	0.01	NWP 25
15	Open Water	Unnamed Tributary Big Fossil Creek	Single and Complete	0.01	0.01	Culvert extension	0	None	0.01	NWP 14

[1] This column represents all the existing delineated waters of the U.S. within the proposed project's ROW and drainage easements. The column titled "Acres Approx. Permanent Impacts" indicates the amount that would be impacted by the proposed project within the ROW.
[2] This culvert receives upland drainage west of IH 35W. Waters of the U.S. begin east of the culvert.
[3] The culvert would not be extended at this location. There would be no impact at this location.
[4] Wetlands within the OHWM.
[5] Tributary is currently in a culvert beneath IH 35W. The culvert would remain in place and extended.

e. TCEQ Section 401 Best Management Practice

General Condition 21 of the NWP Program requires applicants to comply with Section 401 of the CWA. Compliance with Section 401 requires the use of BMPs to manage water quality on construction sites. The SW3P would include at least one BMP from the 401 Water Quality Certification Conditions for NWPs as published by the TCEQ on April 25, 2007. These BMPs would address each of the following categories:

- Category I – Erosion Control
- Category II – Sedimentation Control
- Category III – Post-construction TSS Control

Category I would be addressed by applying temporary vegetation. Category II would be addressed by utilizing silt fences and rock berms. Category III would be addressed by planting vegetative filter strips and vegetation lined drainage ditches. These vegetative strips/ditches would accept roadway runoff as sheet flow and filter it along the front slopes of the ditches as well as the bottom of the ditch. These methods will be used at various locations along the proposed project as warranted. Other approved methods may be substituted if necessary, using one of the BMPs from the identical category.

f. Texas Pollutant Discharge Elimination System (TPDES)

Because the proposed project would disturb more than one acre, TxDOT would be required to comply with the TCEQ – TPDES General Permit for Construction Activity. The proposed project would disturb more than five acres; therefore, a Notice of Intent would be filed to comply with TCEQ stating that TxDOT would have a SW3P in place during construction of the proposed project. This SW3P utilizes the temporary control measures as outlined in TxDOT's manual *Standard Specifications for the Construction and Maintenance of Highways, Streets, and Bridges*. Adverse effects would be minimized by avoiding work by construction equipment directly in the stream channels and/or adjacent areas. No long-term water quality effects are expected as a result of the proposed project.

To minimize impacts to water quality during construction, the proposed project would utilize temporary erosion and sedimentation control practices from TxDOT's manual *Standard Specifications for the Construction and Maintenance of Highways, Streets, and Bridges*. Where appropriate, these temporary erosion and sedimentation control structures would be in place prior to the initiation of construction, and would be maintained throughout the duration of the construction. Clearing of vegetation would be limited and/or phased in, to maintain a natural water quality buffer and minimize the amount of earth exposed at any one time. Upon completion of the earthwork operations, disturbed areas would be restored and reseeded according to the TxDOT's specifications for *Seeding for Erosion Control*.

g. Navigable Waters

The waterways crossed by IH 35W are not navigable waterways. Navigational clearance under the General Bridge Act of 1946, Section 9 of the Rivers and Harbors Act of 1899 (administered by the US Coast Guard [USCG]) and Section 10 of the Rivers and Harbors Act of 1899 (administered by the USACE) is not applicable. Coordination with the USCG (for Section 9 and the Bridge Act) and the USACE (for Section 10) would not be required.

h. Municipal Separate Storm Sewer System (MS4)

The portion of the proposed project within the boundaries of the Phase I (Fort Worth) MS4 (just north of US 81/287) would comply with the applicable MS4 requirements. The remaining portion of the proposed project is outside of MS4 jurisdiction.

C. Hazardous Materials

No-Build Alternative

Under the No-Build Alternative for IH 35W, no impacts to hazardous waste/substance are anticipated.

Build Alternative

Pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) and the Resource Conservation and Recovery Act (RCRA), a preliminary investigation was conducted to identify sites within the proposed project study area which are "at risk" of environmental contamination by hazardous wastes and substances.

Sites considered likely to be contaminated and within the proposed ROW or sites which have the potential to pose a hazard to construction of the Build Alternative are categorized as “high risk”. Examples of “high risk” sites include landfills or sites which have a subsurface plume of contamination with the potential to have migrated within the proposed project limits. Sites are categorized as “low risk” if available information indicated that some potential for contamination exists, but the site is not likely to pose a contamination problem to highway construction.

The TxDOT Fort Worth District has procedures intended to minimize cost and construction delays when petroleum-contaminated soils are encountered during roadway construction. The Fort Worth District has a contractor to remove underground storage tanks (USTs); and a contract to excavate and haul petroleum-contaminated soils. This procedure has reduced the degree of impact that USTs could have for TxDOT construction activities. If this or any other type of encounter with hazardous substances does occur, it would be handled according to all applicable state, federal, and local regulations.

The proposed project area is located in an urban area with predominantly vacant land interspersed with residential commercial uses.

The scope of the preliminary investigation consisted of a review of the TxDOT-specified compliant federal and state environmental databases and the performance of a site visit to confirm information from the databases and note additional field observations. No land use history, title searches, records/historic aerial photographs/historic maps review, interviews, or consultation with local/state/federal authorities were conducted. A hazardous materials regulatory database search was conducted in November 2010 and a site visit was completed on February 19, 2009 and January 20, 2011. The databases and specified search distances are shown in **Table 20**.

Table 20: Federal and State Environmental Database Search

Regulatory Database	Radius Search Distance
Federal National Priorities List (NPL)	1.0 mile
Federal CERCLIS list	0.5 mile
Federal RCRA Treatment, Storage, and Disposal (TSD) facilities list	0.5 mile
Federal RCRA Generators (G)	Build Alternative limits (existing and proposed ROW)
National Response Center (NRC) (formerly the Federal Emergency Response Notification System [ERNS]) list	Build Alternative limits (existing and proposed ROW)
State-equivalent CERCLIS list	1.0 mile
State Landfill and/or Municipal Solid Waste Landfill Facility (MSWLF) list	0.5 mile
Texas Voluntary Compliance Program (TX VCP) list	0.5 mile
State Registered Leaking Petroleum Storage Tank (LPST) list	0.5 mile
State Registered Petroleum Storage Tank (PST) list	0.25 mile
Source: *TxDOT Hazardous Materials and Project Development website, 2010. http://www.txdot.gov/txdot_library/consultants_contractors/publications/environmental_resources.htm*	

The database identified 26 facilities at 21 locations within the specified distance parameters. **Table 21** provides a summary of the database search results. Only four of the 10 databases are shown in the table because no entries or listings were identified for the federal NPL, federal CERCLIS, federal RCRA TSD, state-equivalent CERCLIS, state Landfill and/or MSWLF, and TX VCP site databases. The high risk facilities are also discussed following the table.

Table 21: Hazardous Materials Sites in the Project Area			
Database	**Facilities Within Search Distance (Table 16)**	**No. of High Risk Sites**	**Date Database Updated**
RCRA G	3	0	08/2010
NRC/ERNS	1	0	12/2009
PST	15	0*	09/2010
LPST	7	2	11/2010
Total	**26**	**2**	
* PST sites that are also listed as LPST sites are not included in this category and are not discussed in the PST discussion of the PST sites section. Source: *GeoSearch (November 11, 2010).*			

As shown in **Table 21**, two LPST/PST sites pose high risk to the proposed ROW acquisition and/or construction of the proposed project. These two sites (consisting of two PST and two LPST facilities) are discussed as follows:

LPST/PST Sites

- #1 - Quix 413 (Shell/Mobil Station) (LPST ID No. 116458, PST Facility ID No. 68199), 2420 Westport Parkway, Haslet, Texas. This site is approximately 0.08 mile (422 feet) west of the Build Alternative on adjacent property and at the same gradient as the proposed project. The proposed ROW would impact the three USTs of this gas station and would likely displace the entire facility comprised of the pumps and a convenience store. According to the LPST database, a subsurface release of petroleum hydrocarbons from this site was discovered on June 15, 2004 and was reported on January 7, 2005. The site has a priority description of "assessment incomplete, no apparent receptors impacted" and TCEQ issued "Final Concurrence, Case Closed". According to the PST database, there are three 15-year old gasoline PSTs currently in use. The site poses a high risk to construction of the Build Alternative because additional ROW would be acquired from this site. Refer to **Figure 4**, **Sheet 10** for the location of this high risk site.

- #2 - 7-11 Station (LPST ID No. 116041, PST Facility ID No. 48880), 3300 Western Center Boulevard, Fort Worth, Texas. This site is approximately 0.10 mile (528 feet) east of the Build Alternative on adjacent property and at the same gradient as the proposed project. The Build Alternative would acquire additional ROW along the east boundary of this site, adjacent to the three PSTs. According to the LPST database, a subsurface release of petroleum hydrocarbons from this site was discovered and reported on April 5, 2004. The site has a priority description of "impacted groundwater discharges to SW used by human, endangered species <500 ft". Groundwater was impacted to a depth of 10 feet. On November 4, 2009 TCEQ issued "Final Concurrence, Case Closed" for this facility. According to the PST database, there are three 23-year old gasoline PSTs currently in use. The site poses a high risk to construction of the Build Alternative because additional ROW would be acquired from this site. Refer to **Figure 4**, **Sheet 30** for the location of this high risk site.

A visual survey of the proposed project limits and surrounding area was performed by qualified personnel to identify possible hazardous materials within the Build Alternative ROW. No surface evidence of contamination as in stained discolored, barren, exposed or foreign soil or dead, damaged, or stressed vegetation was observed. Gas pipelines located to the east and west of proposed project limits pose potential hazardous materials risk on areas where additional ROW would be taken. High powered electrical line are located south of the intersection of SH 170/Alliance Gateway and IH 35W. A tower would require potential relocation based on the

proposed location of the proposed frontage road. Although these sites are not likely to pose a contamination problem to the proposed project construction, there is a possibility that some level of contamination might exist. Documentation of the initial site assessment is maintained in the project files. The contractor would take appropriate measures to prevent, minimize, and control the spill of hazardous materials in the construction staging area. The use of construction equipment within sensitive areas would be minimized or eliminated entirely. All construction materials used for this project would be removed as soon as work schedules permit.

The proposed project includes the demolition and/or renovation of approximately 26 bridges. The bridges may contain asbestos containing materials (ACM) and shall be inspected to verify the presence or absence of ACM. Prior to the bridge demolition(s), a 10-Day Notification shall be submitted to the Department of State Health and Human Services.

D. Air Quality

No-Build Alternative

Implementation of the No-Build Alternative would lead to increased traffic congestion and decreased mobility on IH 35W, resulting in decreased vehicular speed and increased stop-and-go traffic. This would likely increase vehicular pollutant emissions.

Build Alternative

This project is located within Tarrant and Denton Counties, which are part of the nine-county area that has been designated by the U.S. Environmetal Protection Agency (EPA) as a serious non-attainment area for ozone; therefore, transportation conformity rules apply.

The proposed action is consistent with the area's financially constrained Metropolitan Transportation Plan NCTCOG *Mobility 2035* and the 2011-2014 TIP, as revised. Both the MTP and the TIP were found to conform to the TCEQ SIP by FHWA on July 14, 2011. Copies of the MTP and TIP pages are included in **Appendix B**. All projects in the NCTCOG TIP, as revised 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.

Traffic Air Quality Analysis

The primary pollutants from motor vehicles are volatile organic compounds (VOCs), carbon monoxide (CO), and nitrogen oxides (NOx). VOCs and NOx can combine under the right conditions in a series of photochemical reactions to form ozone. Because these reactions take place over a period of several hours, maximum concentrations of ozone are often found far downwind of the precursor sources. Thus, ozone is a regional problem and not a localized condition.

The modeling procedures of ozone require long term meteorological data and detailed area wide emission rates for all potential sources (industry, business, and transportation) and are normally too complex to be performed within the scope of an environmental analysis for a highway project. Accordingly, concentrations of ozone for the purpose of comparing the results of the National Ambient Air Quality Standards (NAAQS) are modeled by the regional air quality planning agency for the SIP. However, concentrations for CO are readily modeled for highway projects and are required by federal regulations.

Topography and meteorology of the area in which the proposed project is located would not seriously restrict dispersion of the air pollutants. Under the guidance of TxDOT, the Year 2035 traffic data used in the analysis was extrapolated from the Year 2030 and 2040 traffic data

provided by the TxDOT TPP Division. The estimated time of completion year 2030 ADT is estimated to be 269,800 vpd and the design year of 2035 ADT is estimated to be 284,900 vpd. The CO concentrations for the proposed project were modeled using the worst case scenario (adverse meteorological conditions and receptors at the ROW line) in accordance with the TxDOT Air Quality Guidelines. Local concentrations of CO are not expected to exceed national standards at any time. The results of the analysis are summarized in **Table 22**.

Table 22: Carbon Monoxide Analysis

Year	Traffic Volume		Emission Factor (g/mile)[3]	CO Concentration[1] (ppm)		% NAAQS[2]	
	ADT (vpd)	DHV (vph)		One-Hour	8-Hour	One-Hour	8-Hour
2030	269,800	26,320	5.69	4.4	2.76	12.6%	30.7%
2035	284,900	27,786	5.69	4.6	2.88	13.1%	32%

[1] Includes an ambient concentration of 1.8 ppm for the one-hour averaging time and 1.2 ppm for the 8-hour averaging time.
[2] One-hour NAAQS of 35 ppm and an 8-hour NAAQS of 9 ppm.
[3] At a speed of 65 mph for general purpose (non-toll) and managed (toll) lanes. At a speed of 40 mph for frontage roads.

Lead NAAQS

This project is located in the DFW nine-county non-attainment area which is in attainment or unclassifiable for all NAAQS, except ozone and lead. A small portion of Collin County in the vicinity of Frisco City is in non-attainment for the lead NAAQS; however, this project is located outside that portion of Collin County in non-attainment for lead, effective December 31, 2010.

Congestion Management Process (CMP)

The 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's operational CMP, which meets all requirements of 23 CFR 500.109. In March 2011, the NCTCOG RTC approved the MTP, which contains elements of the CMP.

The region commits to operational improvements and travel demand reduction strategies at two levels of implementation: program level and project level. 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.

The CMP element of the plan carries an inventory of all project commitments (including those resulting from major investment studies) that details type of strategy, implementing responsibilities, schedules, and expected costs. At the project's programming stage, travel demand reduction strategies and commitments will be added to the regional TIP or included in the construction plans. The regional TIP provides for programming of these projects at the appropriate time with respect to the SOV facility implementation and project-specific elements.

Committed congestion reduction strategies and operational improvements within the study boundary will consist of the individual projects listed in **Table 23**.

Table 23: CMP/Operational Improvements in the Corridor					
Street / Name	**City**	**Implementing Agency**	**Project Type**	**Year of Implementation**	**Total Project Cost**
SH 114 from West of County Line Road to West of FM 156	Various	TxDOT-Dallas	Addition of Lanes	2010	$39,849,822
SH 114 from 0.84 Miles East of Trophy Lake Drive to 0.7 Miles West of Trophy Club Drive	Westlake Trophy Club	TXDOT-Dallas	New Roadway	2010	$44,449,905.00
SH 114 from East of FM 156 to West of IH 35W	Various	TxDOT-Dallas	Addition of Lanes	2010	$25,200,000
Litsey Road from Independence Parkway to West of Henrietta Creek (Cleveland Gibbs Road)	Fort Worth	Fort Worth	Addition of Lanes	2010	$8,000,000
Golden Triangle Blvd From IH 35W To US 377	Fort Worth	TxDOT-Fort Worth	Addition of Lanes	2010	$25,685,000
N Fort Worth Park-And-Ride Lot 500 Spaces – IH 35W	Fort Worth	FWTA	Park & Ride/Rail Station	2010	$2,862,000
SH 114 from East of FM 156 to West of IH 35W	Keller	TxDOT-Dallas	Addition of Lanes	2011	$2,000,000
IH 35W at North Tarrant Parkway on IH 35W in Fort Worth	Fort Worth	TxDOT-Fort Worth	Intersection Improvement	2011	$1,193,313
US 377 from SH 170 (Tarrant County Line) to SH 114 (Section 5)	Dallas	TXDOT-Dallas	Addition of Lanes	2011	$13,183,749.00
IH 35W from IH 820 to IH 30	Fort Worth	TxDOT-Fort Worth	Addition of Lanes	2014	$544,982,000
IH 35W from Denton County Line to Eagle Parkway	Fort Worth	TxDOT-Fort Worth	Additon of Lanes	2015	$356,000,000
US 287 from FM 3479 (Harmon Road) to South of Proposed NTP Crossover	Fort Worth	TxDOT-Fort Worth	New Roadway	2015	$2,055,040
US 287 from Entrance/Exit Ramp, North to FM 3479 (Harmon Road)	Fort Worth	TxDOT-Fort Worth	New Roadway	2015	$2,271,360
US 287 from FM 3479 (Harmon Road) to Southbound Entrace Ramp	Fort Worth	TxDOT-Fort Worth	Intersection Improvement	2015	$2,271,360
FM 156 from Watauga Road to US 287	Fort Worth and Saginaw	TxDOT-Fort Worth	Addition of Lanes	2015	$12,555,000

Table 23: CMP/Operational Improvements in the Corridor					
Street / Name	**City**	**Implementing Agency**	**Project Type**	**Year of Implementation**	**Total Project Cost**
Riverside Drive from Stone Creek to Redwood Creek	Fort Worth	Fort Worth	New Roadway	2015	$5,741,036
Source: *NCTCOG - TIPINS website, <http://www.nctcog.org/trans/tip/tipins/>, accessed December 12, 2011.*					

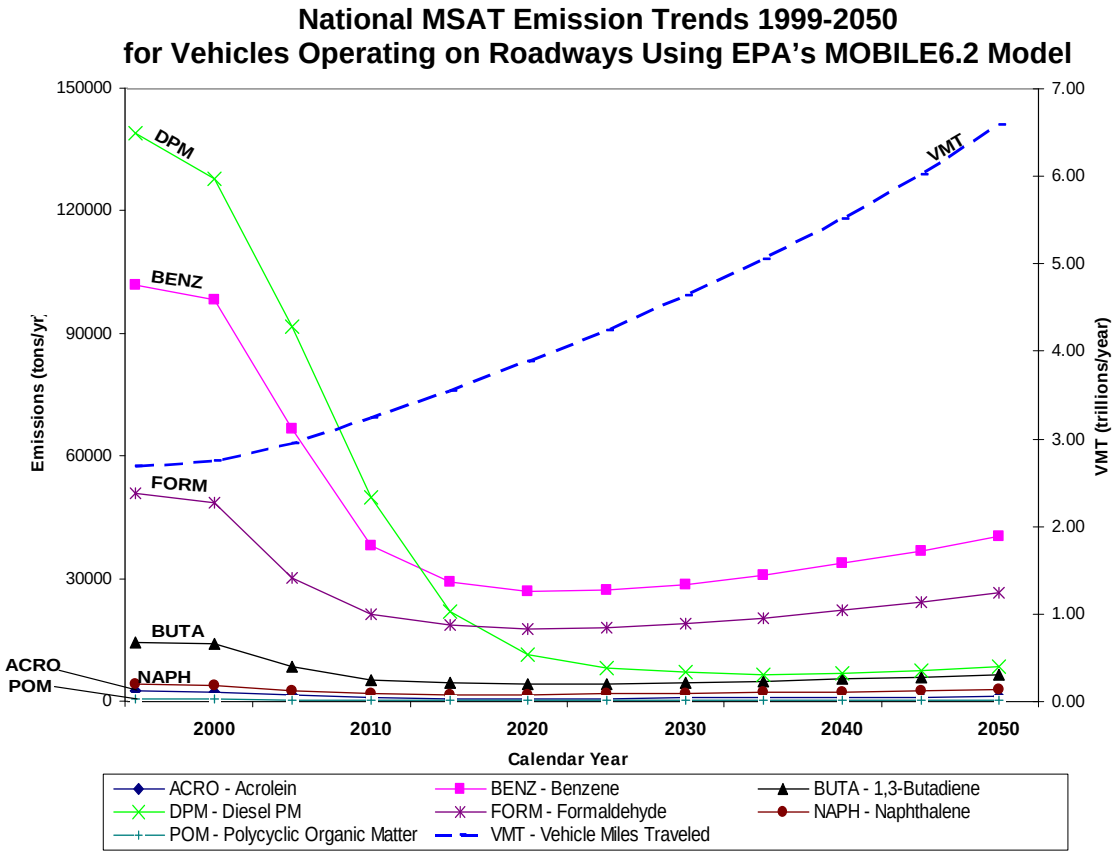
In an effort to reduce congestion and the need for SOV lanes in the region, TxDOT and NCTCOG will continue to promote appropriate congestion reduction strategies through the CMAQ program, the CMP, and the MTP. The congestion reduction strategies considered for this project would help alleviate congestion 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 Transportation Management Area (TMA) is on file and available for review at NCTCOG.

Mobile Source Air Toxics (MSATs)

Controlling air toxic emissions became a national priority with the passage of the Clean Air Act Amendments (CAAA) of 1990, whereby Congress mandated that the EPA regulate 188 air toxics, also known as hazardous air pollutants. The EPA has assessed this expansive list in their latest rule on the Control of Hazardous Air Pollutants from Mobile Sources (Federal Register, Vol. 72, No. 37, page 8430, February 26, 2007) and identified a group of 93 compounds emitted from mobile sources that are listed in their Integrated Risk Information System (IRIS) (http://www.epa.gov/ncea/iris/index.html). In addition, EPA identified seven compounds with significant contributions from mobile sources that are among the national and regional-scale cancer risk drivers from their 1999 National Air Toxics Assessment (NATA) (http://www.epa.gov/ttn/atw/nata1999/). These are acrolein, benzene, 1,3-butadiene, diesel particulate matter plus diesel exhaust organic gases (diesel PM), formaldehyde, naphthalene, and polycyclic organic matter. While FHWA considers these the priority mobile source air toxics, the list is subject to change and may be adjusted in consideration of future EPA rules.

The 2007 EPA MSAT rule mentioned above requires controls that will dramatically decrease MSAT emissions through cleaner fuels and cleaner engines. According to an FHWA analysis using EPA's MOBILE6.2 model, even if vehicle activity (vehicle miles traveled, VMT) increases by 145 percent as assumed, a combined reduction of 72 percent in the total annual emission rate for the priority MSAT is projected from 1999 to 2050, as shown in the graph below and **Table 24**.



Source: ***Table 24** below.*
Note:
(1) Annual emissions of polycyclic organic matter are projected to be 561 tons/yr for 1999, decreasing to 373 tons/yr for 2050.
(2) Trends for specific locations may be different, depending on locally derived information representing vehicle-miles travelled, vehicle speeds, vehicle mix, fuels, emission control programs, meteorology, and other factors

Table 24: Projected National MSAT Emissions and Percent Reduction for 1999-2050 for Vehicles Operating on Roadways Using EPA's MOBILE6.2 Model

Pollutant/VMT	Pollutant Emissions (tons) and Vehicle-Miles Traveled (VMT) by Calendar Year							Reduction
	1999	2000	2010	2020	2030	2040	2050	1999 to 2050
Acrolein	2570	2430	1000	775	824	970	1160	-55%
Benzene	102000	98400	38000	27000	28700	33900	40500	-60%
1,3-Butadiene	14400	14100	5410	4360	4630	5460	6520	-55%
Diesel PM	139000	128000	50000	11400	7080	7070	8440	-94%
Formaldehyde	50900	48800	21400	17800	19000	22400	26800	-47%
Naphthalene	4150	4030	1990	1780	2030	2400	2870	-31%
Polycyclic Organic Matter	561	541	259	233	265	313	373	-33%
Trillions VMT	2.69	2.75	3.24	3.88	4.63	5.51	6.58	145%

Source: *U.S. Environmental Protection Agency. MOBILE6.2 Model run 20 August 2009*

Air toxics analysis is a continuing area of research. While much work has been done to assess the overall health risk of air toxics, many questions remain unanswered. In particular, the tools and techniques for assessing project-specific health outcomes as a result of lifetime MSAT exposure remain limited. These limitations impede the ability to evaluate how the potential

health risks posed by MSAT exposure should be factored into project-level decision-making within the context of NEPA. The FHWA, EPA, the Health Effects Institute, and others have funded and conducted research studies to try to more clearly define potential risks from MSAT emissions associated with highway projects. The FHWA will continue to monitor the developing research in this emerging field.

Project Specific MSAT Information
During a conference call between the NTTA, TxDOT, and the FHWA on August 19, 2010 the FHWA recommended that a quantitative analysis was appropriate to determine the potential MSAT emission impacts of the proposed project. A quantitative analysis provides a basis for identifying and comparing the potential differences among MSAT emissions, if any, from the various alternatives. The quantitative assessment presented below is derived in part from a study conducted by the FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives, found at:

http://www.fhwa.dot.gov/environment/air_quality/air_toxics/research_and_analysis/mobile_source_air_toxics/msatemissions.pdf

For each alternative in this document, the amount of MSAT emitted would be proportional to the VMT, assuming that other variables such as fleet mix are the same for each alternative. The VMT estimated for the Build Alternative is slightly higher than that for the No-Build Alternative because the additional capacity increases the efficiency of the roadway and attracts rerouted trips from elsewhere in the transportation network. Refer to **Table 25** for a comparison of VMT between the Build and No-Build Alternatives.

Table 25: Comparison of Vehicle Miles Traveled (VMT)

Alternative	Roadway Description	2035 VMT/Day
Build Alternative	Six new through lanes	4,202,734
No-Build Alternative	Four-lane existing roadway	5,787,475

This increase in VMT would lead to higher MSAT emissions for the preferred action alternative along the highway corridor, along with a corresponding decrease in MSAT emissions along the parallel routes. The emissions increase is offset somewhat by lower MSAT emission rates due to increased speeds; according to EPA's MOBILE6.2 emissions model, emissions of all of the priority MSAT except for diesel particulate matter decrease as speed increases. The extent to which these speed-related emissions decreases would offset VMT-related emissions increases cannot be reliably projected due to the inherent deficiencies of technical models. Also, regardless of the alternative chosen, emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce annual MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in nearly all cases.

The additional travel lanes contemplated as part of the project alternatives will have the effect of moving some traffic closer to nearby homes, schools, and businesses; therefore, under each alternative there may be localized areas where ambient concentrations of MSAT could be higher under certain Build Alternatives than the No-Build Alternative. The localized increases in MSAT concentrations would likely be most pronounced along the expanded roadway sections that would be built near SH 170, US 81/287, Basswood Boulevard, Western Center Boulevard, and IH 820. However, the magnitude and the duration of these potential increases compared to

the No-Build alternative cannot be reliably quantified due to incomplete or unavailable information in forecasting project-specific MSAT health impacts. In sum, when a highway is widened, the localized level of MSAT emissions for the Build Alternative could be higher relative to the No-Build Alternative, but this could be offset due to increases in speeds and reductions in congestion (which are associated with lower MSAT emissions). Also, MSAT will be lower in other locations when traffic shifts away from them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be lower in the future.

MSAT Modeling
The EPA's highway vehicle emission factor model, MOBILE, is a program that provides average in-use fleet emission factors for criteria pollutants (CO, and NOx) and also provides emission factors for VOCs. These emission factors can be estimated for any year between 1952 and 2050 and under various conditions affecting in-use emission levels. The output from the model is in the form of emissions factors expressed as grams of pollutant per vehicle mile traveled (g/mi).

A quantitative analysis of mass air toxic emissions from the travel study area of the proposed project was completed by following the +/- 5 percent "link by link" methodology and by using the latest version of the EPA's mobile emission factor model (MOBILE6.2). The travel study area used for the MSAT analysis is the same area as the MPA within the NCTCOG Region. The analyzed "affected transportation network" represents the traffic volumes that are expected to change by a certain threshold as a result of project construction. The thresholds for this project are based on the ultimate build-out year +/-5 percent vehicle volume change relative to 2035 No-Build vehicle volumes. The 2035 +/- 5 percent links were selected by overlapping common data base files by using the aid of ArcGIS 9.3. The resulting "affected transportation network" for scenario years 2012 and 2035 includes those links determined to change +/- 5 percent in 2035. Because the 2012 base year scenario represents the existing condition, the model area for 2012 is composed of those links determined to change +/- 5 percent or greater in 2035 and selected by overlaping with the existing 2012 network. The 2012 +/- 5 percent links did not have any common database field and were selected manually using ArcGIS 9.3. Two scenarios were modeled:

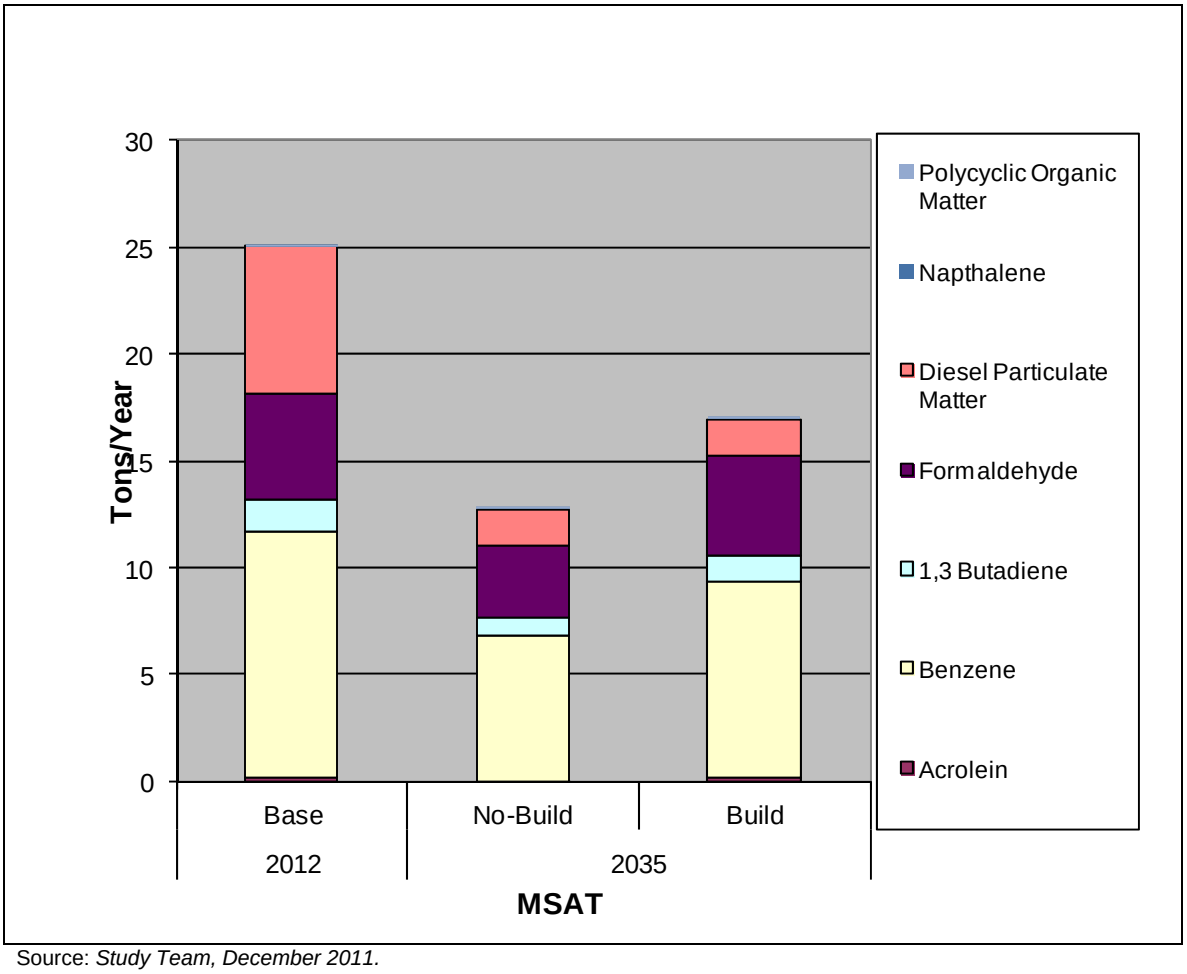
- "2012 base year" or existing condition in 2012,
- "2035 design year" Build and No-Build.

Maps of the two affected transportation networks are presented in **Appendix C**.

Total Emission of MSATs for the Build and No-Build Alternatives
Specific data from the MSAT study area of the NCTCOG Regional Transportation Model were used to determine the mass of MSAT emissions associated with the Build and No-Build scenarios. In addition, the base case or existing conditions mass of MSAT was also modeled. The total mass of MSAT in the year 2012 (base case) was higher than either the Build or No-Build scenarios in the year 2035. This is reflective of the overall national trend in MSAT emissions as previously described. The mass of emissions associated with the base case and design year are shown in **Table 26** and the subsequent graph.

Table 26: MSAT Emissions by Scenario					
Compound	Year / Scenario (Tons/Year)			% Difference	
	2012 Base	2035 No-Build	2035 Build	2012 to 2035 No-Build	2012 to 2035 Build
Acrolein	0.221	0.146	0.207	-34%	-7%
Benzene	11.524	6.693	9.136	-42%	-21%
1,3 Butadiene	1.466	0.873	1.206	-40%	-18%
Formaldehyde	4.984	3.342	4.725	-33%	-5%
DPM	6.847	1.699	1.699	-75%	-75%
Napthalene	0.040	0.039	0.057	-3%	42%
Polycyclic Organic Matter	0.007	0.006	0.009	-19%	18%
Total MSAT	25.090	12.797	17.038	-49%	-32%
Total VMT (Miles/Year)	1,137,209,315	1,533,997,998	2,112,428,539	35%	86%
Source: *Study Team, December, 2011*.					

PROJECTED CHANGES IN MSAT EMISSIONS BY SCENARIO OVER TIME

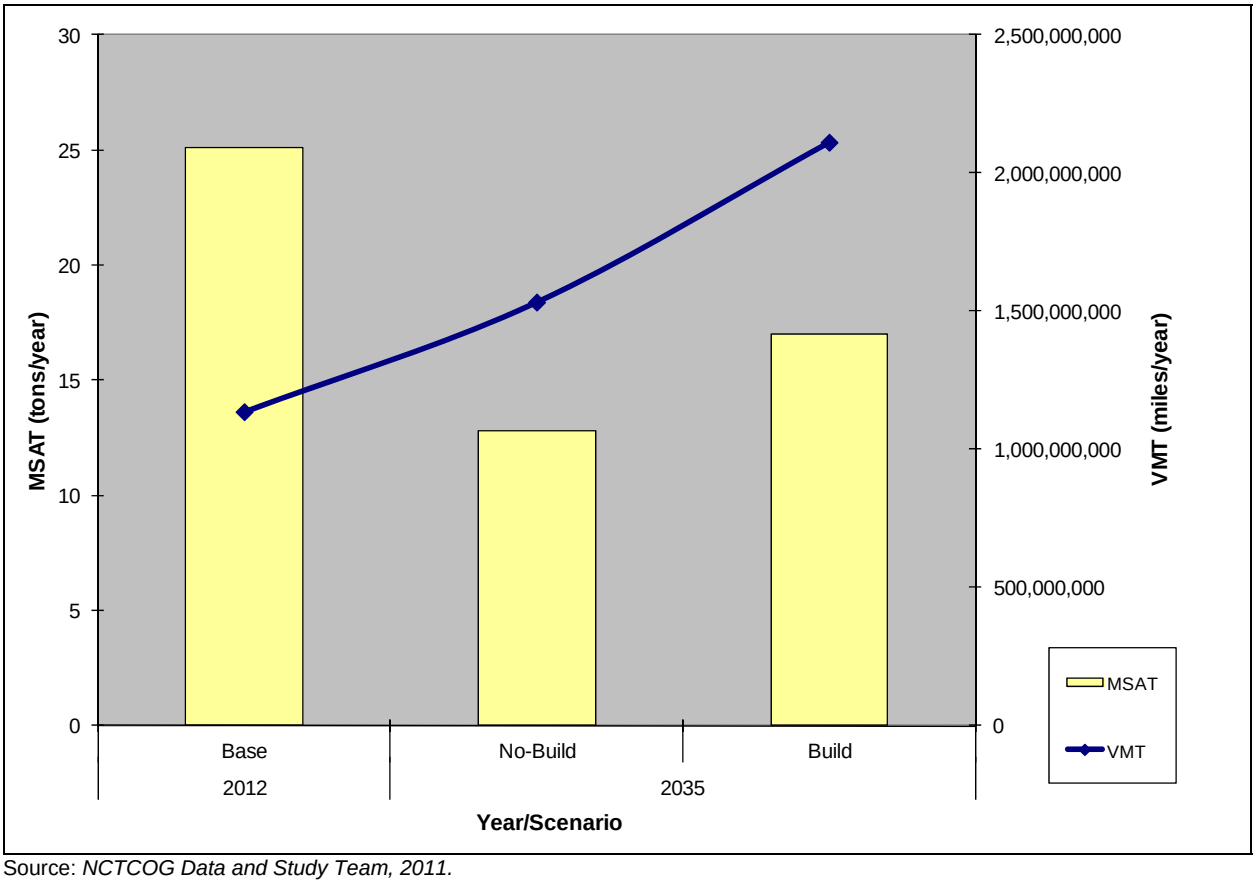


Source: *Study Team, December 2011.*

The analysis indicates a decrease in MSAT emissions for both the Build and No-Build Alternatives for the design year of 2035 versus the 2012 base year. Total MSAT emissions under a Build scenario are predicted to decrease by 32 percent between 2012 and 2035.

Of the seven priority MSAT compounds, benzene and DPM contribute the most to the emissions total in base year (see **Table 26** and the graph above). In future years a decline in benzene is anticipated (21 percent reduction in benzene from 2012 to 2035, Build). And an even larger reduction in DPM emissions is predicted (75 percent decrease from 2012 to 2035, Build). Although overall VMT is expected to increase over time, MSAT emissions are expected to be lower in 2035 compared to the base year (see the graph below).

COMPARISON OF MSAT EMISSIONS VS. VMT BY SCENARIO



Source: *NCTCOG Data and Study Team, 2011.*

The estimated emission levels noted in graph above are for all MSAT evaluated and are based on the projected total VMT. The reasons for these dramatic improvements are twofold; a change in vehicle fuels, both gasoline and diesel fuel, and a change in emission standards that both light-duty and heavy-duty on-highway motor vehicles must meet. The EPA predicts substantial future air emission reductions as the agency's new light-duty and heavy-duty on-highway fuel and vehicle rules come into effect (Tier II, light-duty vehicle standard, Heavy-Duty Diesel Vehicle and (HDDV) standards and low sulfur diesel fuel, and the EPA's proposed Off-Road Diesel Engine and Fuel Standard). These projected air emission reductions will be realized even with the predicted continued growth in VMT. See the EPA's Tier II Regulatory Impact Analysis (RIA) and HDDV RIA; Regulatory Impact Analysis.

The estimated MSAT emissions of the seven priority air toxics are shown in **Table 27**.

Table 27: MSAT Emissions in Tons Per Year	
Year	**IH 35W Project (Affected Traffic Network)**
2012 Base	25.1
2035 No-Build	12.8
2035 Build	17.0
Source: *Study Team, November 2011.*	

Discussion
Although the VMT for the IH 35W Build scenario would increase approximately 86 percent by 2035 when compared to 2012, total MSAT emissions for the same scenario would decrease at least 32 percent by 2035. In 2035, the total MSAT load for the Build scenario is 4.24 tons/year higher than for the No-Build scenario. The higher level of MSAT emissions for the Build scenario is due to a higher VMT when compared to the No-Build scenario.

Regardless of the alternative chosen, emissions would likely be lower than present levels in the future year as a result of the EPA's national control programs that are projected to reduce MSAT emissions by 72 percent between 1999 and 2050. Local conditions may differ from these national projections in terms of fleet mix, vehicle turnover rates, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great that MSAT emissions in the study area are likely to be lower in the future in all cases.

Incomplete or Unavailable Information for Project-Specific MSAT Health Impact Analysis
In FHWA's view, information is incomplete or unavailable to credibly predict the project-specific health impacts due to changes in MSAT emissions associated with a proposed set of highway alternatives. The outcome of such an assessment, adverse or not, would be influenced more by the uncertainty introduced into the process through assumption and speculation rather than any genuine insight into the actual health impacts directly attributable to MSAT exposure associated with a proposed action.

The EPA is responsible for protecting the public health and welfare from any known or anticipated effect of an air pollutant. They are the lead authority for administering the CAA and its amendments and have specific statutory obligations with respect to hazardous air pollutants and MSAT. The EPA is in the continual process of assessing human health effects, exposures, and risks posed by air pollutants. They maintain the Integrated Risk Information System (IRIS), which is "a compilation of electronic reports on specific substances found in the environment and their potential to cause human health effects" (EPA, http://www.epa.gov/ncea/iris/index.html). Each report contains assessments of non-cancerous and cancerous effects for individual compounds and quantitative estimates of risk levels from lifetime oral and inhalation exposures with uncertainty spanning perhaps an order of magnitude.

Other organizations are also active in the research and analyses of the human health effects of MSAT, including the Health Effects Institute (HEI). Two HEI studies are summarized in Appendix D of FHWA's 2009 Interim Guidance Update on Mobile Source Air Toxic Analysis in NEPA Documents, which can be found at the following address: (http://www.fhwa.dot.gov/environment/air_quality/air_toxics/policy_and_guidance/100109guidmem.cfm). This Appendix also discusses a variety of FHWA research initiatives related to air toxics. Among the adverse health effects linked to MSAT compounds at high exposures are cancer in humans in occupational settings; cancer in animals; and irritation to the respiratory tract, including the exacerbation of asthma. Less obvious is the adverse human health effects of MSAT compounds at current environmental concentrations

(HEI, http://pubs.healtheffects.org/view.php?id=282) or in the future as vehicle emissions substantially decrease (HEI, http://pubs.healtheffects.org/view.php?id=306).

The methodologies for forecasting health impacts include emissions modeling; dispersion modeling; exposure modeling; and then final determination of health impacts - each step in the process building on the model predictions obtained in the previous step. All are encumbered by technical shortcomings or uncertain science that prevents a more complete differentiation of the MSAT health impacts among a set of project alternatives. These difficulties are magnified for lifetime (i.e., 70 year) assessments, particularly because unsupportable assumptions would have to be made regarding changes in travel patterns and vehicle technology (which affects emissions rates) over that time frame, since such information is unavailable. The results produced by the EPA's MOBILE6.2 model, the California EPA's Emfac2007 model, and the EPA's MOVES model in forecasting MSAT emissions are highly inconsistent. Indications from the development of the MOVES model are that MOBILE6.2 significantly underestimates diesel particulate matter (PM) emissions and significantly overestimates benzene emissions.

Regarding air dispersion modeling, an extensive evaluation of EPA's guideline CAL3QHC model was conducted in an NCHRP study (http://www.epa.gov/scram001/dispersion_alt.htm#hyroad), which documents poor model performance at ten sites across the country - three where intensive monitoring was conducted plus an additional seven with less intensive monitoring. The study indicates a bias of the CAL3QHC model to overestimate concentrations near highly congested intersections and underestimate concentrations near uncongested intersections. The consequence of this is a tendency to overstate the air quality benefits of mitigating congestion at intersections. Such poor model performance is less difficult to manage for demonstrating compliance with NAAQS for relatively short time frames than it is for forecasting individual exposure over an entire lifetime, especially given that some information needed for estimating 70-year lifetime exposure is unavailable. It is particularly difficult to reliably forecast MSAT exposure near roadways, and to determine the portion of time that people are actually exposed at a specific location.

There are considerable uncertainties associated with the existing estimates of toxicity of the various MSAT, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population, a concern expressed by HEI (http://pubs.healtheffects.org/view.php?id=282). As a result, there is no national consensus on air dose-response values assumed to protect the public health and welfare for MSAT compounds, and in particular for diesel PM. The EPA (http://www.epa.gov/risk/basicinformation.htm#g) and the HEI (http://wwwcf.fhwa.dot.gov/exit.cfm?link=http://pubs.healtheffects.org/getfile.php?u=395) have not established a basis for quantitative risk assessment of diesel PM in ambient settings.

There is also the lack of a national consensus on an acceptable level of risk. The current context is the process used by the EPA as provided by the CAA to determine whether more stringent controls are required in order to provide an ample margin of safety to protect public health or to prevent an adverse environmental effect for industrial sources subject to the maximum achievable control technology standards, such as benzene emissions from refineries. The decision framework is a two-step process. The first step requires EPA to determine a "safe" or "acceptable" level of risk due to emissions from a source, which is generally no greater than approximately 100 in a million. Additional factors are considered in the second step, the goal of which is to maximize the number of people with risks less than 1 in a million due to emissions from a source. The results of this statutory two-step process do not guarantee that cancer risks from exposure to air toxics are less than 1 in a million; in some cases, the residual risk determination could result in maximum individual cancer risks that are as high as approximately

100 in a million. In a June 2008 decision, the U.S. Court of Appeals for the District of Columbia Circuit upheld EPA's approach to addressing risk in its two step decision framework. Information is incomplete or unavailable to establish that even the largest of highway projects would result in levels of risk greater than safe or acceptable.

Because of the limitations in the methodologies for forecasting health impacts described, any predicted difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with predicting the impacts. Consequently, the results of such assessments would not be useful to decision makers, who would need to weigh this information against project benefits, such as reducing traffic congestion, accident rates, and fatalities plus improved access for emergency response, that are better suited for quantitative analysis.

Conclusion

The ability to discern differences in MSAT emissions among transportation alternatives is difficult given the uncertainties associated with forecasting travel activity and air emissions 25 years or more into the future. The main analytical tool for predicting emissions from on-road motor vehicles is the EPA's MOBILE6.2 model. The MOBILE6.2 model is regional in scope and has limited applicability to a project-level analysis. However, the effects of a major transportation project extend beyond its corridor and an evaluation within the context of an affected transportation network can be accomplished.

When evaluating the future options for upgrading a transportation corridor, the major mitigating factor in reducing MSAT emissions is the implementation of the EPA's new motor vehicle emission control standards. Decreases in MSAT emissions will be realized from the 2012 through an estimated time of completion for a planned project and its design year some 24 years in the future. Accounting for anticipated increases in VMT and varying degrees of efficiency of vehicle operation, total MSAT emissions are predicted to decline approximately 32 percent from 2012 base year to 2035 design year. While benzene emissions are predicted to decline 21 percent, emissions of DPM are predicted to decline even more (i.e., 75 percent). MSAT emissions decreases from the base year are substantial even with the associated increase in VMT in the travel study area.

The MSAT from mobile sources, especially benzene, have dropped dramatically since 1995, and are expected to continue dropping. The introduction of reformulated gasoline has lead to a substantial part of this improvement. In addition, Tier II automobiles introduced in model year 2004 will continue to help reduce MSAT. Diesel exhaust emissions have been falling since the early 1990s with the passage of the CAAA. The CAAA provided for improvement in diesel fuel through reductions in sulfur and other diesel fuel improvements. In addition, the EPA has further reduced the sulfur level in diesel fuel, which took effect in 2006. The EPA has also called for dramatic reductions in NOx emissions and PM from on-road and off-road diesel engines. MSAT emissions related to 35W north are not expected to increase overall air toxics levels in Tarrant and Denton Counties in the future years investigated.

<u>Air Quality Construction Emissions Reduction Strategies</u>

During the construction phase of this project, temporary increases in air pollutant emissions may occur from construction activities. The primary construction-related emissions are particulate matter (fugitive dust) from site preparation. These emissions are temporary in nature (only occurring during actual construction); it is not possible to reasonably estimate impacts from these emissions due to limitations of the existing models. However, the potential impacts of particulate matter emissions will 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 construction activity phase of this project may generate a temporary increase in MSAT emissions from construction activities, equipment and related vehicles. The primary MSAT construction related emissions are particulate matter from site preparation and diesel particulate matter from diesel powered construction equipment and vehicles.

Construction emission reduction includes strategies that reduce engine activity, reduce emissions per unit of operating time, such as reducing the numbers of trips and extended idling, or have construction occur during non-normal business hours. These strategies would be determined and implemented if feasible during the proposed construction. 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 will have any significant impact on air quality in the area.

E. Noise

No-Build Alternative

Traffic noise has been, is, and would continue to be the primary component of the existing ambient noise level in the study area. The predicted increase in future traffic volumes on IH 35W would likely increase future ambient noise levels.

Build Alternative

This analysis was accomplished in accordance with TxDOT's (FHWA approved) *Guidelines for Analysis and Abatement of Roadway Traffic Noise* (2011). Sound from highway traffic is generated primarily from a vehicle's tires, engine and exhaust. It is commonly measured in decibels and is expressed as "dB." Sound occurs over a wide range of frequencies. However, not all frequencies are detectable by the human ear; therefore, an adjustment is made to the high and low frequencies to approximate the way an average person hears traffic sounds. This adjustment is called A-weighting and is expressed as "dB(A)."

Also, because traffic sound levels are never constant due to the changing number, type and speed of vehicles, a single value is used to represent the average or equivalent sound level and is expressed as "Leq."

The traffic noise analysis typically includes the following elements:

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

The FHWA has established the Noise Abatement Criteria (NAC) listed in **Table 28** for various land use activity areas that are used as one of two means to determine when a traffic noise impact would occur.

Table 28: Noise Abatement Criteria			
Activity Category	**FHWA dB(A) Leq**	**TxDOT dB(A) Leq**	**Description of Land Use Activity Areas**
A	57 (exterior)	56 (exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	66 (exterior)	Residential
C	67 (exterior)	66 (exterior)	Active sport areas, amphitheaters, auditoriums, campgrounds, cemeteries, day care centers, hospitals, libraries, medical facilities, parks, picnic areas, places of worship, playgrounds, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, recreation areas, Section 4(f) sites, schools , television studios, trails, and trail crossings.
D	52 (interior)	51 (interior)	Auditoriums, day care centers, hospitals, libraries, medical facilities, places of worship, public meeting rooms, public or nonprofit institutional structures, radio studios, recording studios, schools, and television studios.
E	72 (exterior)	71 (exterior)	Hotels, motels, offices, restaurants/bars, and other developed lands, properties, or activities not included in A-D or F.
F	--	--	Agricultural, airports, bus yards, emergency services, industrial, logging, maintenance facilities, manufacturing, mining, rail yards, retail facilities, shipyards, utilities (water resources, water treatment, electrical), and warehousing.
G	--	--	Undeveloped lands that are not permitted.

NOTE: primary consideration is given to exterior areas (Category A, B, C, or E) where frequent human activity occurs. However, interior areas (Category D) are used if exterior areas are physically shielded from the roadway, or if there is little or no human activity in exterior areas adjacent to the roadway.
[1] Determined by land use.

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

Absolute criterion: the predicted noise level at a receiver approaches, equals or exceeds the FHWA NAC. "Approach" is defined as one dB(A) below the NAC. For example: a noise impact would occur at a Category B residence if the noise level is predicted to be 66 dB(A) or above.

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

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

The FHWA traffic noise modeling software, Traffic Noise Model, was used to calculate existing and predicted traffic noise levels. The model primarily considers the number, type, and speed of vehicles; highway alignment and grade; cuts, fills, and natural berms; surrounding terrain features; and the locations of activity areas likely to be impacted by the associated traffic noise. Existing and predicted traffic noise levels were modeled at receiver locations (**Table 29** and **Figure 4**) that represent the land use activity areas adjacent to the proposed project that might be impacted by traffic noise and potentially benefit from feasible and reasonable noise abatement.

Table 29: Noise Assessment Results

Receiver and ID	NAC Category	NAC Level	Existing Noise Level	2035 Noise Level	Change (+/-)	Noise Impact
R1 – Motel 6	E	72	52	55	+3	No
R2 – Sleep Inn	E	72	50	53	+3	No
R3 – Multifamily Residential	B	66	44	48	+4	No
R4 – Hampton Inn	E	72	52	61	+9	No
R5 – Residence Inn	E	72	48	57	+9	No
R6 – Single Family Residential	**B**	**67**	**66**	**66**	**0**	**Yes**
R7 – Single Family Residential	**B**	**67**	**63**	**67**	**+4**	**Yes**
R8 – Multifamily Residential	D	52	42	42	0	No
R9 - Restaurant	**E**	**72**	**73**	**75**	**+2**	**Yes**
R10 – Residence Inn	E	72	63	65	+2	No
R11 - Church	D	52	42	48	+6	No

* - Negative or no change in sound levels is due to change in configuration of ramps, the rerouting of traffic at the interchanges, and the additional lanes spreading traffic farther from the representative receiver.

As indicated in **Table 29**, the Build Alternative would result in a traffic noise impact at three representative receivers, and the following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers.

Before any abatement measure can be proposed for incorporation into the project, it must be both feasible and reasonable. In order to be "feasible," the abatement measure must be able to reduce the noise level at greater than 50% of impacted, first row receivers by at least five dB(A); and to be "reasonable," it must not exceed the cost-effectiveness criterion of $25,000 for each receiver that would benefit by a reduction of at least five dB(A) and the abatement measure must be able to reduce the noise level at least one impacted, first row receiver by at least seven dB(A).

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

Alteration of Horizontal and/or Vertical Alignments: any alteration of the existing alignment would displace existing businesses and residences, require additional ROW and not be cost effective/reasonable.

Buffer zone: the acquisition of undeveloped property to act as a buffer zone is designed to avoid rather than abate traffic noise impacts and, therefore, is not feasible.

Noise Barriers: this is the most commonly used noise abatement measure. Noise barriers were considered for two representative impacted residential receivers.

R6 and R7: These representative receivers represent 23 residences with existing developer walls that provide a 5 dBA reduction with some receivers receiving a benefit greater than 7 dB(A). Because of the benefits provided by these existing developer walls, any proposed noise mitigation that would achieve the minimum feasible reduction of 5 dBA at each of the receivers and a reduction of 7 dB(A) at one or more of these receivers would exceed the reasonable cost-effectiveness criterion of $25,000.

R9: This representative receiver represents a restaurant with an outdoor sitting area. Because this restaurant is in a retail facility with changing businesses, noise abatement would not reasonable because it would restrict views to potential customers.

None of the above noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this project.

To avoid noise impacts that may result from future development of properties adjacent to the project, local officials responsible for land use control programs should ensure, to the maximum extent possible, no new activities are planned or constructed along or within the following predicted noise impact contour:

Land Use	Impact Contour	Distance from ROW (feet)
NAC B & C	66 dBA	130
NAC E	71 dBA	33

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 will be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

A copy of this traffic noise analysis will be available to local officials. On the date of approval of this document (Date of Public Knowledge), FHWA and TxDOT are no longer responsible for providing noise abatement for new development adjacent to the project.

F. Cultural Resources

Cultural resources are structures, buildings, archeological sites, districts (a collection of related structures, buildings, and/or archeological sites), cemeteries, and objects. Both federal and state laws require consideration of cultural resources during project planning. At the federal level, NEPA and the National Historic Preservation Act (NHPA) of 1966, among others, apply to transportation projects such as this one. In addition, state laws such as the Antiquities Code of Texas apply to these projects. Compliance with these laws often requires consultation with the Texas Historical Commission (THC)/ Texas State Historic Preservation Officer (SHPO) and/or federally-recognized tribes to determine the proposed project's effects on cultural resources. Review and coordination of this project followed approved procedures for compliance with federal and state laws.

No-Build Alternative
Implementation of the No-Build Alternative would have no effect on existing cultural resources in the proposed project area.

Build Alternative
A discussion of the potential effects from the Build Alternative on cultural resources is provided below.

Archeology
A TxDOT archeologist evaluated the potential for the proposed undertaking to affect archeological historic properties (36 CFR 800.16(l)) or State Archeological Landmarks (SAL) (13 TAC 26.12) in the area of potential effects (APE). The APE comprises the existing ROW (approximately 350 ft wide) and the proposed ROW (which varies up to 100 ft. wide in the APE) for a total length of 10.5 miles and extends to a maximum depth of six feet below the modern ground surface. Section 106 review and consultation proceeded in accordance with the First Amended Programmatic Agreement (PA) among the FHWA, the TxDOT, the Texas SHPO, and the Advisory Council on Historic Preservation Regarding the Implementation of Transportation Undertakings (PA-TU), as well as the MOU between the THC and TxDOT. The following documentation presents TxDOTs findings and explains the basis for those findings.

An intensive archeological survey of the APE was conducted by Ecological Communications Corporation under Texas Antiquities Permit No. 4648 in September 2007. This survey revealed no archeological deposits within the proposed undertaking's APE.

TxDOT completed its review on May 4, 2009. Section 106 consultation with federally recognized Native American tribes with a demonstrated historic interest in the area was initiated on March 20, 2009. No objections or expressions of concern were received within the comment period.

Subsequent to the intensive archeological survey, design changes resulted in additional ROW at several locations. Separately these portions of additional ROW were never more than 0.2 acre and collectively do not total more than approximately one acre of additional ROW. All additional ROW falls within the 50-foot lateral buffer coordinated with federally recognized Native American tribes on July 13, 2010 and section 106 was coordinated with SHPO on April 8, 2011.

Pursuant to Stipulation VI of the PA-TU, TxDOT finds that the APE does not contain archeological historic properties (36 CFR 800.16(l)), and thus the proposed undertaking would not affect archeological historic properties. The project does not merit further field investigations. Project planning can also proceed, in compliance with 13 TAC 26.20(2) and 43 TAC 2.24(f)(1)(C) of the MOU. If unanticipated archeological deposits are encountered during construction, work in the immediate area will cease, and TxDOT archeological staff will be contacted to initiate post-review discovery procedures under the provisions of the PA and MOU.

Standing Structures
A review of the National Register of Historic Places (NRHP), the list of SALs, and the list of Recorded Texas Historic Landmarks indicated that no historically significant resources have been previously documented within the APE. It has been determined through consultation with the SHPO that the APE for the proposed project is 150 feet from the project ROW. A site visit identified 60 historic-age (built prior to 1967) resources on 15 numbered sites located within the project APE. The 15 numbered resources consist of 10 agricultural, four residential, and one commercial site. TxDOT historians determined that none of the historic-age resources are NRHP eligible.

Pursuant to Stipulation VI "Undertakings with Potential to Cause Effects" of the First Amended Statewide PA for Transportation Undertakings (PA-TU) between the FHWA, the Texas SHPO, the Advisory Council on Historic Preservation, and TxDOT and the MOU, ENV historians determined that none of the historic-age resources are eligible for listing in the NRHP. Since the properties are not NRHP eligible, the project would have no effects to historic properties and individual project coordination with SHPO is not required (**Appendix E**).

G. Section 4(f) Properties

No-Build Alternative
Implementation of the No-Build Alternative would have no effect on Section 4(f) properties.

Build Alternative
There are no Section 4(f) properties within the project area. The proposed action would not require the use of any publicly owned land such as a public park, recreational area, wildlife and waterfowl refuge lands or historic sites of national, state or local significance; therefore, a Section 4(f) statement would not be required.

H. Items of Special Nature

No-Build Alternative
Implementation of the No-Build Alternative would have no effect on Coastal Zone Management Plans, Wild and Scenic Rivers or require coordination for Airway-Highway Clearance.

Build Alternative
Coastal Zone Management Plan
The proposed project is not located within the Texas Coastal Zone Management Program boundary; therefore, the proposed project is not subject to the guidelines of the associated plan.

Wild and Scenic Rivers
There are no wild and scenic rivers in the project area; therefore, there would be no impacts to a river designated as a component or proposed for inclusion in the national system of Wild and Scenic Rivers.

Airway-Highway Clearance
There are two airports, Fort Worth Meacham International Airport and Alliance Airport, which are found within the vicinity of the proposed project area. The Alliance Airport runway is less than 2,000 feet from the proposed project. Elevations of the airports and the proposed project's structures (plus 17 feet per federal guidelines) were determined, as well as the distances between the airports and proposed structures. These measurements are provided in **Table 30**. Because Alliance Airport has precision instrument runways, additional calculations for penetration into the 50:1 approach surface were performed for the proposed direct connectors in the IH 35W/SH 170 interchange which is located approximately 5,600 feet south of Alliance Airport. Based on the distances and elevations indicated in **Table 30** and **Appendix F** and current Federal Regulations for Objects Affecting Navigable Airspace (CFR 77), the proposed direct connectors in the IH 35W/SH 170 interchange do not penetrate the 50:1 approach surface. Sixteen structures penetrate the 100:1 slope, shown in bold italics in **Table 30**; therefore, a Federal Aviation Administration (FAA) Notice of Proposed Construction or Alteration form (Form AD-7460-1) will be completed during the design phase and submitted by TxDOT to the FAA for their approval prior to construction of proposed improvements surrounding the airport.

Consultation with Alliance Airport has been conducted and it is not expected that the proposed project would change the policies, procedures or operations of Alliance Airport. The proposed structures are not considered flight path hazards for incoming or departing planes.

Table 30: Airfields & Proposed Structures - Distance and Elevation

Point No.	Point Name	Elevation (FT)	Distance to Closest Runway (FT)	Closest Runway	Elevation* (FT)
1	Alliance Blvd.	694	4,230	Alliance Airport	664
2	*IH 35W SB @Westport Pkwy.*	*690*	*2,050*	*Alliance Airport*	*664*
3	*IH 35W ML @Westport Pkwy.*	*691*	*2,110*	*Alliance Airport*	*664*
4	*IH 35W NB @Westport Pkwy.*	*690*	*2,170*	*Alliance Airport*	*664*
5	*DC SB IH 35W to WB 170*	*743*	*5,603*	*Alliance Airport*	*664*
6	*DC SB IH 35W ML to WB 170*	*749*	*5,634*	*Alliance Airport*	*664*
7	*DC EB 170 to NB 35W ML*	*775*	*5,929*	*Alliance Airport*	*664*
8	*DC EB 170 to NB 35W GP*	*777*	*5,970*	*Alliance Airport*	*664*
9	*WB 170 FR*	*727*	*5,755*	*Alliance Airport*	*664*
10	*170 GP*	*754*	*6,000*	*Alliance Airport*	*664*
11	*EB 170 FR*	*731*	*6,223*	*Alliance Airport*	*664*
12	*DC WB 170 to SB 35W GP*	*784*	*6,309*	*Alliance Airport*	*664*
13	*DC NB IH 35W GP to EB 170*	*771*	*7,460*	*Alliance Airport*	*664*
14	*IH 35W ML @ Keller-Hicks Rd.*	*834*	*12,040*	*Alliance Airport*	*664*
15	*IH 35W NB ML to IH 35W NB GP*	*845*	*14,688*	*Alliance Airport*	*664*
16	*IH 35W SB GP to IH 35W SB ML*	*845*	*14,585*	*Alliance Airport*	*664*
17	*IH 35W ML @ Golden Triangle*	*825*	*15,151*	*Alliance Airport*	*664*
18	Basswood to IH 35W SB ML	678	19,107	Meacham Int'l Airport	674
19	IH 35W NB ML to Basswood	680	19,213	Meacham Int'l Airport	674
20	Basswood to IH 35W SB GP	659	18,531	Meacham Int'l Airport	674
21	IH 35W NB GP to Basswood	670	18,813	Meacham Int'l Airport	674
22	IH 35W ML @ Western Center	651	18,034	Meacham Int'l Airport	674

*Airport Diagram 10266, Fort Worth Alliance (AFW), Fort Worth, TX, SC-2, 30 JUN 2011 to 28 JUL 2011 and Airport Diagram 11125, Fort Worth Meacham International (FTW), Fort Worth, TX, SC-2, 30 JUN 2011 to 28 JUL 2011

I. Indirect Effects

FHWA generally describes the consequences of an action as falling into two broad categories: direct and indirect. Indirect effects are defined as those "…which are caused by an 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). Potential indirect effects could include the following:

- Development and land use changes due to improved access;

- Increases in storm water runoff due to changes in land use and increased development on land surrounding the proposed facility;

- Increased sedimentation of wetlands and streams and decreased water quality due to future development of land adjacent to the new facility;

- Loss of wildlife habitat and decreased habitat value in areas of increased land development spurred by the proposed project;

- Impact to cultural resource sites from development projects on private properties that do not require cultural resource investigations because public funds or permits are not required;

- Increased use of parks and recreational areas due to more convenient access provided by the new facility; and,

- Stimulation of the local economy from the circulation of construction spending; improved access to employment opportunities, markets, goods, or services such as health and education; an increased work force related to construction; and development stemming from the new facility.

- Impacts to air quality as a result of the redistribution of traffic.

Indirect effects were assessed based on guidance described in TxDOT's *Revised Guidance on Preparing Indirect and Cumulative Impact Analysis* (September 2010), the Transportation Research Board's (TRB) National Cooperative Highway Research Program (NCHRP) Report 466: *Desk Reference for Estimating the Indirect Effects of Proposed Transportation Projects* (TRB, 2002), and NCHRP 25-25, Task 22: *Forecasting Indirect Land Use Effects of Transportation Projects*. Indirect effects can occur in three broad categories:

1. Encroachment-Alteration Effects - Alteration of the behavior and functioning of the affected environment caused by project encroachment (e.g., physical, chemical, biological);

2. Access-Alteration Effects - Project-influenced development impacts (i.e., the land use effect); and,

3. Effects Related to Project-Influenced Development - Impacts such as the effects of the change of land use on the human and natural environment.

For transportation projects, Category 1 impacts include project impacts such as fragmentation of habitat by a roadway or dispersal of pollutants onto adjacent lands. Indirect effects from Categories 2 and 3 are typically encountered outside of the project ROW, and may result from actions taken by other parties such as private land developers not directly associated with the project. The CEQ regulations state that the environmental document must identify all the indirect effects that are known and make a good faith effort to explain the impacts that are not known, but which are "reasonably foreseeable." CEQ has issued guidance that further explains "reasonably foreseeable" as events that must be "probable."

The indirect effects analysis was conducted in accordance with the seven-step process suggested in TxDOT's *Revised Guidance on Preparing Indirect and Cumulative Impact Analysis*. **Table 31** details the seven steps.

Table 31: Seven Step Approach to Estimate Indirect Effects
Step 1 - Scoping: The basic approach, effort required, and geographical boundaries of the study are determined.
Step 2 - Identify the Study Area's Goals and Trends: Information regarding the study area is compiled with the goal of defining the context for assessment.
Step 3 - Inventory the Study Area's Notable Features: Additional data on environmental features are gathered and synthesized with a goal of identifying specific environmental issues by which to assess the project.
Step 4 - Identify Impact-Causing Activities of Proposed Action and Alternatives: Fully describe the component activities of each project alternative.
Step 5 - Identify Potentially Substantial Indirect Effects for Analysis: Indirect effects associated with project activities and alternatives are cataloged, and potentially significant impacts meriting further analysis are identified.
Step 6 - Analyze Indirect Effects and Evaluate Results: Qualitative and quantitative techniques are employed to estimate the magnitude of the potentially significant impacts identified in Step 5 and describe future conditions with and without the proposed transportation improvement. The uncertainty of the results of the indirect effects analysis is evaluated for its ramification on the overall assessment.
Step 7- Assess Consequences and Consider/Develop Mitigation: The consequences of indirect effects are evaluated in the context of the full range of project effects. Strategies to avoid or lessen any impacts found to be unacceptable are developed. Impacts are reevaluated in the context of those mitigation strategies.

Step 1: Scoping

This step examines the attributes of the proposed project and the surrounding area to focus the analytical approach and to identify an appropriate area for analysis of indirect effects.

Project Attributes

IH 35W is a major north-south transportation corridor in Tarrant and Denton Counties. The proposed 10.5-mile long project has been planned and designed to meet future travel demands stemming from projected population growth and traffic volumes, address operational and capacity deficiencies on IH 35W, US 81/287, and SH 170, and update the facility to current design standards. IH 35W, from SH 114 to IH 820 is a four-lane divided highway with limited access entrances and exits with discontinuous frontage roads. The proposed improvements include the reconstruction and widening of the existing highway to a 10 and 14-lane facility (consisting of four to six barrier-separated concurrent managed (toll) lanes centered between the six to eight general purpose lanes (non-toll)), auxiliary lanes (constructed between entrance and exit ramps along the roadway) and frontage roads. The proposed project does not include improvements to the IH 35W/IH 820 interchange. The interchange (extending from the centerline of IH 820 to 825 feet north of Fossil Creek Boulevard) would be constructed as part of the IH 820 improvement project. Approximately 97.4 acres of additional ROW and 0.6 acres of drainage easements would be required for the proposed project.

Study Approach and Level of Effort

The process described in NCHRP 466 Figure 3-1 was used to determine the general study approach and required level of effort for the indirect effects analysis. The results are shown in **Table 32**.

Table 32: Level of Effort for Indirect Effects Analysis		
Project Variables		Assessment Methodology
Project Type	Roadway Expansion	Qualitative/Quantitative
Project Scale	Medium – 10.5 miles; 97.4 acres of new ROW and 0.6 acre of drainage easements.	Qualitative/Quantitative
Project Scope	Regional	Qualitative/Quantitative
Stage of Study	Design Alternatives	Quantitative
Project Setting	Urban area within the Cities of Fort Worth and Haslet. The land use along the project corridor consists of agricultural (pasture/cultivated), commercial, residential, retail, office, light industrial, and floodplain with some additional undeveloped areas.	Qualitative
Design Features	The proposed improvements to IH 35W include the following: Eagle Parkway to US 81/287: Reconstruction and widening to a 10-lane facility consisting of three general purpose lanes (non-toll) in each direction and a barrier-separated four-lane concurrent managed (toll) lane facility (two lanes in each direction) centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway. US 81/287 to Basswood Boulevard: Reconstruction and widening to a 12-lane facility consisting of four general purpose lanes (non-toll) in each direction. A barrier-separated four-lane concurrent managed (toll) lane facility (two lanes in each direction) would be centered between the general purpose lanes (non-toll). Basswood Boulevard to IH 820: Reconstruction and widening to a 14-lane facility consisting of eight general purpose lanes (non-toll) in each direction. A barrier-separated six-lane concurrent managed (toll) lane facility (three lanes in each direction) centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway. The reconstructed general purpose lanes (non-toll) and frontage roads would not be tolled. Only the new managed (toll) lanes would be tolled.	Qualitative/Quantitative
Project Purpose	To improve mobility within the IH 35W corridor and facilitate access to existing and future land uses along the proposed project.	Qualitative/Quantitative
Data Available	Discussions with Cities of Fort Worth, Blue Mound, Haslet, and Roanoke, and the Town of Northlake. Review of maps and field data.	Qualitative/Quantitative

Geographic and Temporal Boundaries of the Indirect Effects Area of Influence

Geographic Boundary

The Area of Influence (AOI) for this project is bound by SH 114 to the north (the proposed project's northern terminus), US 377/SH 170/Alta Vista Road/Beach Street to the east, IH 820 to the south, and FM 156 (Blue Mound Road) to the west (**Figure 17**). The southern boundary of the AOI is also the proposed project's southern terminus and the IH 35W southern leg's northern terminus (CSJs 0014-16-179, -192, and -193). Because of the similarity of their

respective indirect effects, it is reasonable to assume that the indirect effects of one major roadway would largely become eclipsed by the indirect effects associated with other major roadways in proximity to the proposed project. Defining the AOI in this manner is one of the several acceptable methods identified in the NCHRP Report 466. The AOI encompasses approximately 31,664 acres of land.

Temporal Boundary
The temporal component of the indirect effects analysis is the timeframe in which impacts to resources are expected to occur, which for this analysis is 2009 to 2035. Extending the timeframe forward to 2035 for indirect effects matches *Mobility 2035*, the MTP for the region.

Step 2 – Identify the Study Area's Direction and Goals
The AOI is within the limits of the Cities of Fort Worth, Blue Mound, Haslet, and Roanoke, and the Town of Northlake. These entities have developed plans and policies and compiled data which would provide information for identifying the direction and goals associated with the proposed project's AOI.

Goals

Mobility 2035: The Metropolitan Transportation Plan (NCTCOG)
This plan defines transportation systems and services in the DFW metropolitan area. It serves as a guide for the expenditure of State and Federal funds through the year 2035. The Plan 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 project is consistent with the MTP, which describes the proposed project as a 14 to 22 lane facility with four/six concurrent managed (toll) lanes, and frontage roads that would vary from four to eight (two-four lanes in each direction). See Table 8 for further information.

Excess Toll Revenue Sharing Policy: Managed Lane Policy
This policy was developed by NCTCOG to determine how and where excess revenue generated by TxDOT managed lanes would be spent. Excess revenue is considered the annual revenue generated after debt, maintenance, reserve funds, profit, and other expenses related to the managed lanes are covered. Excess funds would remain within the county where the managed lane is located. For this project, all excess revenue would be distributed in Tarrant County according to the Excess Toll Revenue Sharing: Managed Lane Policy (**Appendix D**).

City of Fort Worth: Comprehensive Plan
The Comprehensive Plan is the City of Fort Worth's official guide for making decisions about growth and development. The City's Plan is a summary of the recommended policies, strategies, programs, and projects that would enable the City to achieve its mission of "focusing on the future, working together to build strong neighborhoods, develop a sound economy, and provide a safe community". In developing the Plan to achieve its mission, five major themes emerged:

1. Promoting Economic Growth
   - Strengthen the effectiveness of economic development incentives by including appropriate capital improvement funding in an overall incentive package that encourages central city redevelopment.

2. Meeting the Needs of an Expanding Population

- Encourage development that reduces daily VMT for commuters through the creation of growth centers.

3. Encourage new development adjacent to developed or platted areas so as to utilize existing infrastructure and services.Revitalizing the Central City
   - Promote neighborhood stability through a comprehensive and coordinated strategy that addresses housing, neighborhood economic development, infrastructure, parks, cultural programs, safety improvements, and human services.
   - Use the Neighborhood Empowerment Zone program to promote the development of designated urban villages, model blocks, and other targeted redevelopment areas.

4. Developing Multiple Growth Centers
   - Promote location of multifamily units within walking distance of public transportation, employment, and/or shopping to increase accessibility and decrease vehicular traffic generation.
   - Link growth centers with major thoroughfares, public transportation, trails and linear parks.
   - Accommodate higher density residential and mixed uses in areas designated as commercial on the City's future land use maps.
   - Locate large industrial uses along rail lines, highways, or airports within industrial growth centers and other appropriate locations.

5. Celebrating the Trinity River
   - Pursue implementation of the Trinity River Vision Master Plan in cooperation with Streams and Valleys, Inc., the Tarrant Regional Water District, and the USACE.
   - Encourage redevelopment and infill in order to reduce the amount of new impervious surfaces.

The Comprehensive Plan is an evolving working document that is updated each year to assure its usefulness and relevance to the community. The 2010 Draft Comprehensive Plan (posted September 4, 2009) will be the ninth update of the *2000 Comprehensive Plan*. The 2009 Comprehensive Plan was adopted February 24, 2009. The plans listed below are incorporated into the Comprehensive Plan by reference. The plans address significant policy issues for targeted districts or the city as a whole:

City of Fort Worth: The Master Thoroughfare Plan and Street Development
The Master Thoroughfare Plan Standards (adopted by City Council on March 10, 2009) provides a network of public streets that offers access to private and public properties on one hand and mobility on the other. The Plan was developed based on the following criteria: the Comprehensive Plan; future traffic capacity needs; environmental issues (floodplain, drainage, topographic features, etc.); safe utilization by pedestrians, bicyclists, buses, and truck traffic; existing and planned neighborhoods; existing roadways; construction feasibility; and coordination with the NCTCOG's Regional Transportation Plan and with adjacent cities' plans. The Plan identifies existing and future roadways for the City and its extraterritorial jurisdiction consistent with the above criteria. It recognized that classifications and/or locations of arterials may change based on future conditions.

City of Fort Worth: Mobility and Air Quality (MAQ) Plan
In January 2009, the City Council adopted the MAQ Plan which identifies, analyzes, and recommends transit and roadway projects that will reduce congestion and air pollution. The MAQ Plan also provides a strategic implementation plan, including a financial element. The final product is a comprehensive and multimodal transportation system plan and a programmed

effort to improve mobility and air quality. The MAQ Plan identified 12 corridors containing over 80 major roadway and transit alternatives for analysis. IH 35W is one of these 12 corridors.

City of Fort Worth: Zoning
Zoning is the City's tool in implementing the land use component of the Comprehensive Plan. Through the use of district classifications, zoning helps to regulate land use, promote orderly growth, and protect existing property owners by ensuring a convenient, attractive and functional community. Both the Comprehensive Plan and the Zoning Map designate the AOI as an industrial district (primarily along IH 35W and along the northern limits of the study area) and residential and mix-used district. Industrial uses in the City may include light, medium, and heavy industrial. Residential includes single-family and low to high-density multifamily. Mixed-use include residential, commercial, institutional, and light industrial. The City guides land use to ensure that land resources appropriately encourage economic development, promote a variety of housing choices, preserve natural and historic resources, and accommodate transportation routes and public facilities, in order to protect and improve Fort Worth's quality of life. Predevelopment conferences with City staff are offered for applicants to learn more about City development policies and procedures and to address site specific issues.

In addition to the City of Fort Worth Comprehensive Plan, development plans for the cities of Blue Mound, Haslet, and Roanoke, and the Town of Northlake were reviewed. These plans guide development in each of these cities and an overview of each is presented below.

City of Blue Mound: Comprehensive Plan
The comprehensive plan for Blue Mound is an official long range policy statement adopted and amended by formal resolution of the City Council. It is a major component of the planning process for the City as it guides the long-range, comprehensive decision making process involving primarily physical development and those city actions expected to influence development in the long-term.

City of Haslet: Code of Ordinances
The City of Haslet's Code of Ordinances contains the rules and laws that govern the City. It covers general administration to zoning. The Comprehensive Plan is contained under Article 14.03 of Zoning. The Plan was adopted on October 2, 2006 and contains the land use plan, master thoroughfare plan, water system and sanitary sewer master plans, and future land use map.

City of Roanoke: Code of Ordinances
The City of Roanoke's Code of Ordinances was adopted on August 15, 1995 and its Supplement No. 13, Update 3 was enacted on August 11, 2009. The Code consists of articles on the form of government and boundaries to development standards. The City's Comprehensive Plan's procedure and legal effect is located under Article IX of the Planning and Zoning Commission. The existing Comprehensive Plan for the physical development of the City contains recommendations for the growth, development and beautification of the City and its extraterritorial jurisdiction. It serves as a guide to all future City Council action concerning land use and development regulations and expenditures for capital improvements. Additions to and amendments of the Comprehensive Plan shall be by ordinance.

Town of Northlake: Comprehensive Plan
Northlake was incorporated on December 28, 1960. The action to incorporate was motivated by the concern that adjacent cities, including the Cities of Denton and Fort Worth, had designs to absorb the community of ranches into their corporate limits. Up until that time, the area where the new Town was located consisted of only a number of ranches, and very little other uses.

The Northlake Vision and Comprehensive Plan is an update to the Northlake Strategic Plan, which was adopted by the Town of Northlake in 2002. The 2002 Strategic Plan established goals, plans and design guidelines to direct future growth. The Plan is intended to capture the desires and aspirations of the town's citizens and translate that vision into a plan through the adoption and implementation of strategic actions that will guide future development in the town. The goal of this Plan is to ensure that stakeholders have tools available to successfully implement the plan, including appropriate regulations, key public strategies, investments and incentives to encourage appropriate private investment. The Plan, in itself, is not a regulatory document; instead, once adopted, the Plan will be used to guide town development decisions. In addition, the Town Council shall consider the adopted plan before adopting local laws, ordinances and regulations related to current and future development issues. The Plan was adopted by the Northlake Town Council on April 9, 2009.

A review of the existing conditions, current plans, and development around the Town of Northlake coupled with an analysis of community input suggests six Strategic Issues the Town should consider in order to move toward the future envisioned by Northlake citizens. The Town's Strategic Issues are as follows:

- Strategic Issue 1: Maintaining rural character
- Strategic Issue 2: Parks, open space and trails
- Strategic Issue 3: Quantity, quality, and location of development
- Strategic Issue 4: Providing infrastructure and services
- Strategic Issue 5: Impact of gas and oil on future surface development
- Strategic Issue 6: Annexation

Trends

Population
Tarrant and Denton Counties are expected to experience growth through the year 2035. Tarrant County experienced a 25 percent growth rate from 2000 to 2010. Population forecasts indicate that Tarrant County will experience a 56 percent growth rate from 2010 through 2035. Denton County experienced a 53 percent growth rate from 2000 to 2010. Population forecasts indicate that Denton County will experience a 59 percent growth rate from 2010 through 2035.

Economy
Recently, the Fort Worth area has seen a dramatic increase in the total number of natural gas wells throughout the city and surrounding counties. This increase in natural gas wells is attributed to the large natural gas reserve under Tarrant, Wise, Denton, Johnson, and Parker counties, known as the Barnett Shale. Rising production of natural gas in Tarrant County has helped make Fort Worth a leader in Texas' energy production. Tarrant County is now ranked no. 7 in top gas producing counties by the Texas Railroad Commission.

However, the changing economy provides the Cities of Fort Worth, Blue Mound, Haslet, and Roanoke, and the Town of Northlake with several challenges and many opportunities. The national, state, and local economies began emerging from a slowdown after September 11, 2001. According to the City of Fort Worth's Comprehensive Plan, the City fared well during this time due its diverse economy and its close proximity to Alliance and DFW airports and the North American Free Trade Agreement IH 35 corridor. In addition, the community's pro-business stance has helped diversify the Fort Worth economy. These factors provide Fort Worth with a firm foundation for growth in future years. However, the policies and programs of the City will be

continuously examined to ensure that the City will help mitigate the impacts of a slowing economy and rising energy costs, while promoting its economic strengths.

Employment

Once dependent on agriculture, oil, and defense, the City of Fort Worth is developing into a major center for industry, technology, distribution, and transportation. The Cities of Blue Mound, Haslet, and Roanoke, and the Town of Northlake are commuter communities for Fort Worth. All sectors of the economy are expected to continue to add jobs, with services capturing over 30 percent of the jobs by 2030. Employment in City of Fort Worth grew at a rate of 3.4 percent per year between 1990 and 2007. Per **Table 10**, employment in Tarrant County is expected to grow 74 percent between 2005 and 2035. In Denton County, employment is expected to grow 114 percent between 2005 and 2035.

Economic research forecasts indicate job growth in the Fort Worth-Arlington Metropolitan Division will continue, though at a slightly slower rate than that of the late 1990s. Between 1990 and 2005, the area gained jobs at a rate of 2.3 percent per year. Total job growth is expected to slow to 1.8 percent annually through the year 2030 (2007-2030). This projection takes into account the slowing of the national economy in the face of increasing global competition, geopolitical conflicts, and tightening labor markets. Rising energy costs may play a further role in limiting job growth as gasoline prices continue to rise. In November 2009, the Fort Worth-Arlington Metropolitan Division recorded an unemployment rate was 8 percent. As the nation continues to experience economic uncertainty, unemployment rates will continue to rise. In November 2009, the nation recorded an unemployment rate of 10 percent.

Single-Family Home Construction

Single-family home construction was identified as one of the primary land use types in the City. In 2005, single-family and duplex land uses constituted 21 percent of the City's total land area. In 2008, approximately 52.0% of the City was zoned for single-family and low density residential use. There were 139,200 single-family home units in the City of Fort Worth in 2000 (66 percent of all residential uses) and 203,912 (69.1 percent of all residential uses) in the year 2010. This development has triggered the construction of public facilities, and development of commercial and retail areas.

The increase in the single-family home units for the Cities of Fort Worth, Blue Mound, Haslet, and Roanoke, and the Town of Northlake are summarized in **Table 33**.

Table 33: Single-Family Structures

City/Town	2000 Number	2010 Number	Percent change between 2000 and 2010
Fort Worth	139,200	203,912	46.5%
Blue Mound	790	790	0%
Haslet	400	518	29.5%
Roanoke	756	1,422	88.1%
Northlake	103	221	114.6%

Source: *NCTCOG, 2010 Housing Estimates (May 2010), http://www.nctcog.org/ris/demographics/housing.asp.*

School Enrollment

The Texas Education Agency (TEA) guides and monitors activities and programs related to public education in Texas. According to the TEA's Public Education Information Management System, the 2010-2011 school year enrollment totaled 13,312 students compared to the

2005-2006 school year enrollment of 8,074 students within the AOI. This represents a growth rate of 64.9 percent over a period of six years.

NCTCOG Development Monitoring
The NCTCOG maintains a development monitoring database that tracks over 8,000 major developments that exist, are under construction, are announced, or are in the conceptual stages within the MPA. Major developments are over 100,000 square feet and/or 100 employees. **Table 34** presents a summary of major developments that are either under construction or announced within the cities of Fort Worth, Roanoke, Haslet, Northlake, and Blue Mound. This information indicates that the AOI is continuing to become more urbanized.

Table 34: Major Developments Within the AOI

City/Town	Number of Developments	Development Types
Fort Worth	1,480	Cultural, Education, Group Quarters, Hotels, Industrial, Institutions, Multi-Family, Mixed-Use, Office, Retail, Single Family
Blue Mound	1	Education
Haslet	14	Education, Industrial.
Roanoke	25	Education, Industrial, Multi-Family, Retail
Northlake	10	Hotels, Industrial, Institutions, Multi-Family, Mixed-Use, Office, Single Family

Source: *NCTCOG, 2008.*

Step 3 – Inventory of Study Area's Notable Features
The third step in the indirect effects assessment framework involves conducting an inventory of notable features to identify specific issues by which to assess the project. Notable features include sensitive species and habitats; valued environmental components; relative uniqueness, recovery time, and unusual landscape features; and vulnerable elements of the population. The notable features in the AOI consist of the following:

Sensitive Species and Habitats
Sensitive species and habitats are those ecologically valuable species and habitats and/or those that are vulnerable to impacts. Undeveloped land in the AOI consists of approximately 528 acres of upland woodlands, 129 acres of fence row vegetation, 976 acres of bottomland hardwoods, 109 acres of riparian woodlands, and 1,280 acres of herbaceous vegetation.

There is the potential for three state-listed threatened species (Louisiana pigtoe, Texas heelsplitter, and Texas horned lizard) to be present in the AOI. In addition, there is the potential for three non-listed species of concern (plains spotted skunk, little spectaclecase, and Texas garter snake) to be present in the AOI. **Table 18** describes the habitat for these species.

Elizabeth Creek, Henrietta Creek, Buffalo Creek, Big Bear Creek, Big Fossil Creek, Little Fossil Creek, and their unnamed tributaries traverse the AOI. There are approximately 81 linear miles of streams, 505 acres of wetlands, 80 acres of ponds, and 4,794 acres of floodplains associated with these water bodies in the AOI.

Valued Environmental Components
Valued environmental components are those characteristics or attributes of the environment that society seeks to use, protect, or enhance such as parks and recreation areas. There are 18

parks within the AOI. Collectively, these parks total approximately 359 acres. The parks range in size from less than four acres to approximately 161 acres.

Relative Uniqueness, Recovery Time, and Unusual Landscape Features

Relative uniqueness refers to how many comparable examples of the element exist at different levels of scale. Recovery time refers to how long it would take to replace the landscape element if it were disturbed or destroyed. Unusual landscape features are those that occur once, or only a few times, across a landscape. The vegetation and water body features previously discussed in the Notable Features Sensitive Species and Habitats section are also included in this section because these features are relatively unique to the AOI, would require a long recovery time, and only occur a few times across the landscape.

Centrally located in the U.S., the 17,000-acre AllianceTexas® development is anchored by the Alliance Global Logistics Hub. The Alliance Global Logistics Hub offers multi-modal transportation options, including the Burlington Northern-Santa Fe Railway's Alliance Intermodal Facility, two Class I rail lines, Fort Worth Alliance Airport (the world's first 100 percent industrial airport), and the FedEx Southwest Regional Sort Hub.

Vulnerable Elements of the Population

Vulnerable elements of the population may include the elderly, children, persons with disabilities, minority groups, and low-income groups. Vulnerable elements of the population exist in the AOI.

There are sixteen schools and three daycare facilities within the AOI.

According to city-data.com, the cities of Roanoke and Haslet and the town of Northlake average an 80 percent white population and the highest minority group in each city is Hispanic. The City of Blue Mound, which is entirely encompassed by the AOI and is only 312 acres in size, is less than 50 percent white with 40 percent Hispanic. The majority of the AOI is located within the City of Fort Worth. The city keeps an inventory of voluntary and mandatory neighborhood associations within the city limits and there are 22 neighborhoods within the AOI. None of these neighborhoods have been identified as high minority or low-income neighborhoods by the city. Fort Worth neighborhoods with the most need (Model Blocks, recipients of federally funded improvement grants) are located within the IH 820 loop; the AOI is outside this loop. The City of Blue Mound exhibits a distinct Hispanic population within the AOI; however, no other readily identifiable minority communities were identifed in the AOI. Additionally, no readily identifiable low-income communities are present within the AOI.

Step 4 – Identify Impact-Causing Activities of the Proposed Improvements

A thorough understanding of project design features and the range of impacts they might cause is the first step toward the identification of encroachment-alteration and access-alteration indirect effects. The impact-causing activities from the proposed project are discussed below:

Modification of Regime Effects – Nearly all of the vegetation (approximately 85.8 percent) within existing and proposed ROW is mowed and maintained grassland, at times interspersed with a variety of broadleaf herbaceous plants. The dominant species throughout the ROW is Bermuda grass. Unmaintained vegetation (grassland and scattered sapling-scrub-shrub vegetation, pasture, cultivated fields, and fence row vegetation) comprises approximately 14 percent of the proposed project corridor. Riparian vegetation comprises approximately 0.1 percent of the proposed project corridor. These impacts are associated with clearing of existing vegetation cover as required for the construction of the travel lanes, frontage roads, ramps, connectors, safety clear zone, and bridges. According to the design engineer, the vegetation

within the existing and proposed ROW, and drainage easements would be impacted. The vegetation would be permanently impacted due to not only the aforementioned activities, but additionally by construction phasing, storage, and staging activities. The proposed project would permanently impact approximately 407 acres of maintained/herbaceous vegetation, 62 acres of unmaintained vegetation (grassland and scattered sapling-scrub-shrub vegetation, pasture, cultivated fields, and fencerow vegetation) and 0.2 acre of riparian vegetation. An additional 0.3 acre of riparian areas is located within the existing ROW but would not be impacted by the proposed project.

Land Transformation and Construction – In order to improve mobility within the IH 35W corridor and facilitate access to existing and future land uses along the proposed project, the following land transformation and construction measures are proposed:

- From Eagle Parkway to US 81/287, the proposed project would consist of reconstructing and widening the roadway to a 10-lane facility consisting of three general purpose lanes (non-toll) in each direction and a barrier-separated four-lane concurrent managed (toll) lane facility (two lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/threelane frontage roads in each direction with bicycle accommodation would be constructed. Direct connectors from IH 35W to SH 170 would also be constructed.
- From US 81/287 to Basswood Boulevard, the proposed project would consist of reconstructing and widening the roadway to a 12-lane facility consisting of four general purpose lanes (non-toll) in each direction and a barrier-separated four-lane concurrent managed (toll) lane facility (two lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/three/four-lane frontage roads in each direction with bicycle accommodation would be constructed throughout this section. Direct connectors to/from US 81/287 from IH 35W managed (toll) lanes would be constructed.
- From Basswood Boulevard to IH 820, the proposed project would consist of reconstructing and widening the roadway to a 14-lane facility consisting of four general purpose lanes (non-toll) in each direction and a barrier-separated six-lane concurrent managed (toll) lane facility (three lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/three/four-lane frontage roads in each direction with bicycle accommodation would be constructed throughout this section.

Processing – TxDOT would comply with TCEQ's TPDES Construction General Permit and a construction site notice would be posted on the construction site. A NOI would be filed to comply with TCEQ stating that TxDOT would have a SW3P in place during construction of the proposed project. This SW3P utilizes the temporary control measures as outlined in TxDOT's manual *Standard Specifications for the Construction and Maintenance of Highways, Streets, and Bridges*. The contractor would take appropriate measures to prevent, minimize, and control spill of hazardous materials in the construction staging area. The use of construction equipment within sensitive areas would be minimized or eliminated entirely. All construction materials used for this project would be removed as soon as the work schedule permits. Any unanticipated hazardous materials and/or petroleum contamination encountered during construction would be handled according to applicable federal, state, and local regulations per TxDOT Standard Specifications.

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

Resource Renewal – The only habitats located within the proposed project corridor given consideration for non-regulatory mitigation are the two riparian areas of the ephemeral streams. Impacts to these areas would be limited to approximately four trees that are six to 12-inch dbh or greater. Compensatory mitigation for these impacts is not being offered because impacts would be minor (approximately 0.2 acre) and the riparian areas are poor quality and low in species composition. Riparian vegetation observed adjacent to the proposed project that would not be disturbed is similar in composition and structure to that which would be removed. In accordance with EO 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping, seeding and replanting with TxDOT approved seeding specifications that is in compliance with EO 13112 would be done where possible. Moreover, abutting turf grasses within the ROW are expected to re-establish throughout the project length. Soil disturbance would be minimized to ensure that invasive species would not establish in the ROW.

Changes in Traffic – The proposed project is expected to improve mobility within the IH 35W corridor and facilitate access to existing and future land uses along the proposed project. The addition of general purpose lanes (non-toll) and managed (toll) lanes would add capacity and improve mobility. The implementation of the concurrent managed (toll) lanes as part of the IH 35W project would provide congestion relief primarily within the peak hour travel times, as well as provide a revenue source to pay for the operational and maintenance costs of the facility and future rehabilitation or reconstruction of the facility.

Waste Emplacement and Treatment – Soil excavated from the project area would likely be stockpiled for use on another project or sold for other uses, depending on the results of soil testing. The contractor, when selected, may chose to provide portable sanitary facilities for employees at the field office. No other sanitary waste discharge is anticipated.

Chemical Treatment – No use of fertilizer is anticipated during re-vegetation. Periodic applications of herbicide may occur during the maintenance phase of the proposed project.

Access Alteration – The purpose of the proposed project is to improve mobility within the IH 35W corridor and facilitate access to existing and future land uses along the proposed project. The addition of general purpose lanes (non-toll) and managed (toll) lanes would add capacity and improve mobility. The purpose of implementing concurrent managed (toll) lanes as part of the IH 35W project would be to provide congestion relief primarily within the peak hour travel times, as well as provide a revenue source to pay for the operational and maintenance costs of the facility and future rehabilitation or reconstruction of the facility.

Step 5 –Identify Potentially Substantial Indirect Effects for Analysis

The objective of this step is to compare the list of project impact-causing activities with the lists of goals discussed in Step 2 and notable features discussed in Step 3 to explore potential cause-effect relationships and establish which effects are potentially substantial and merit subsequent detailed analysis. The analysis focuses on encroachment-alteration effects, induced growth effects, and effects related to induced growth. Indirect effects that are not potentially substantial and require no further assessment are dismissed in this step.

<u>Encroachment-Alteration Effects</u>

Encroachment-alteration effects may occur in two categories: ecological effects and socio-economic effects.

Ecological Effects

Wildlife Habitat
Implementation of the proposed project could create ecological encroachment-alteration effects to vegetation and wildlife habitat in the AOI over time. This includes potential habitat for three state-listed threatened species (Louisiana pigtoe, Texas heelsplitter, and Texas horned lizard) and three non-listed species of concern (plains spotted skunk, little spectaclecase, and Texas garter snake) that have the potential to be present in the AOI. The habitat preferred by these threatened and endangered species and species of concern would not be substantially altered, fragmented, or polluted because of the proposed project. In regards to the mollusk species, habitat encroachment to the ecosystem associated with the Trinity River would not occur. Therefore, vegetation and wildlife habitat encroachment-alteration effects will not be carried forward in the analysis.

Hydric Regime
The proposed project would not create substantial ecological encroachment-alteration effects to the hydric regime of Elizabeth Creek, Henrietta Creek, Buffalo Creek, Big Bear Creek, Big Fossil Creek, and Little Fossil Creek. Although the proposed project would require the water body modifications described in Step 4: Modification of Regime, portions of the Elizabeth Creek, Henrietta Creek, Buffalo Creek, Big Bear Creek, Big Fossil Creek, Little Fossil Creek, and their unnamed tributaries have already been channelized and/or placed in culverts as a result of surrounding intense urbanization. Hydric regime encroachment-alteration effects on the Elizabeth Creek, Henrietta Creek, Buffalo Creek, Big Bear Creek, Big Fossil Creek, Little Fossil Creek, and their unnamed tributaries will not be carried forward in the analysis.

The proposed project would not create substantial ecological encroachment-alteration effects to the hydric regime of the 4,794.33 acres of floodplains in the AOI. According to the cities and town's Comprehensive Plan/Code of Ordinance, one of the listed policies and strategies on land use is to leave floodplains in their natural state (with bike trails encouraged) to improve water quality and minimize flooding. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations or ordinances. Hydric regime encroachment-alteration effects on floodplains will not be carried forward in the analysis.

Air Quality
It is anticipated that the proposed project would create substantial ecological encroachment-alteration effects to air quality. The planned transportation projects and construction activities within the AOI would result in an increase of emissions. Air quality encroachment-alteration effects will be carried forward in the analysis.

Socio-economic Effects
Due to ROW acquisition, a total of 109 parcels would be impacted by ROW acquisition and potentially three commercial structures would be displaced by the proposed project. No residential displacements would occur. As fully discussed in **Section V.A – ROW Requirements, Relocations, and Displacements**, adverse impacts associated with the displacement of these structures are not expected. The commercial facilities and developers in the area are strong supporters of the proposed project and view the proposed roadway facility as a way to enhance their existing facilities.

Economic impact is expected to any SOV motorist who utilizes the IH 35W managed lanes. Motorists who use the general purpose lanes (non-toll) during peak hours may experience longer travel times than motorists using the managed (toll) lanes. Motorists using the frontage roads may experience longer travel times due to lower posted speed limits and traffic signals

along the frontage roads. Because of the greater economic burden of paying a toll, low-income populations would likely use the general purpose lanes (non-toll) and frontage roads. Discussion of the regional effects of the addition of managed (toll) facilities is included in **Section V.K**.

The proposed project would cause changes in travel patterns. Based on roadway performance reports provided by NCTCOG, the LOS on arterial roadways within the IH 35W project area would improve after the proposed widening is completed. The completed facility would offer better travel time for motorists and make it less likely that motorists would leave the highway to find alternate routes on neighborhood streets. The proposed added capacity from the general purpose lanes (non-toll), frontage roads, and managed (toll) lanes is intended to improve traffic mobility and reduce congestion as compared to the existing conditions. This benefit would be a positive effect to all motorists using the facility. Access to the managed (toll) lanes would be limited to those who elect or can only on occasional basis afford to pay the toll. The IH 35W frontage roads would include a minimum of four travel lanes (two in each direction) and would provide a non-toll alternative, in addition to the six to eight non-toll main lanes, for motorists who do not elect or can only on occasional basis afford to travel the managed (toll) lanes. Under normal operating conditions, motorists (including emergency vehicles) using the frontage roads would experience longer travel times than motorists using either the non-toll main lanes or the managed (toll) lanes due to a lower posted speed limit and traffic signals along the frontage roads. However, the overall added capacity the proposed project provides would relieve traffic congestion for all motorists using IH 35W whether they use the non-toll main lanes or frontage roads compared to the existing facility. Furthermore, motorists would have access to a greater number of non-toll main lanes within the project limits as currently exist (increase from four/six lanes to eight non-toll main lanes). For these reasons, socio-economic effects on travel patterns and displacements will not be carried forward in the analysis.

It is unlikely that socio-economic effects would adversely affect public facilities/community centers such as parks/recreation centers. The cities and town have strong provisions in each respective Comprehensive Plan/Code of Ordinance for the preservation of existing parks and recreation centers, as well as for the expansion of the park system. Socio-economic effects on parks and recreation areas will not be carried forward in the analysis.

Induced Growth Effects

The proposed project has the potential to create substantial induced growth effects. There are approximately 14,534 acres of undeveloped/vacant land within the AOI. The cities and town's Land Use Plan has identified the project area as a potential growth area. These induced growth effects will be carried forward in the analysis.

Effects Related to Induced Growth

Induced growth has the potential to create substantial effects on the vegetation and wildlife habitat in the AOI by displacing the vegetation and wildlife habitat. In addition, this induced growth has the potential to adversely affect waters of the U.S. in the AOI by fill and degradation of the waters from development. The effects on vegetation and wildlife habitat, and waters of the U.S., as related to induced growth will be carried forward in the analysis.

The proposed project would not create substantial induced growth effects to the 4,794.33 acres of floodplains in the AOI. According to the Comprehensive Plan, one of the City of Forth Worth's listed policies and strategies on land use is to leave floodplains in their natural state (with bike trails encouraged) to improve water quality and minimize flooding. Induced growth effects on floodplains will not be carried forward in the analysis.

Induced growth has the potential to create substantial effects on air quality in the AOI. The new development would potentially increase air emissions from the following sources:

- point sources (large industrial facilities);
- area sources (smaller businesses such as gas stations, paint and body shops, bakeries);
- on-road mobile sources (motorized vehicles); and,
- non-road mobile sources (lawn mowers, construction equipment).

These air quality effects related to induce growth will be carried forward in the analysis.

Induced growth has the potential to create substantial socio-economic effects. New development would increase the tax base and has the potential to affect the values of surrounding properties. These socio-economic effects related to induced growth will be carried forward in the analysis.

It is unlikely that induced growth would adversely affect public facilities/community centers such as parks/recreation centers. The cities and town within the AOI have strong provisions in their Comprehensive Plans/Codes of Ordinances for the preservation of existing parks and recreation centers, as well as for the expansion of the park system. Induced growth effects on parks and recreation areas will not be carried forward in the analysis.

Undertakings induced by the proposed project could affect recorded and unrecorded archeological resources. Typical types of undertakings include infrastructure, residential and commercial development projects. In areas where public development is forecasted, archeological sites may receive some protection under federal or state regulations. In areas where private development is forecasted, archeological sites would not be protected. Induced growth effects on archeological resources will be carried forward in the analysis.

Step 6 – Analyze Indirect Effects and Evaluate Analysis Results

The objective of this step is to assess the effects identified in Step 5 by determining magnitude, probability of occurrence, timing and duration, and degree to which the effects can be controlled or mitigated to determine if those effects have the potential to be substantial.

Encroachment-Alteration Effects

Ecological Effects

Air Quality

The NAAQS CO analysis under the direct impacts revealed that local concentrations of CO under the worst meteorological conditions are not expected to exceed national standards at any time. Results of the MSAT analysis indicate a substantial decrease in MSAT emissions for both the Build and No-Build Alternative (2035) versus the base year (2012). Emissions of total MSATs are predicted to decrease by approximately 32 percent in the 2035 Build Alternative compared with 2012 levels (**Table 22**). If emissions are plotted over time, a substantially decreasing level of MSAT can be seen in the chart on page 51 however, overall VMT continues to rise. Differences in total MSAT emissions between the No-Build and Build Alternatives were found. The 2035 Build Alternative is expected to generate a 38 percent increase in VMT as compared to the 2035 No-Build, and a corresponding 33 percent increase in total MSATs.

Under the No-Build Alternative, air quality would still be impacted from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with the past, present, and reasonably foreseeable public and private actions.

Induced Growth Effects

Step 5 identified potentially substantial induced growth effects and effects related to the induced growth. Transportation improvements often reduce the time of travel, enhancing the attractiveness of surrounding land to developers and consumers. Development on vacant land, or conversion of the built environment to more intensive uses, is often a consequence of highway projects. Growth in population and employment attributable to a direct project effect is an indirect effect that, in turn, produces its own effects on the environment such as induced growth. Important characteristics of induced growth are described below:

- The land use impacts of highway investment vary depending on existing land use conditions in the proposed project area.
- Transportation investments can prompt changes in economic, social, and demographic conditions which can alter location decisions and land use.
- A transportation investment and the increased accessibility that it brings is just one factor in the development decision-making process. Other factors include location attractiveness; consumer preferences; the existence and/or availability of other infrastructure; local political and economic conditions; and the rate and path of urbanization in the region.

An evaluation for indirect land use effects was conducted using the guidelines of NCHRP Report 25-25, Task 22, *Forecasting Indirect Land Use Effects on Transportation Projects*. Of the six land use forecasting tools provided in the NCHRP Report 25-25 (Task 22), the "Planning Judgment" forecasting tool was utilized as the framework for the analysis. The steps provided for this specific methodology come from *A Guidebook for Evaluating the Indirect Land Use and Growth Impacts of Highway Improvements* (2001) prepared by ECONorthwest and Portland State University for the Oregon DOT.

Framework for Evaluation

Definition of Indirect Land Use Effects

As previously discussed, indirect effects are effects 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. For the purposes of this analysis, the indirect effects assessment is limited to land use.

Measuring Indirect Land Use Effects

NCHRP Report 25-25 (Task 22) identifies seven key variables that might contribute to measurable changes in local development patterns in response to a transportation improvement. The variables are discussed as follows:

- Change in accessibility. This is typically the most important variable. The key measures are average trip time, volumes, and mobility.
- Change in property value. Likely changes in land prices may influence development.
- Expected growth. Forecasted population and employment data may indicate the pressure to develop where good access and services are available.
- Relationship between supply and demand. Determine how much vacant, buildable land exists in the study area compared to the rest of a larger city/area/region. The more limited the supply is relative to demand, the more likely improved access would increase the probability of development.
- Availability of other services. Access alone is not sufficient to trigger development; other key public facilities like sewer and water often must be available to the study area at a

reasonable cost. If they are, improvements in access are more likely to facilitate land use change.

- Other market factors. Identifying areas of growth and comparing the study area market to other areas can identify other market factors.
- Public policy. Determine whether or not public policies that allow land uses to change can resist pressure for development.

The assessment of the key variables for indirect effects should take into consideration the likelihood that a transportation project will be followed by some noticeable change in the land use that would not have occurred in the absence of the proposed project or sooner than anticipated, and if such changes did occur, would they be consistent with the comprehensive plan.

Existing and Forecasted Conditions

Description of the Proposed Project
The proposed project description is located on pages 7 to 8 of this document.

Study Area Boundaries
As previously stated, the study area of expected indirect effects consists of the major roadways to the north, south, east, and west of the proposed project. The AOI is bounded by SH 114 to the north (the proposed project's northern terminus), US 377/SH 170/Alta Vista Road/Beach Street to the east, IH 820 to the south, and FM 156 (Blue Mound Road) to the west (**Figure 17**). The southern boundary of the AOI is also the proposed project's southern terminus and the IH 35W southern leg's northern terminus (CSJs 0014-16-179, -192, and -193). The AOI encompasses approximately 31,664 acres of land.

Time Frame for Indirect Effects Analysis
The temporal component of the indirect effects analysis is the timeframe in which impacts to resources are expected to occur, which for this analysis is 2009 to 2035. Extending the timeframe forward to 2035 for indirect effects matches *Mobility 2035*, the MTP for the region.

Population and Employment Forecast
The population and employment forecasts are located on pages 11 and 12 of this document.

Relevant Plans and Policy Documents in the Study Area
Several plans and policies within the AOI were developed to promote, guide, and monitor various development activities ranging from regional transportation infrastructure to commercial development aesthetics. These plans include the *Mobility 2035: The Metropolitan Transportation Plan* (NCTCOG); the City of Fort Worth's Comprehensive Plan, The Master Thoroughfare Plan and Street Development, MAQ Plan, and Zoning; the City of Blue Mound, Haslet, and Roanoke's Code of Ordinances; and the Town of Northlake's Comprehensive Plan and Code of Ordinance. These plans and policy documents are described at length in Step 2.

Development Capacity of the Study Area
A primary tool for urban planning is land use control. The cities and town actively monitor the acreage of developed versus undeveloped land, demographic trends, and development patterns. There are approximately 14,534 acres of undeveloped/vacant land within the 31,664-acre AOI (46 percent of the AOI acreage).

Future Development Patterns in the Study Area
There are approximately 14,534 acres of undeveloped land within the AOI. According to the City of Fort Worth's Future Land Use Plan, the undeveloped land is zoned as mixed-use and

industrial growth centers. Mixed-use growth centers have a high concentration of jobs and housing, access to public transit and public facilities, pedestrian activity, and a sense of place. Industrial growth centers are similar, but do not have a concentration of housing. Intense industrial uses would be located within industrial growth centers that incorporate other compatible uses and are well integrated into the transportation network. An industrial growth center will primarily consist of industrial and commercial uses, with a high concentration of jobs, mostly industrial in nature. Other related and supporting uses include office space and services. Residential uses are generally discouraged within industrial growth centers.

The City of Roanoke's Future Land Use map identifies the majority of the undeveloped land in the AOI as zoned for industrial growth centers and parks. The City of Haslet's Land Use Plan map illustrates a predominantly industrial and residential planned development in the vacant land located in the AOI. The City of Blue Mound does not have a land use plan map available at this time.

According to the Town of Northlake's Comprehensive Plan, regional growth pressures converge on Northlake from three directions, north from Fort Worth, south from Denton and west from DFW Airport and the cities along SH 114. The Town is located along IH 35W in the northeast growth corridor of Fort Worth and the southwest growth corridor of Denton. Growth pressures also converge on Northlake along the SH 114 corridor coming up from DFW Airport, converging at the IH 35W and SH 114 intersection in the southeast corner of Northlake. The land use development concept within the AOI is zoned as industrial and mixed-use. The current development pattern has the majority of the residential development in multifamily units, with the remainder in single family homes. Under existing zoning, the pattern changes as zoning is built-out. For residential development, rural residential moves up to 22.5 percent of the residential units; multifamily drops to 8.5 percent and single family accounts for 69 percent. The additional single family units are built in existing mixed-use zones. For nonresidential development, existing development shows Northlake has a predominately industrial land use pattern based on the overall square feet of nonresidential development with almost 93 percent industrial and a little over seven percent retail-commercial. If existing zoning were built out, retail and industrial would flip with 24.4 percent of the nonresidential square footage being industrial and 75.6 percent being retail-commercial. The proposed project would improve a regional highway which is consistent with the roadway type required to support land uses in the AOI.

Two additional land uses were identified which affect development potential of properties in the AOI: oil /gas wells and floodplains. Existing land uses listed above within the town limits are depicted on the Land Use Map. The Cities' and Town's policies and strategies on land use are to leave floodplains in their natural state (with bike trails encouraged) to improve water quality and minimize flooding. Near floodplains, buildings must be constructed above the 100-year flood level, unless used for recreational purposes. Some of this land, particularly along the smaller drainage ways, would be developable with proper floodplain management. Oil and gas wells affect the ability to develop land within the AOI. Current regulations do not allow a well to be within 600 feet of an existing residence or within 150 feet of town property or a public ROW. The impact of well locations is further compounded by the location of oil and gas pipelines.

Travel Performance

System Level Analysis

A system level analysis for the proposed project (Build Alternative) was conducted using the Complete Performance Reports provided by NCTCOG. According to the Performance Reports, the Build Alternative appears to improve LOS on all roadway classifications. LOS is a qualitative measure of describing the effectiveness of transporting vehicles along a roadway accounting for

factors as speed, travel time, maneuverability, traffic interruptions, comfort, convenience, and safety. LOS ranges from LOS A, which describes free-flow operation with minimum delays, to LOS F, which describes extremely low speeds, high delays, high volumes, and extensive queuing. **Table 35** shows a summary of LOS changes provided by the Performance Reports for the classifications of roadways within the traffic analysis study area. As seen in **Table 35**, the total number of lane-miles in each LOS category/roadway type improves between the No-Build and Build Alternatives.

Table 35: Year 2035 Level of Service for Indirect Area of Influence

Location	No-Build LOS lane-miles		Build LOS lane-miles	
Freeways	A, B, C	66.72	A, B, C	89.84
(No-Build = 153.48 total lane-miles)	D, E	51.02	D, E	41.92
(Build = 177.15 total lane-miles)	F	35.74	F	45.39
Principal Arterials	A, B, C	27.80	A, B, C	34.24
(No-Build = 53.22 total lane-miles)	D, E	9.92	D, E	10.48
(Build = 53.46 total lane-miles)	F	6.09	F	3.24
Minor Arterials	A, B, C	115.66	A, B, C	117.12
(No-Build = 128.06 total lane-miles)	D, E	3.52	D, E	3.06
(Build = 128.60 total lane-miles)	F	4.98	F	4.98
Collectors	A, B, C	133.02	A, B, C	135.28
(No-Build = 179.33 total lane-miles)	D, E	18.04	D, E	13.95
(Build = 179.05 total lane-miles)	F	18.29	F	16.53
Frontage Roads	A, B, C	96.00	A, B, C	99.69
(No-Build = 113.81 total lane-miles)	D, E	5.59	D, E	9.48
(Build = 120.90 total lane-miles)	F	12.22	F	11.73
Managed HOV Lanes	A, B, C	6.57	A, B, C	58.91
(No-Build = 6.57 total lane-miles)	D, E	0	D, E	0
(Build = 58.91 total lane-miles)	F	0	F	0

Source: *NCTCOG, 2011.*

Travel time and traffic volumes (and real or perceived economic impact) are key transportation measures for estimating impacts on residential and commercial development. Larger volumes that result from transportation improvements could support an increase of demand and prices for retail properties along a corridor, which in turn contribute to the potential for land-use changes. Key questions are whether 1) that potential is sufficient to cause property owners and developers to build faster and differently than they would have, and 2) whether the comprehensive plan would have to be changed in any significant way (e.g., zoning, comprehensive plan designations, city limits, urban growth boundaries) to allow that change in development. Key transportation variables of interest for land use analysis are change in travel time, traffic volumes, and mobility.

Changes in Accessibility

Changes in accessibility are most readily analyzed by comparing differences in travel time, congestion delay, LOS, and average speed along a particular facility or study area. For the proposed project, changes in accessibility were analyzed for the No-Build versus the Build Alternatives. Utilizing the 51.62-square mile traffic study area developed by the NCTCOG, performance reports were generated for all freeway, principal arterials, minor arterials,

collectors, frontage roads, and managed (toll) lanes within the traffic study area. The traffic study area along the IH 35W corridor extends approximately one mile around the proposed project. These performance reports allowed for direct comparison of average trip times, changes in average speed, levels of service, and total trips within the traffic study area.

The average trip time decreased 0.10 minute, and average trip length increased by 0.14 mile within the traffic study area for the Build versus the No-Build Alternatives. Similarly, the average speed along the various street classifications revealed a 0.5 mph change in speed during the AM peak period. **Table 36** provides data pertaining to the 2035 average free speed of the used roadway for the No-Build and Build Alternatives.

Table 36: Year 2035 Average Free Speed of Used Roadways in Miles Per Hour

Roadway Classification	No-Build			Build			Percent Change		
	AM Period	PM Period	Daily	AM Period	PM Period	Daily	AM Period	PM Period	Daily
Freeways	62.07	62.61	62.11	62.46	62.59	62.42	0.63	0.61	0.50
Principal Arterials	44.35	44.08	44.89	44.64	44.39	45.27	0.65	0.70	0.85
Minor Arterials	40.13	40.31	40.65	40.14	40.19	40.49	0.02	-0.30	-0.39
Collectors	37.11	37.07	37.17	37.07	37.14	37.24	-0.11	0.19	0.19
Frontage Roads	40.74	41.13	41.21	40.36	40.76	40.82	-0.93	-0.90	-0.95
Managed HOV Lanes	58.86	59.26	59.51	55.59	55.10	55.95	-5.56	-7.02	-5.98

Source: *NCTCOG, 2011.*

Assessment of Indirect Land Use Effects

Potential for Land Use Change Assessment
The potential for land use change can be measured by changes in accessibility, changes in property value, expected growth, the relationship between land supply and demand, availability of public services, market factors, and public policy. The population, employment, and land use forecasts described above presume the construction of the proposed facility.

A summary of potential land use impacts for indirect effects is included in **Table 37**. These changes are graded on a scale of comparison (none, very weak, weak, moderate, strong, very strong) and are discussed as follows:

- The “none” comparison indicates that the proposed action would not affect land use changes.
- “Very weak” implies that there would be little change to land use by the proposed action and that this change would be associated with rebuilding existing facilities for more modern facilities and revitalizing the existing areas. Small changes in land use could occur from closely related land use types (industrial to commercial and vice versa).
- “Weak” suggests that there would be some change to land use by the proposed action, but this change would occur at a slower rate as compared to change in the region.
- A “moderate” score includes changes in land use that would occur at an even pace level for the region. The expected changes would be conversions from older land use types to new areas (i.e., old industrial parks to mixed use facilities, multi-family areas converted to single family homes, etc.). Some land use changes from vacant to more developed land would occur.

- A rating of "strong" indicates that the area is changing more rapidly than the general region. Land use changes would occur in greater amounts and complete changes in land use are expected (i.e., industrial to parks or residential and commercial).
- "Very strong" land use changes would occur at an extremely high rate compared to regional development. Multiple projects and land use changes would be occurring throughout. Drastic changes in land use types (i.e., vacant to development) would account for the majority of all changes.

Table 37: Indirect Land Use Effects Assessment

Change	Data Sources	Condition Within AOI	Potential for Indirect Land Use Effects
Change in accessibility *Measured as change in travel time or delay, if available*	LOS Analysis	A time travel analysis was conducted on the proposed project. The average trip time decreased 0.10 minute and average trip length increased by 0.14 mile within the traffic study area for the Build versus the No-Build Alternatives.	None to very weak
Change in property value *Measured in dollars*	City of Fort Worth Comprehensive Plan, Cities of Blue Mound, Haslet and Roanoke and Town of Northlake's Code of Ordinances.	Detailed studies on the net fiscal impacts from the proposed project have not been conducted. Regardless of the proposed project, a change in vacant to commercial land use (0% to 20%) would result in higher property values.	Weak to Moderate
Forecasted growth *Measured as population and employment for region*	NCTCOG 2040 Demographic Forecast, U.S. Census 2010 PL94-171	Tarrant County experienced a 25 percent growth rate from 2000 to 2010. Population forecasts indicate that Tarrant County will experience a 56 percent growth rate from 2010 through 2035. Denton County experienced a 53 percent growth rate from 2000 to 2010. Population forecasts indicate that Denton County will experience a 59 percent growth rate from 2010 through 2035	Very Strong
Relationship between supply and demand *Measured as population, employment, land development*	Aerial Maps City of Fort Worth and Town of Northlake Comprehensive Plans, Cities of Blue Mound, Haslet and Roanoke and Town of Northlake's Code of Ordinances. Interview with the cities' officials and local developers	Less than a 10-year supply of vacant land.	Strong
Availability of non-transportation services *Measured number of people or employees that can be served; or barriers to service provisions*	City of Fort Worth Comprehensive Plan Interview with the City of Fort Worth Planning Department	Key services are available now.	Very Strong
Other factors that impact the market for development	Interview with the cities' officials and local developers	Very strong market	Very Strong

Table 37: Indirect Land Use Effects Assessment			
Change	Data Sources	Condition Within AOI	Potential for Indirect Land Use Effects
Public policy	City of Fort Worth Comprehensive Plan, Cities of Blue Mound, Haslet and Roanoke and Town of Northlake's Code of Ordinances. Interview with the cities' officials and local developers	Strong policy, strong record of policy enforcement and implementation.	None to Very Weak

According to the factors related to indirect land use impacts outlined in **Table 37**, the improvements to the proposed project have an overall "strong" potential for land use change. A "strong" determination indicates that land use changes in the AOI would occur in greater amounts and complete changes in land use are expected (i.e., vacant land to commercial).

Contact with Public Officials and Local Developers

Based on the aerial map, approximately 14,534 acres of undeveloped/vacant lands are located within the AOI. A meeting with the City of Fort Worth's planners took place on December 19, 2008, to determine the potential impacts of the proposed improvements to IH 35W and to discuss how these effects would influence their current comprehensive plans, zoning, and land use plans. Public officials from the Cities of Blue Mound, Haslet, and Roanoke, and the Town of Northlake, as well as local developers were also contacted. A meeting with Hillwood (developer) took place on March 5, 2009. Below is a summary of the meetings/conversations with the public officials and Hillwood:

- According to the City of Fort Worth planners, IH 35W has been operating as a highway facility for many years with the development growth occurring when the highway was originally constructed. The proposed project is consistent with current uses and future land use plan. The addition of managed lanes to the proposed project would enhance the flow and accessibility to the area as well as support their current investment in utility infrastructure. The concentration of workforce is from southeast of the City. This workforce commutes up north for their employment. IH 35W corridor provides one of the direct routes from south to north. The proposed project is needed to keep pace with traffic demand resulting from growth and development trends. This growth would occur even in the absence of the proposed project. Vacant lands are located throughout the AOI. Portions of these undeveloped lands are currently planned, funded or under construction (reasonably foreseeable projects).
- Hillwood indicated that the future development of their properties was tied to the improvements of the IH 35W corridor. Hillwood is the developer of AllianceTexas®, a 17,000-acre master-planned, mixed-use community located in north Fort Worth (outside the AOI). Approximately 6,478 acres of the 17,000 acres of this mater-planned community is located within the AOI. Approximately 4,454 acres of the 6,478 acres is vacant/undeveloped land. Hillwood indicated that development of these vacant/undeveloped lands would continue to occur regardless, but without the proposed improvements, the pace and quality of development would be weaker. They expect that development would take three times longer without the highway improvements. AllianceTexas® houses the following facilities/communities located in the AOI: Alliance

Commerce Center; Alliance Advanced Technology Center; Alliance Gateway; Lone Star Crossing (retail center that includes Cabelas), Saratoga, Heritage, and Park Glen (single-family master-planned community); Alliance Town Center (retail, restaurants, a cinema, offices, and residential.); and Monterra Village (mixed-use urban village and luxury apartments).

- According to the Cities of Haslet and Roanoke, there are no roadway induced projects. Whatever roadway and water/sewer projects they have would take place as planned if funding comes through, regardless of whether or not the IH 35W North improvements take place. The Cities of Haslet and Roanoke and the Town of Northlake's respective planning departments were contacted. They concurred that with increased urbanization in their respective cities/town, the amount of vacant lands within the RSA should decrease.

Based on the City of Forth Worth, there are undeveloped properties within the AOI that are currently planned, funded, or under construction independent of the proposed project. The representative of Hillwood anticipates that the pace of development of AllianceTexas® would be dependent on the construction of the proposed project. The 6,478-acre property is shown on **Figure 17**.

Effects Related to Induced Growth

Vegetation and Wildlife Habitat
The approximately 4,454 acres of induced development in the AOI under the Build Alternative have the potential to impact up to approximately 4,250 acres of herbaceous vegetation, 110 acres of bottomland hardwoods, 29 acres of fence row vegetation, and 11 acres of riparian vegetation.

Under the No-Build Alternative, vegetation and wildlife habitat in the AOI would still be impacted by this development, but at a slower rate.

Waters of the U.S.
The potential indirect effects on waters of the U.S. and wetlands from roadway projects include fill and degradation from roadway-induced development. The 4,454 acres of induced development in the AOI under the Build Alternative has the potential to impact up to approximately 11 linear miles of streams and 44 acres of wetlands.

Under the No-Build Alternative, waters of the U.S. in the AOI would still be impacted by this development, but at a slower rate.

Air Quality
The 4,454 acres of induced development within the AOI under the Build Alternative would include residential, industrial, and commercial facilities. The new development would increase air emissions from point sources (large industrial facilities), area sources (smaller businesses such as gas stations, paint and body shops, bakeries), on-road mobile sources (motorized vehicles), and non-road mobile sources (lawn mowers, construction equipment).

Under the No-Build Alternative, air quality in the AOI would still be impacted by this development, but at a slower rate.

Socio-economics
Under the Build Alternative, the 4,454 acres of induced development within the AOI has the potential to create a positive effect on the social and economic environment. Additional

residences and employees of the new industrial and commercial complexes would boost sales, tax revenues, and personal income in the AOI.

Under the No Build Alternative, there is still potential to create a positive effect on the social and economic environment, but at a slower rate.

Step 7 – Assess Consequences and Consider/Develop Mitigation

Vegetation and Wildlife Habitat
Incorporating parks, open spaces, and riparian corridors around and within developed areas would provide wildlife habitat and shelter. Planting these areas with native fruit or nut-bearing trees and shrubs, and native grain-bearing grasses would provide food for wildlife, and would help to mitigate impacts to habitat used by wildlife.

Waters of the U.S.
Avoidance or minimization of impacts to waters of the U.S. and wetlands should be performed during the development design phase so that only the least amount of impacts occurs. Mitigation is only conducted when impacts to waters of the U.S. and wetlands cannot be avoided. Typical mitigation for impacts to waters of the U.S. includes the construction of mitigation areas or purchasing credits from a mitigation bank. Mitigation is frequently conducted as a one of the requirements for obtaining a Section 404 permit. The USACE decides what the ratio of the mitigation area would be relative to the acreage of impacts to waters of the U.S. A typical mitigation ratio is three times the amount of acreage impacted, while the minimum mitigation ratio is one time the amount of acreage impacted (i.e. 1:1 ratio). A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or in certain circumstances, preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland regulation. Mitigation banks are used in situations where the construction of a mitigation area is not practical. Mitigation banks are a form of “third-party” compensatory mitigation, in which the responsibility for compensatory mitigation implementation and success is assumed by a party other than the permittee. The USACE would have jurisdiction over mitigation activities for indirect impacts to waters of the U.S., and as such, would determine the mitigation responsibilities of the developers.

Air Quality
The effect of air emission increases from development serving as point sources, area sources, on-road mobile sources, and non-road mobile sources would be minimized as these forms of development are required to comply with state and federal regulations, mandated and enforced by the EPA and TCEQ. These regulations are designed to ensure that growth and urbanization do not prevent regional compliance with the ozone standard or threaten the maintenance of the other air quality standards.

Socio-economics
Impacts related to tolling have been analyzed and there would be an economic impact to low-income users of the proposed managed (toll) lanes, and the potential for longer travel times on the general purpose lanes (non-toll) or frontage roads compared to the managed (toll) lanes. However, the improved capacity on the proposed facility would improve mobility for all users compared to the existing facility. Refer to **Sections V.A. – Tolling Effects to EJ Populations** for socio-economic impacts related to tolling.

It is not anticipated that the induced development resulting from the implementation of the Build Alternative would have an adverse indirect effect on socio-economics in the AOI other than the temporary disruption to businesses and residents as a result of construction activities.

If adverse impacts were to occur, joint economic development and redevelopment efforts on the part of the Cities of Fort Worth, Blue Mound, Haslet, and Roanoke, the Town of Northlake, and local businesses would likely be the most effective strategy for mitigating the adverse impacts.

J. Cumulative Impacts Analysis

Cumulative effects are defined as effects "on the environment which result from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions, regardless of what agency (Federal or non-Federal) or person undertakes such other actions. "Cumulative impacts can result from individually minor, but collectively significant actions taking place over a period of time" (NEPA, Section 1508.7, 1978). Cumulative impacts tend to be less defined than indirect impacts and are therefore more difficult to quantify.

In accordance with TxDOT's *Revised Guidance on Preparing Indirect and Cumulative Impacts Analyses* (September 2010), this analysis follows the following recommended approach:

1. Identify the affected resources.
2. Define the study area for each resource.
3. Describe the current health and historical context of each resource.
4. Identify direct impacts and indirect effects that may contribute to cumulative impacts.
5. Identify other past, present and reasonably foreseeable future actions that may contribute to cumulative impacts on the identified resources.
6. Assess the potential cumulative impacts to each resource.
7. Report the results.
8. Assess and discuss mitigation issues for adverse impacts.

Step 1 – Identify the Resource to Consider in the Analysis

The resources to consider in the cumulative impacts analysis were narrowed down by carrying forward the direct and indirect impacts that may contribute to a cumulative impact. In addition, only those resources substantially impacted or in poor or declining health were analyzed for cumulative impacts. The resources are listed as follows:

- Vegetation and Wildlife Habitat
- Waters of the U.S
- Air Quality

Step 2 – Resource Study Areas

The Resource Study Area (RSA) for each resource was chosen using resource-specific data, and reflects the influence that the proposed project would have on the surrounding area. The RSA has both temporal and geographic components. The temporal component of an RSA is the timeframe in which effects to resources are expected to occur, which for this analysis is 2000 to 2035. Extending the timeframe back to 2000 incorporates an important decennial U.S. Census to account for trends in population growth and demographic change and includes a substantial period of the business cycle, which is also a determinant in regional and community growth. Extending the timeframe forward to 2035 correlates with NCTCOG's *Mobility 2035* and the Comprehensive Plans/Code of Ordinances for the Cities of Fort Worth, Blue Mound, Haslet, and

Roanoke, and the Town of Northlake. This 35-year period should also be sufficient to capture cumulative impacts resulting from those actions for which construction has been initiated, but not yet completed.

The resources subject to indirect and cumulative impacts (vegetation and wildlife habitat, waters of the U.S., and air quality) are discussed below in separate sub-sections. Steps 1, 2, and 5 are discussed collectively for the affected resources. Steps 3, 4, 6, 7, and 8 of the cumulative impacts evaluation process are discussed separately within each resource sub-section.

The geographic area of each RSA would vary from resource to resource. **Table 38** lists the affected resources and their corresponding RSAs. Maps of the RSAs are shown in **Figures 18** and **19**.

Table 38: Resource Study Area for Affected Resources

Affected Resource	Resource Study Area
Waters of the U.S.	Sub-basins of the West Fork Trinity River and Grapevine Lake (approximately 87,279 acres); **Figure 18**.
Vegetation and Wildlife Habitat	
Air Quality	Ozone – DFW 8-hour Non-attainment Area CO – Proposed ROW Line MSAT – Affected Transportation Network;**Figure 19**

As shown in **Table 38**, the 87,279-acre drainage sub-basin of the West Fork Trinity River was chosen as the RSA for vegetation and wildlife habitat, and waters of the U.S. It was determined that this RSA would provide a suitable study area for examining the availability of vegetation, wildlife habitat, and water resources in the surrounding area, and for serving as a baseline for assessing cumulative impacts. The sub-basin contains the streams, wetlands, floodplains, and the associated vegetative habitat that wildlife depends on for food, water, and shelter. In addition, all of the drainage from the proposed project, project induced development, and past, present, and reasonably foreseeable actions in the area are contained within this sub-basin.

Evaluating Air Quality in relation to cumulative impacts requires looking at three distinct RSAs, as described below:

- Ozone - The RSA for evaluating the ozone NAAQS was designated as the DFW eight-hour ozone non-attainment area, which includes Collin, Dallas, Denton, Tarrant, Ellis, Johnson, Kaufman, Parker, Rockwall.
- CO - The RSA for CO was based on the ROW line, which represents the locations with the highest potential for CO concentrations.
- MSAT - The RSA for MSAT is the affected transportation network in the 12-county MPA. Air quality impacts from MSAT have been evaluated quantitatively in this proposed project by TxDOT and FHWA. MSAT are regulated by EPA on a national basis through requirements for fuels and vehicle technology. The MSAT RSA qualitatively evaluated emission changes based upon the Build Alternative and national trends.

As noted previously, steps 3 and 4 will be discussed later in each resource sub-section.

Step 5 - Other Past, Present, and Reasonably Foreseeable Actions

The other past, present, and reasonably foreseeable actions discussed in this section of the EA could contribute to the cumulative effects on the resources shown in **Table 41**. Data collection associated with other past, present, and reasonably foreseeable actions included literature reviews; analyses of demographic and economic records; aerial photograph review; and interviews with the city planners and developers.

The results of the data analysis revealed the following existing or planned development projects that are considered other past, present, and reasonably foreseeable actions (**Table 39**).

Table 39: Existing or Planned Development Projects (Past, Present, and Reasonably Foreseeable Actions)

Project	Type	Acreage
BNSF Alliance Intermodal Facility/ Westport at Alliance	Industrial	230.77
Alliance Center/Fort Worth Alliance Airport	Industrial/Commercial/Aviation	305.49
Texas Motor Speedway	Commercial	1885.67
Alliance Crossing	Commercial	2732.84
Alliance Commerce Center	Commercial	1368.08
Speedway Business Park/Texas Speedway Center/Chadwick Farms	Mixed-Used	96.80
Planned Development (City of Roanoke)	Mixed-Used	316.29
Northwest ISD (Middle School)	Institutional	19.55
Marriott Hotel	Commercial	10.06
Multi-family	Residential	16.85
Daycare	Commercial	2.20
North Main Service Center	Commercial	3.03
Retail	Commercial	3.78
Commercial Lease	Commercial	20.73
Warehouse	Commercial	39.48
Office Building	Commercial	3.04
Retail/Restaurant/Business	Commercial	37.96
Data Center	Commercial	236.62
Restaurant	Commercial	1.82
Industrial/Commercial	Industrial/Commercial	14.91
Cinemark 15 Theater	Commercial	39.24
Pharmacy	Commercial	3.25
Chase Bank	Commercial	0.95
Church	Institutional	0.76
Quality Inn Hotel	Commercial	1.94
Pharmacy	Commercial	6.46
Retail	Commercial	9.53
Retail	Commercial	1.49
Distribution Center	Industrial	210.05
Cargill Meat Solutions	Commercial	26.16
Cargill Meat Solutions	Commercial	21.28

Table 39: Existing or Planned Development Projects (Past, Present, and Reasonably Foreseeable Actions)		
Project	**Type**	**Acreage**
Edohanna Japanese Restaurant	Commercial	1.09
School Expansion	Institutional	10.75
Olive Garden	Commercial	1.79
Church Campus	Institutional	43.96
Dental Office	Commercial	0.50
Exel Inc.	Industrial	39.53
Hotel	Commercial	2.70
Cold Storage Warehouse	Commercial	129.97
RV Park	Commercial	4.90
Comm/Retail Development	Commercial	5.85
Warehouse	Industrial	24.57
Vogue Commercial Office	Commercial	1.02
Service Station and Retail	Commercial	2.77
Olive Garden	Commercial	0.71
Commercial	Commercial	4.13
Cold Storage	Commercial	129.50
Solid Waste Service Center	Industrial	16.35
Keller Middle School	Institutional	24.35
Skilled Nursing Facility	Commercial	9.97
Hotel	Commercial	7.04
Senior Living/Apartment/Multi-family	Residential	24.59
Retail/Gas Sales	Commercial	2.45
Warehouse	Commercial	2.74
Electricity Transmission	Commercial	29.54
Northlake Business Center	Mixed Use	24.40
Clorox Northport	Industrial	27.36
Northlake Business Center	Industrial	27.75
Motel 6	Commercial	2.54
Northport Building 21	Commercial	30.85
Chadwick Place Apartments	Commercial	13.41
Valero	Commercial	1.77
Hooters Restaurant	Commercial	1.62
Holiday Inn Express	Commercial	1.61
Candlewood Suites	Commercial	3.19
La Quinta Inn & Suites	Commercial	1.48
931 Litsey Rd	Industrial	14.52
United Supermarket Distribution Center	Industrial	7.55
General Motors	Industrial	28.94
Ww Grainger	Industrial	24.55
Alliance Gateway 52	Industrial	15.29
Alliance Gateway 49	Industrial	16.38
Cardinal Health	Industrial	9.16
Applied Industrial Technologies	Industrial	9.57

Table 39: Existing or Planned Development Projects (Past, Present, and Reasonably Foreseeable Actions)		
Project	**Type**	**Acreage**
Victor Equipment	Industrial	17.13
Randalls/Tom Thumb	Industrial	110.22
Home Depot Distribution Center	Industrial	24.60
Honeywell/Dryer	Industrial	18.24
Bell Helicopter Logistics and Repair Facility	Industrial	17.61
Behr Processing Corp	Industrial	23.38
Alliance Gateway 60	Industrial	28.89
Bridgestone Firestone	Industrial	36.41
Exel Lego Distribution Center	Industrial	16.92
Dsc Logistics	Industrial	27.07
Amerisource Bergan	Industrial	30.93
L A Gililland Elementary School	Institutional	8.27
Haslet Elementary School	Institutional	15.52
Sc Johnson/Southwest Logistics	Industrial	20.18
Volkswagen Parts Facility	Industrial	22.44
Techstar	Industrial	11.98
Teleflex Medical	Industrial	16.93
Michaels Store Inc	Industrial	25.05
Kfs Inc	Industrial	9.36
Conway Freight Service Center	Industrial	11.07
Kraft Foods/Americold Logistics	Industrial	35.38
Coca Cola Concentrate Plant	Industrial	15.82
Alliance Air Trade	Industrial	21.24
201 N Intermodal Parkway	Industrial	12.47
Westport 1	Industrial	6.71
Alliance Operational Services	Industrial	15.07
	Total	**8,635.56**

Planned transportation improvements included in the RSA's Thoroughfare Plans can be found in the table below (**Table 40**).

Table 40: Planned Transportation Improvements (Past, Present, and Reasonably Foreseeable Actions)		
Project	**Type**	**Acreage**
Alliance Gateway Parkway (SH 170)	Tollway/Freeway	69.65
Alta Vista Road	Principal Arterial	9.00
Avondale Haslet Road	Minor Arterial	10.31
E. Bailey Boswell Road	Principal Arterial	40.89
W. Bailey Boswell Road	Major Arterial	57.24
Basswood Boulevard	Principal Arterial	12.52
N. Beach Street	Principal Arterial	70.48
Bear Creek Parkway	Major Arterial	10.52
Bear Creek Parkway	Minor Arterial	5.14

Table 40: Planned Transportation Improvements (Past, Present, and Reasonably Foreseeable Actions)		
Project	**Type**	**Acreage**
E. Blue Mound Road	Minor Arterial	10.54
Blue Mound Road	Minor Arterial	16.23
Blue Mound Road	Principal Arterial	35.49
E. Bonds Ranch Road	Major Arterial	13.16
W. Bonds Ranch Road	Major Arterial	16.91
Business Highway 287	Principal Arterial	5.70
Cantrell Sansom Road	Major Arterial	14.26
Cleveland-Gibbs Road	Principal Arterial	36.32
Continental Boulevard	Major Arterial	1.57
S. County Line Road	Principal Arterial	3.67
Country road 4041	Major Arterial	14.82
Dale Earnhardt Way	Principal Arterial	0.74
Diamondback Lane	Minor Arterial	0.83
Eagle Parkway	Major Arterial	14.95
FM 156	Principal Arterial	72.08
FM 156	Minor Arterial	14.63
Golden Heights Road	Major Arterial	4.37
Golden Triangle Boulevard	Major Arterial	47.42
Harmon Road	Principal Arterial	72.66
Harmon Basswood Street	Minor Arterial	5.39
Haslet County Line Road	Principal Arterial	10.52
Henrietta Creek Road	Major Arterial	9.42
Heritage Parkway	Principal Arterial	67.16
Hicks Road	Major Arterial	8.71
SH 114	Tollway/Freeway	40.21
SH 156	Principal Arterial	5.98
Independence Parkway	Major Arterial	14.88
E. Industrial Avenue	Major Arterial	4.30
Industrial Boulevard	Major Arterial	3.95
Intermodal Parkway	Principal Arterial	23.86
John Day Road	Major Arterial	17.82
Johnson Road	Minor Arterial	11.15
W. Keller Road	Principal Arterial	0.25
Keller Haslet Road	Major Arterial	4.39
Keller Hicks Road	Major Arterial	0.78
Keller Hicks Road	Major Arterial	18.94
Keller Smithfield Road	Major Arterial	12.97
Kroger Road	Principal Arterial	8.36
Litsey Road	Major Arterial	21.88
Lone Star Boulevard	Minor Arterial	4.83
Longhorn Road	Major Arterial	1.49
Mark IV Parkway	Major Arterial	4.57
McLeroy Boulevard	Major Arterial	14.10

Table 40: Planned Transportation Improvements (Past, Present, and Reasonably Foreseeable Actions)		
Project	**Type**	**Acreage**
Meacham Boulevard	Principal Arterial	21.62
Northeast Parkway	Minor Arterial	1.18
Northern Cross Boulevard	Major Arterial	5.00
Northern Cross Boulevard	Minor Arterial	1.84
Old Decatur Road	Major Arterial	4.55
Old Decatur Road	Minor Arterial	7.77
Old Denton Road	Major Arterial	16.11
Old Denton Road	Minor Arterial	3.58
Park Drive	Minor Arterial	1.10
Park Vista Boulevard	Major Arterial	9.70
S. Pearson Lane	Major Arterial	4.35
W. Price Street	Principal Arterial	0.40
Rapp Road	Major Arterial	2.40
Ray White Road	Major Arterial	11.67
N. Riverside Dr.	Major Arterial	39.65
Robert W. Downing Drive	Major Arterial	3.11
Rufe Snow Road	Major Arterial	0.58
Saginaw Boulevard	Principal Arterial	40.53
Sansom Boulevard	Minor Arterial	5.59
Sendera Ranch Boulevard	Major Arterial	1.02
Sendera Ranch Boulevard	Minor Arterial	1.13
Sendera Ranch Boulevard	Principal Arterial	27.90
Shady Grove Road	Major Arterial	0.70
Summerfields Boulevard	Minor Arterial	1.02
N. Sylvania Avenue	Minor Arterial	4.26
N. Tarrant Parkway	Minor Arterial	598.00
N. Tarrant Parkway	Principal Arterial	37.19
Timberland Boulevard	Major Arterial	9.73
Union Church Road	Major Arterial	8.78
US Highway 377	Principal Arterial	7.43
W. J. Boaz Road	Major Arterial	3.76
Wagley Robertson Road	Major Arterial	30.50
Western Center Boulevard	Principal Arterial	15.65
Westport Parkway	Major Arterial	38.51
Willow Springs Road	Minor Arterial	28.10
	Total	**1,996.06**

The results of the data analysis indicate that past, present, and reasonably foreseeable actions total approximately 10,632 acres.

The cumulative impacts on air quality from the Build Alternative and other reasonably foreseeable transportation projects are addressed at the regional level by analyzing the air quality impacts of transportation projects in the *Mobility 2035* (MTP) and the TIP. The proposed

project and the other reasonably foreseeable transportation projects were included in the MTP and the TIP and have been determined to conform to the SIP.

Discussion of Cumulative Impacts by Resource (Steps 3, 4, 6, 7, and 8)

Vegetation and Wildlife Habitat

Step 3 - Resource Health and Historical Context

The RSA was historically used for agricultural purposes with crops dominating the area. Most of the developments were located in close proximity to IH 35W and other major roadways in the area. As the population has increased in the region, the RSA began to become urbanized with industrial, commercial, and new residential. This practice reduced the available habitat along the riparian corridors and reduced the ability of streams and wetlands to filter runoff and retain water. This allowed for increased erosion and degradation of the water features. Even though some areas have remained relatively unchanged for a number of years, they provide minimal habitat for wildlife and ecological benefits from water features. Many areas have been developed or fragmented to such an extent that little habitat exists for wildlife and overall water quality has declined. Streams and wetlands have been altered and do not provide the same ecological benefits they once provided. As a result of a change in vegetation and habitat, wildlife species in the area are shifting to species better able to adapt to an urban environment.

The current condition of the vegetation and wildlife habitat within the RSA is considered “in decline”.

The land within the approximately 11,365-acre drainage sub-basin RSA consists of approximately 29,406 acres of maintained/herbaceous vegetation, 1,345 acres of upland woodlands, 1,650 acres of bottomland hardwoods, 480 acres of fence row vegetation, and 949 acres of riparian vegetation.

Step 4 – Direct and Indirect Impacts

The proposed project would permanently impact approximately 407 acres of maintained/herbaceous vegetation, 62 acres of unmaintained vegetation (grassland and scattered sapling-scrub-shrub vegetation, pasture, cultivated fields, and fencerow vegetation) and 0.2 acre of riparian vegetation. An additional 0.3 acre of riparian areas is located within the existing ROW but would not be impacted by the proposed project.

Approximately 4,454 acres of a mix-used development are anticipated to occur along the corridor as an indirect effect of the Build Alternative. The induced development has the potential to impact up to approximately 4,250 acres of herbaceous vegetation, 110 acres of bottomland hardwoods, 29 acres of fence row vegetation, and 11 acres of riparian vegetation.

Step 6 – Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include direct and indirect impacts to the vegetation and wildlife habitat as a result of implementation of the Build Alternative in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The 87,279-acre sub-basin RSA was considered sufficient to capture most cumulative effects of the Build Alternative on vegetation and wildlife habitat because this sub-basin contains the streams, floodplains, and the associated vegetative habitat that wildlife depends on for food, water, and shelter. Acreages of vegetation types in the RSA were determined from aerial photographs and topographic maps. Acreages of impacted vegetation

types were determined by using development overlays for the Build and No Build Alternatives. For the purpose of this analysis, it was assumed that any of the other past, present or reasonable foreseeable developments would displace all the native vegetation and wildlife habitat within the confines of the development.

Step 7 – Results of the Cumulative Impact Assessment

The cumulative impacts on vegetation and wildlife habitat resulting from the direct impacts, indirect impacts, and other past, present, and reasonably foreseeable public and private actions would decrease the amount of vegetation and wildlife habitat in the RSA by 8,224 acres. Of this acreage, approximately 329 acres of bottomland hardwoods, 64 acres of fence row vegetation, 7,559 acres of herbaceous vegetation, 73 acres of riparian vegetation, 137 acres of upland overstory vegetation, and 62 acres of unmaintained vegetation is comprised of grassland and scattered sapling-scrub-shrub vegetation, pasture, cultivated fields, and fence row vegetation) would be impacted.

Under the No Build Alternative, vegetation and wildlife habitat would still be impacted from the previously described other past, present, and reasonably foreseeable public and private actions, and would decrease the amount of vegetation and wildlife habitat in the RSA to approximately 3,355 acres. Of this acreage, approximately 219 acres of bottomland hardwoods, 35 acres of fence row vegetation, 2,902 acres of fence row vegetation, 62 acres of riparian vegetation, and 137 acres of upland overstory vegetation would be impacted.

Table 43 provides a summary of the direct, indirect, and cumulative impacts associated with the Build and No-Build Alternatives.

Step 8 – Potential Mitigation
Incorporating parks, open spaces, and riparian corridors around and within developed areas would provide wildlife habitat and shelter. Planting these areas with native fruit or nut-bearing trees and shrubs, and native grain-bearing grasses would provide food for wildlife, and would help to mitigate impacts to habitat used by wildlife.

Waters of the U.S.

Step 3 – Resource Health and Historical Context

There are approximately 268-linear miles of streams and 1,055 acres of wetlands within the drainage sub-basin RSA. The DFW metropolitan area accounts for the most urbanized portion of the upper Trinity River Basin. Steams and their associated floodplains have been affected both physically and indirectly by urbanization impacts and past agricultural, drainage, and mining activities. Straightening of channels, dredging and filling of wetlands, construction of levees, and removal of natural vegetation has also occurred in certain areas. Land clearing, soil compaction, riparian corridor encroachment, and modifications to the surface water drainage network have all accompanied urbanization of the DFW area, including the IH 35W project area. Human use of the West Fork Trinity River in this portion of the DFW metropolitan area has included activities to straighten, narrow, deepen, fill, block, and otherwise encroach upon the stream channel. As a result, much of the channel system has become simplified, stabilized in position, and subject to stabilized stream flows that have lost part of their flow variability. These physical alternations have had an impact on the associated natural ecosystem and native biota that evolved and depended upon natural conditions. The current health of waters of the U.S. within the RSA is considered “stable”.

Step 4 – Direct and Indirect Impacts

The proposed project would directly impact approximately 0.63 linear mile of streams and 0.58 acre of wetlands. The potential indirect effects on waters of the U.S. and wetlands from roadway projects include fill and degradation from roadway-induced development. The approximately 4,454 acres of a mixed-use development has the potential to impact up to approximately 11 linear miles of streams and 44 acres of wetlands.

Step 6 – Assessment of Potential Cumulative Impacts

Potential cumulative impacts considered and discussed include impacts on waters of the U.S. resulting from the direct impacts and indirect effects of the Build Alternative, in combination with the effects of other past, present, and reasonably foreseeable public and private actions. The 31,664-acre sub-basin RSA was considered sufficient to capture most cumulative effects of the Build Alternative on waters of the U.S. because the majority of waters within this portion of the area are included in this sub-basin. Data is not available to quantify the acreage of streams in the RSA; however, stream lengths in the RSA can be measured using aerial photographs and topographic maps, and the acreage of wetlands can be determined from NWI maps. Therefore, linear mile is the measurement unit used for determining stream impacts and acres is the measurement unit used for determining wetland impacts. The lengths of impacted streams and acres of impacted wetlands were determined by using development overlays for the Build and No-Build Alternatives.

Step 7 – Results of the Cumulative Impact Assessment

The cumulative impacts on waters of the U.S. resulting from the direct impacts, indirect impacts, and other past, present, and reasonably foreseeable public and private actions would decrease the amount of waters of the U.S. by 35 linear miles of streams and 173 acres of wetlands in the RSA.

Under the No-Build Alternative, waters of the U.S. would still be impacted from the previously described other past, present, and reasonably foreseeable public and private actions. Approximately 23 linear miles of streams and 117 acres of wetlands would be impacted in the RSA.

Table 43 provides a summary of the direct, indirect, and cumulative impacts associated with the Build and No-Build Alternatives.

Step 8 – Potential Mitigation

Avoidance or minimization of impacts to waters of the U.S. and wetlands should be performed during the development design phase so that only the least amount of impacts occur. Mitigation is only conducted when impacts to waters of the U.S. and wetlands cannot be avoided. Typical mitigation for impacts to waters of the U.S includes the construction of mitigation areas or purchasing credits from a mitigation bank. Mitigation is frequently conducted as a one of the requirements for obtaining a Section 404 permit. The USACE decides what the ratio of the mitigation area would be relative to the acreage of impacts to waters of the U.S. A typical mitigation ratio is three times the amount of acreage impacted, while the minimum mitigation ratio is one time the amount of acreage impacted (i.e. 1:1 ratio). A mitigation bank is a wetland, stream, or other aquatic resource area that has been restored, established, enhanced, or in certain circumstances, preserved for the purpose of providing compensation for unavoidable impacts to aquatic resources permitted under Section 404 or a similar state or local wetland

regulation. Mitigation banks are used in situations where the construction of a mitigation area is not practical. Mitigation banks are a form of “third-party” compensatory mitigation, in which the responsibility for compensatory mitigation implementation and success is assumed by a party other than the permittee. The USACE would have jurisdiction over mitigation activities for impacts to waters of the U.S., and as such, would determine the mitigation responsibilities of the developers.

Air Quality

Step 3 – Resource Health and Historical Context

The enactment of the CAA of 1970 authorized the development of comprehensive federal and state regulations to limit emissions from both stationary (industrial) sources and mobile sources. Four major regulatory programs affecting stationary sources were initiated: the NAAQS, SIPs, New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPs). The EPA was created on May 2, 1971 to implement the various requirements included in the CAA of 1970.

Major amendments were added to the CAA in 1977. The 1977 Amendments primarily concerned provisions for the Prevention of Significant Deterioration (PSD) of air quality in areas attaining the NAAQS. The 1977 CAA Amendments (CAAA) also contained requirements pertaining to sources in non-attainment areas for NAAQS. A non-attainment area is a geographic area that does not meet one or more of the federal air quality standards. Both of these 1977 CAAA established major permit review requirements to ensure attainment and maintenance of the NAAQS.

The 1990 CAAA established specific criteria which must be met for air quality. The EPA was authorized to designate areas in “non-attainment” or failing to meet established NAAQS. In July 1997, the EPA announced a new NAAQS for ground-level ozone. The EPA phased out and replaced the previous one-hour standard with an eight-hour standard to protect public health against longer exposure to this air pollutant.

In 2004, the EPA designated nine counties in North Central Texas as non-attainment for the new 8-hour ozone standard in accordance with the NAAQS. The region is currently in attainment for all other criteria pollutants, with the exception of a small part of Collin County that is in non-attainment for lead, effective December 31, 2010. This project is located outside that portion of Collin County in non-attainment for lead. Tarrant and Denton Counties are located within the designated non-attainment area for ozone. Although the DFW region remains in non-attainment for ozone, the number of daily exceedances of the federal standards for ozone has decreased within the past decade. There have been year-to-year fluctuations in ozone levels; however, the ozone trend continues to show improvement. This trend is attributable in part to the effective integration of highway and alternative modes of transportation, cleaner fuels, improved emission control technologies, and NCTCOG’s regional clean air initiatives. The current health of the air quality within the RSA is considered “improving”.

Step 4 - Direct and Indirect Impacts

The NAAQS CO analysis under the direct impacts revealed that local concentrations of CO under the worst meteorological conditions are not expected to exceed national standards at any time. Results of the MSAT analysis indicate a substantial decrease in MSAT emissions for both the Build and No-Build Alternative (2035) versus the base year (2012). Emissions of total MSATs are predicted to decrease by approximately 32 percent in 2035 Build Alternative

compared with 2012 levels (**Table 26**). If emissions are plotted over time, a substantially decreasing level of MSAT can be seen in graph on **page 57**; however, overall VMT continues to rise. Differences in total MSAT emissions between the No-Build and Build Alternatives were found. The 2035 Build Alternative is expected to generate a 38 percent increase in VMT as compared to the 2035 No-Build, and a corresponding 33 percent increase in MSATs.

The 4,454 acres of induced development within the AOI would include business/commercial development projects. The new development would increase air emissions from point sources (large industrial facilities), area sources (smaller businesses such as gas stations, paint and body shops, bakeries), on-road mobile sources (motorized vehicles), and non-road mobile sources (lawn mowers, construction equipment).

Under the No-Build Alternative, air quality would still be impacted from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with the past, present, and reasonably foreseeable public and private actions.

Step 6 - Assessment of Potential Cumulative Impacts

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.

Step 7 - Results of the Cumulative Impact Assessment

The cumulative impacts on air quality from the Build Alternative and other reasonably foreseeable transportation projects are addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP. The Build Alternative and the other reasonably foreseeable transportation projects were included in the MTP and the TIP and have been determined to conform to the ozone non-attainment SIP.

Under the No-Build Alternative, the cumulative impacts on air quality from other past, present, and reasonably foreseeable transportation projects would still be addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP, and would still conform to the ozone non-attainment SIP.

Table 43 provides a summary of the direct, indirect, and cumulative impacts associated with the Build and No Build Alternatives.

Step 8 - Potential Mitigation

The cumulative impact of reasonably foreseeable future growth and urbanization on air quality would be minimized by complying with state and federal regulations, mandated and enforced by the EPA and TCEQ. These regulations are designed to ensure that growth and urbanization do not prevent regional compliance with the ozone standard or threaten the maintenance of the other air quality standards.

Direct, Indirect, and Cumulative Impacts Summary

Table 41 provides a summary of the direct, indirect, and cumulative impacts associated with the Build and No-Build Alternatives.

Table 41: Summary of Direct, Indirect, and Cumulative Impacts Associated With the Build and No-Build Alternatives

Resource	BUILD ALTERNATIVE IMPACTS				NO-BUILD ALTERNATIVE IMPACTS		
	Direct Impacts	Indirect Effects	Past, Present, & Reasonably Foreseeable Actions	Cumulative Impacts	Direct/Indirect Effects	Past, Present, & Reasonably Foreseeable Actions	Cumulative Impacts
Vegetation and Wildlife Habitat	407 acres of maintained/ herbaceous vegetation 62 acres of unmaintained vegetation* 0.2 acres of riparian vegetation *Unmaintained vegetation is comprised of grassland and scattered sapling-scrub-shrub vegetation, pasture, cultivated fields, and fencerow vegetation.	4,250 acres of herbaceous vegetation 11 acres of riparian vegetation 110 acres of bottomland hardwoods vegetation 29 acres of fence row vegetation	2,902 acres of herbaceous vegetation 62 acres of riparian vegetation 219 acres of bottomland hardwoods vegetation 35 acres of fence row vegetation 137 acres of upland overstory vegetation	7,559 acres of herbaceous vegetation 73 acres of riparian vegetation 329 acres of bottomland hardwoods vegetation 64 acres of fence row vegetation 137 acres of upland overstory vegetation 62 acres of unmaintained vegetation* *Unmaintained vegetation is comprised of grassland and scattered sapling-scrub-shrub vegetation, pasture, cultivated fields, and fencerow vegetation.	None	2,902 acres of herbaceous vegetation 62 acres of riparian vegetation 219 acres of bottomland hardwoods vegetation 35 acres of fence row vegetation 137 acres of upland overstory vegetation	2,902 acres of herbaceous vegetation 62 acres of riparian vegetation 219 acres of bottomland hardwoods vegetation 35 acres of fence row vegetation 137 acres of upland overstory vegetation

Table 41: Summary of Direct, Indirect, and Cumulative Impacts Associated With the Build and No-Build Alternatives							
	BUILD ALTERNATIVE IMPACTS				NO-BUILD ALTERNATIVE IMPACTS		
Resource	**Direct Impacts**	**Indirect Effects**	**Past, Present, & Reasonably Foreseeable Actions**	**Cumulative Impacts**	**Direct/Indirect Effects**	**Past, Present, & Reasonably Foreseeable Actions**	**Cumulative Impacts**
Waters of the U.S.	0.63 linear mile of streams 0.58 acre of wetlands	11 linear miles of streams 44 acres of wetlands	23 linear miles of streams 117 acres of wetlands	35 linear miles of streams 161 acres of wetlands	None	23 linear miles of streams 117 acres of wetlands	23 linear miles of streams 117 acres of wetlands
Air Quality	The NAAQS CO revealed that local concentrations of CO under the worst meteorological conditions are not expected to exceed national standards at any time. Results of the MSAT analysis indicate a substantial decrease in MSAT emissions for both the Build and No-Build Alternatives (2035) versus the base year (2012). Emissions of total MSATs are predicted to decrease by approximately 32 percent for the 2035 Build Alternative compared with 2012 levels. The 2035 Build Alternative is	Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with 4,454 acres of development would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.	Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with other past, present, and reasonably foreseeable public and private actions (10,632 acres) would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.	The cumulative impacts on air quality from the Build Alternative and other reasonably foreseeable transportation projects are addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP. The Build Alternative and the other reasonably foreseeable transportation projects were included in the MTP and the TIP and have been determined to conform to the ozone non-attainment SIP.	None	Impacts from point sources, area sources, on-road mobile sources, and non-road mobile sources associated with other past, present, and reasonably foreseeable public and private actions would not adversely affect the regional ozone standard compliance or maintenance of the other air quality standards.	Under the No-Build Alternative, the cumulative impacts on air quality from other past, present, and reasonably foreseeable transportation projects would still be addressed at the regional level by analyzing the air quality impacts of transportation projects in the MTP and the TIP, and would still conform to the ozone non-attainment SIP.

Table 41: Summary of Direct, Indirect, and Cumulative Impacts Associated With the Build and No-Build Alternatives							
Resource	BUILD ALTERNATIVE IMPACTS				NO-BUILD ALTERNATIVE IMPACTS		
	Direct Impacts	Indirect Effects	Past, Present, & Reasonably Foreseeable Actions	Cumulative Impacts	Direct/Indirect Effects	Past, Present, & Reasonably Foreseeable Actions	Cumulative Impacts
	expected to generate a 38 percent increase in VMT as compared to the 2035 No-Build, and a corresponding 33 percent increase in MSATs.						

K. Regional Toll Analysis

To assess the significance of regional impacts and address the potential need for mitigation of the tolled components of the long-range metropolitan transportation plan, NCTCOG prepared the *Regional Tolling Analysis for the Dallas-Fort Worth Metropolitan Planning Area based on Mobility 2035* (*Regional Tolling Analysis*) technical memorandum. This technical memorandum can be viewed at www.nctcog.org/mobility2035. The purpose of the analysis is to evaluate the effects of proposed expansion of the regional priced facility system in the Dallas-Fort Worth region based on the improvements included in the metropolitan transportation plan (MTP): *Mobility 2035: The Metropolitan Transportation Plan for North Central Texas* (*Mobility 2035*). The technical memorandum provides the context of the transportation system, planned improvement potential effects, incomplete and unavailable information, summary, and conclusion. The following summarizes the methodology, effects, and conclusion of the analysis.

Methodology

Section 4.0 of the *Regional Tolling Analysis* evaluates potential effects of the regional toll system elements of *Mobility 2035* on land-use, air quality, and environmental justice populations. Figure 20 shows the funded recommendations for controlled access facilities from *Mobility 2035*. The land-use and demographic forecasts from *2040 Demographic Forecast* were used as the basis for all travel demand modeling in *Mobility 2035* and *Regional Tolling Analysis*.

The *Regional Tolling Analysis* environmental justice analysis focuses on differential impacts (see **Table 42**) between environmental justice populations and non-environmental justice populations at the transportation survey zone (TSZ) geography. Based on 2010 census data and 2005-2009 American Community Survey data, the *Regional Tolling Analysis* classifies TSZs into four categories: non-environmental justice TSZs, low-income alone TSZs, minority alone TSZs, and both low-income and minority TSZs. Regional traffic was modeled under three transportation network conditions:

- 2012 network (2012 roadway and transit facilities with 2012 demographics)

- 2035 build network (all *Mobility 2035* recommended roadway and transit facilities with 2035 demographics)
- 2035 priced facilities no build network [all recommended transportation (roadway and transit) facilities in *Mobility 2035* except proposed facilities with any priced elements (built after 2012) with 2035 demographics]

Regional Toll System Effects

Table 42 lists the resource areas and performance metrics analyzed in *Regional Tolling Analysis*. A more detailed analysis of each item is included in section 4.0 of the full technical memorandum.

Table 42: Analysis of Potential Effects

Analysis	Section of Technical Memorandum	Results
Land Use	4.1	The priced facilities components of *Mobility 2035* may affect land-use by helping to enhance land development or redevelopment opportunities.
Air Quality	4.2	The regional roadway network (including priced facilities) would show a decrease in nitrogen oxides and emissions of volatile organic compounds, which are both precursors to ozone.
Environmental Justice Populations		
Access to Jobs*	4.3.1	The 2035 build network (including priced facilities) would provide protected populations access to more jobs accessible within 30 minutes by car and more jobs accessible within 60 minutes by transit in the future when compared to the 2012 network
Regional Congestion*	4.3.1	While congestion increases for both the protected and non-protected populations in the 2035 networks, the non-protected population sees a larger increase in localized congestion.
Average Travel Times*	4.3.1	Under the 2035 build network (including priced facilities), travel times would increase for both protected and non-protected populations, but travel times for both populations would be substantially lower than under the 2035 full no build network**
Daily Vehicle Miles Travelled	4.3.2	The greater VMT on freeways and priced facilities under the 2035 build network would reduce the amount of congestion on arterials and collectors compared to the 2035 priced facilities no build network.
Average Loaded Speed	4.3.2	The 2035 build network would result in a slight increase in daily roadway speed for most roadway classifications compared to the 2035 priced facilities no build network.
Morning Peak Period Level of Service	4.3.2	Under the 2035 build network the overall proportion of lane-miles at LOS F is lower than the 2035 priced facilities no build network.
Morning Peak Period Roadway Trip Times	4.3.3	Under the 2035 build network the average vehicle trip times are lower than in the 2035 priced facilities no build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Roadway Trip Length	4.3.3	Under the 2035 build network the average vehicle trip lengths are longer than in the 2035 priced facilities no build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Roadway Trip	4.3.3	Under the 2035 build network the average vehicle trip speed is higher than in the 2035 priced facilities no build network for both environmental justice and non-environmental justice populations.

Table 42: Analysis of Potential Effects		
Analysis	**Section of Technical Memorandum**	**Results**
Speeds		
Morning Peak Period Transit Usage	4.3.3	Under the 2035 build network the number of transit trips is higher than in the 2035 priced facilities no build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Transit Trip Times	4.3.3	Under the 2035 build network the average transit trip times are higher than in the 2035 priced facilities no build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Transit Trip Length	4.3.3	Under the 2035 build network the average transit trip lengths are longer than in the 2035 priced facilities no build network for both environmental justice and non-environmental justice populations.
Morning Peak Period Transit Trip Speeds	4.3.3	Under the 2035 build network the average vehicle trip speed is higher than in the 2035 priced facilities no build network for both environmental justice and non-environmental justice populations.
Congestion Levels	4.3.4	Environmental justice TSZs are projected to have fewer no congestion and severe congestion TSZs, but more light to moderate congestion TSZs than the non-environmental justice areas. The construction of additional facilities in the 2035 build network would reduce the percentage of environmental justice TSZs with severe congestion.
Regional Origin-Destination Study	4.3.5	Under the 2035 build network, slightly more TSZs would send trips to priced facilities than under the 2035 priced facility no build network. Proposed priced facilities would be built closer to environmental justice populations than the existing priced facility system. This would increase accessibility to these roadway facilities as shown by the slightly higher proportion of trips from environmental justice TSZs on priced facilities in the 2035 build network than in the 2035 priced facility no build network.
Annual Toll Costs	4.3.6	As a percentage of total household income, regular use of priced facilities would cost a household at the low-income threshold approximately 1.4 times more than a median income household.
Transportation Benefits		
Quality of Life	4.3.7	The planned priced facility projects would help to reduce traffic congestion, improve air quality, improve travel time reliability, improve safety, and enhance health compared to the full no build and priced facility no build alternatives.
Bus Transit and Emergency Vehicles	4.3.7	An increase in service for both bus and emergency vehicles would improve the quality of life for those choosing to use or in need of those services, respectively.
Transportation System Financing	4.3.7	The revenue from priced facilities would help to finance improvements/rehabilitation of both tolled and non-tolled facilities. It would also accelerate the funding for construction as compared to traditional tax-supported highway finance, thereby reducing capital costs and making new transportation capacity available to the traveling public sooner.

*****Analysis conducted and documented within *Mobility 2035*, summarized in the *Regional Tolling Analysis*
** *Mobility 2035* includes a 2035 full no build network, which is defined as the 2012 roadway and transit facilities with 2035 demographics

Section 6.0 of the *Regional Tolling Analysis* provides the results of the assessment. Based on the environmental justice analysis conducted for *Mobility 2035* and summarized in *Regional*

Tolling Analysis, it was determined that the recommended transportation projects included in *Mobility 2035* do not have a highly adverse or disproportionate impact on protected populations.

In addition, results from the performance reports prepared for the metropolitan planning area (MPA) showed a marginal increase in roadway speed and a slight improvement in LOS for the majority of the roadway classifications in the 2035 build network compared to the 2035 priced facilities no build network. The 2035 build network for the MPA would generally maintain the 2012 network roadway performance conditions for freeways and toll roads throughout the NCTCOG region while accommodating the travel demands of the growing regional population.

Although environmental justice populations would see an increase in spending for priced facility usage under the 2035 build scenario, it is proportional to the increased spending for non-environmental justice populations on priced facilities for the entire MPA. Almost all environmental justice TSZs are projected to generate trips along priced facilities in the 2012 network and 2035 build network. For populations (including environmental justice populations) who would choose to use non-priced facilities, the 2035 build network would provide a non-priced roadway network that would operate at better traffic conditions (slightly higher speeds and an improved LOS) on all roadways and an increased benefit over the 2035 priced facilities no build network.

The planned transit system is the same for both the 2035 build network and 2035 priced facility no build network. The analysis in the *Regional Tolling Analysis* show that improved roadway performance would lead to slightly longer and higher speed transit trips in the 2035 build network compared to the 2035 priced facility no build network.

While the analysis focused on the potential impacts, priced facilities are also expected to provide benefits to system users which can be categorized into two forms: quality of life and economic. The transportation system, including priced facilities, increases the number of travel options available to transportation system users. These facilities serve as bus transit corridors, improving the performance of the on-road transit system. The priced facilities will help reduce traffic congestion, improve air quality, improve travel time reliability, improve safety, and enhance health compared to the no build and priced facility no build alternatives. By helping to reduce overall congestion levels, improvements to the overall transportation system, including priced facilities, also contributes to the economic vitality of the region. Additionally, the revenue from priced facilities will help to finance improvements/rehabilitation of both priced and non-priced facilities. Compared to traditional tax-supported highway finance, priced facilities are implemented more quickly, thereby minimizing capital costs and making new transportation capacity (via transit, roadway, or other modes) available to the traveling public sooner.

Conclusion

Based on the analysis documented in the *Regional Tolling Analysis*, the 2035 build network for the MPA, including future priced facilities, would result in a fair distribution of impacts and benefits among the regional population including environmental justice communities. The 2035 build network for the MPA, including priced facilities, would not cause disproportionately high and adverse impacts on any minority or low-income populations as per Executive Order 12898 regarding environmental justice. Therefore, no regional mitigation measures are proposed. This regional analysis is based on the most recent policies, programs, and projects included in *Mobility 2035*. Changes in tolling/managed lane policies could necessitate that the regional tolling analysis be revised if, after a thorough review, the changes are of sufficient magnitude. All of these elements are subject to change in future MTPs. During the development of future MTPs, new analyses of the effects of pricing to environmental justice and protected classes would be conducted.

The *Regional Tolling Analysis* concludes that *Mobility 2035* and the regional transportation planning process provide ways to avoid and minimize potential impacts that could occur due to transportation projects. It also indicates that NCTCOG has performed an environmental justice and Title VI analysis, using the best available data, to ensure that no person is excluded from participation in, denied benefits of, or discriminated against in planning efforts, including the development of the MTP. This assures that *Mobility 2035* is consistent with Title VI of the Civil Rights Act of 1964 and Executive Order 12898 on environmental justice, as well as the Civil Rights Restoration Act of 1987.

VI. PUBLIC INVOLVEMENT AND LOCAL GOVERNMENT COORDINATION

On Thursday, March 8, 2007 TxDOT conducted a Public Meeting (open house format) for the purpose of soliciting public comments on the proposed project. The meeting was held at the Education Service Center (ESC) Region XI facility located at 3001 North Freeway in Fort Worth, Texas. The meeting began at 6:00 p.m. and concluded at approximately 8:00 p.m. Registered attendance totaled 59.

Viewing of the project exhibits and informal discussion sessions were held throughout the duration of the meeting to provide attendees an opportunity to review displays and to ask questions regarding the proposed project, including the managed (toll) lanes tolling component, with project team members present. Five written comments were received either at the public meeting or mailed to TxDOT before the written comment period expired on March 19, 2007. These comments have been reviewed and were considered during the development of the project.

All comments received indicated a general support of the project. The written comments also included other specific statements regarding the project. Copies of the written comments received and public sign-in sheets are available for review at the TxDOT Fort Worth District Office located at 2501 SW Loop 820, Fort Worth, Texas 76133.

On Monday, May 11, 2009, TxDOT conducted a project coordination work group/stakeholders group meeting. The meeting was held at the ESC Region XI facility located at 3001 North Freeway in Fort Worth, Texas. The meeting began at 1:30 p.m. and concluded at approximately 3:30 p.m.

After a brief introduction, topics discussed included the project schedule and status, the EA, and design schematic overview. At the end of the meeting, attendees were given the opportunity to ask questions or make comments. One comment and one question were made at the public meeting. Neither was in opposition or support of the project.

A copy of the meeting notes and public sign-in sheets are available for review at the TxDOT Fort Worth District Office located at 2501 SW Loop 820, Fort Worth, Texas 76133.

On Tuesday, July 28, 2009 TxDOT conducted a Public Meeting (open house format) for the purpose of soliciting public comments on the proposed project. The meeting was held at the ESC Region XI facility located at 3001 North Freeway in Fort Worth, Texas. The meeting began at 6:00 p.m. and concluded at approximately 8:00 p.m. Registered attendance totaled 59.

Viewing of the project exhibits and informal discussion sessions were held throughout the duration of the meeting to provide attendees an opportunity to review displays and to ask questions regarding the proposed project, including the managed (toll) lanes tolling component,

with project team members present. Three written comments were received either at the public meeting or mailed to TxDOT before the written comment period expired on August 7, 2009.

Two of the comments pertained to different projects outside the IH 35W Improvement Study limits. One comment suggested a design change at IH 35W and SH 114. TxDOT thoroughly analyzed and responded to all comments. No comments were received in opposition to the project. Copies of the written comments received and public sign-in sheets are available for review at the TxDOT Fort Worth District Office located at 2501 SW Loop 820, Fort Worth, Texas 76133.

On Thursday, December 15, 2011, TxDOT conducted a Public Hearing for the purpose of presenting the planned improvements to IH 35W to interested citizens, and soliciting public comments on the proposed project. The meeting was held at the John M. Tidwell Middle School located at 3937 Haslet-Roanoke Road in Roanoke, Texas.

Displays were available for public viewing at 6:30 p.m. to 7:00 p.m. and the Public Hearing began at 7:00 p.m. with a formal presentation. Upon completion of the presentation, a 20-minute recess was provided so that attendees could review displays and ask questions regarding the proposed project, including the managed lane tolling component, with project team members present. After the recess, attendees were given the opportunity to make verbal comments for the public record. No verbal comments were made, and the Public Hearing concluded at approximately 8:00 p.m. Registered attendance totaled 48. Sixteen written comments were received either at the Public Hearing or mailed to TxDOT before the written comment period expired on December 27, 2011. These comments have been reviewed and considered.

All comments received indicated a general support of the project. The written comments also included other specific statements regarding impacts to adjacent properties. Copies of the written comments received and public sign-in sheets are available for review at the TxDOT Fort Worth District Office located at 2501 SW Loop 820, Fort Worth, Texas 76133.

The proposed project is fully supported by the Cities of Fort Worth and Haslet, Tarrant County, Denton County and the NCTCOG.

VII. DETERMINATION OF ASSESSMENT

A. Preferred Alternative

The Build Alternative would include the reconstruction and widening of a 10.5 mile section of IH 35W between SH 114 and IH 820 (refer to actual construction limits provided in **Section I**). The proposed project extends from Eagle Parkway in southern Denton County to IH 820 in north-central Tarrant County. The proposed improvements to IH 35W include the following:

- From Eagle Parkway to US 81/287, the proposed project would consist of reconstructing and widening the roadway to a 10-lane facility consisting of three general purpose lanes (non-toll) in each direction and a barrier-separated four-lane concurrent managed (toll) lane facility (two lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/threelane frontage roads in each direction with bicycle accommodation would be constructed. Direct connectors from IH 35W to SH 170 would also be constructed.
- From US 81/287 to Basswood Boulevard, the proposed project would consist of reconstructing and widening the roadway to a 12-lane facility consisting of four general purpose lanes (non-toll) in each direction and a barrier-separated four-lane concurrent

managed (toll) lane facility (two lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/three/four-lane frontage roads in each direction with bicycle accommodation would be constructed throughout this section. Direct connectors to/from US 81/287 from IH 35W managed (toll) lanes would be constructed.

- From Basswood Boulevard to IH 820, the proposed project would consist of reconstructing and widening the roadway to a 14-lane facility consisting of four general purpose lanes (non-toll) in each direction and a barrier-separated six-lane concurrent managed (toll) lane facility (three lanes in each direction). The concurrent managed (toll) lane facility would be centered between the general purpose lanes (non-toll). Auxiliary lanes would be constructed between entrance and exit ramps along the roadway and two/three/four-lane frontage roads in each direction with bicycle accommodation would be constructed throughout this section.

B. Mitigation and Monitoring Commitments

The following mitigation and monitoring commitments are proposed for the Build Alternative.

Right-of-Way Requirements, Relocations, and Displacements

Implementing the Build Alternative would require approximately 97.4 acres of additional ROW and 0.6 acres of drainage easements to accommodate the proposed facility. 109 parcels would be impacted by ROW acquisition, and three commercial structures would be displaced by the proposed project. No residential structures would be displaced. The TxDOT ROW Acquisition and Relocation Assistance Program would be conducted in accordance with the Uniform Relocation Assistance and Real Property Acquisition Policy Act of 1970, as amended.

Vegetation and Wildlife Habitat

Approximately 407 acres of maintained vegetation, 62 acres of unmaintained grassland/pasture, and 0.2 acres of low quality riparian vegetation would be impacted by the proposed project. In addition, two trees with a dbh equal to 20-inches or greater would be impacted. Compensatory mitigation per the MOA for the loss of the low quality riparian habitat would not be provided.

Permanent soil erosion control features would be constructed as soon as feasible during the early stages of construction through proper sodding and/or seeding techniques. Disturbed areas would be restored and stabilized as soon as the construction schedule permits and temporary sodding would be considered where large areas of disturbed ground would be left bare for a considerable length of time. In accordance with EO 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping, seeding and replanting with TxDOT approved seeding specifications that are in compliance with EO 13112 would be done where possible.

Threatened and Endangered Species

During construction of the proposed Build Alternative, if implemented, there is the potential for temporary impacts to the state threatened Louisiana pigtoe, Texas heelsplitter, the little spectaclecase (a state species of concern), and their habitats from adverse water quality conditions from construction area storm water runoff. Mitigation for project impacts that might occur to mollusk habitats would consist of the water quality measures discussed in **Section V.B. Water Quality Issues**.

Also during construction, there would be temporary impacts to streams which could serve as Texas garter snake habitat and temporary impacts to open areas with sparse vegetation which could serve as Texas horned lizard habitat. After construction, the impacted areas of these

streams and open areas would be returned to preconstruction contours and any Texas garter snake and Texas horned lizard habitats would reestablish themselves. There are also ample streams, wetlands, and open areas outside of the proposed construction limits of the proposed Build Alternative that could serve as Texas garter snake and Texas horned lizard habitats to replace the permanently impacted habitats.

Floodplains
The proposed project crosses 15 water bodies and seven flood zones. According to NFIP, Zone A and Zone AE are located in a special flood hazard area inundated by the 100-year level. The hydraulic design practices for the proposed project would be in accordance with current TxDOT design policy and standards. The highway facility would permit the conveyance of the 100-year flood levels, inundation of the roadway being acceptable, without causing significant damage to the roadway, stream, or other property. A portion of the proposed project is within the Regulated Floodway Zone. The proposed project would not increase the base flood elevation to a level that would violate applicable floodplain regulations or ordinances; therefore, coordination with either the FEMA or the local floodplain administrator is not required. However, information coordination with the local floodplain administrator would occur.

Waters of the U.S.
As shown in **Table 19**, impacts to all Area Crossings would be authorized under NWP 14 - *Linear Transportation Projects*. Because impacts at Area Crossings 5, 8, 9, 10, 11, 12, and 13 exceed the 0.1 acre impact threshold and/or a discharge in wetlands, a PCN would be required. If temporary fills are needed in jurisdictional waters then the affected areas would be returned to their pre-existing elevations. Channelization would not be required to construct the proposed project. Compensatory mitigation for Section 404 impacts would be coordinated with the USACE and performed in accordance with the terms of the approved permit(s).

Water Quality
General Condition 21 of the NWP Program requires applicants to comply with Section 401 of the CWA. Compliance with Section 401 requires the use of BMPs to manage water quality on construction sites. The SW3P would include at least one BMP from the 401 Water Quality Certification Conditions for NWPs as published by the TCEQ on April 25, 2007. These BMPs would address each of the following categories:

- Category I – Erosion Control
- Category II – Sedimentation Control
- Category III – Post-construction TSS Control

Because the proposed project would disturb more than one acre, TxDOT would be required to comply with the TCEQ-TPDES General Permit for Construction Activity. The proposed project would also disturb more than five acres; therefore, a Notice of Intent would be filed to comply with TCEQ stating that TxDOT would have a SW3P in place during construction of the proposed project.

The portion of the proposed project within the boundaries of the Phase I (Fort Worth) MS4 (just north of US 81/287) would comply with the applicable MS4 requirements. The remaining portion of the proposed project is outside of MS4 jurisdiction.

The proposed project is not within the Trinity River Corridor Development Regulatory Zone; therefore, a CDC would not be required.

Noise

The Build Alternative would result in a traffic noise impact at two representative receivers and the following noise abatement measures were considered: traffic management, alteration of horizontal and/or vertical alignments, acquisition of undeveloped property to act as a buffer zone, and the construction of noise barriers. None of these noise abatement measures would be both feasible and reasonable; therefore, no abatement measures are proposed for this project.

Airway-Highway Clearance

A FAA Notice of Proposed Construction or Alteration form (Form AD-7460-1) would be completed during the design phase and submitted by TxDOT to the FAA for their approval prior to construction of proposed improvements.

C. Recommendation for Alternative Selection and a FONSI

The engineering, social, and environmental investigations conducted thus far indicate that the proposed project would have no significant impact on the quality of the human environment. A Finding of No Significant Impact (FONSI) is anticipated for this proposed project.

FIGURES

Appendix A
Wetland Data Forms

Appendix B
MTP/STIP Pages

Appendix C
Affected Transportation Networks

Appendix D
Regional Transportation Council
Managed Lane Policies and
Excess Toll Revenue Sharing Policy

Appendix E
Cultural Resources Coordination

Appendix F
FAA Clearance Data