FINAL ENVIRONMENTAL IMPACT STATEMENT
FHWA-TX-EIS-99-05-F
State Highway 121
From IH 30 to FM 1187
Tarrant County, Texas

Volume One

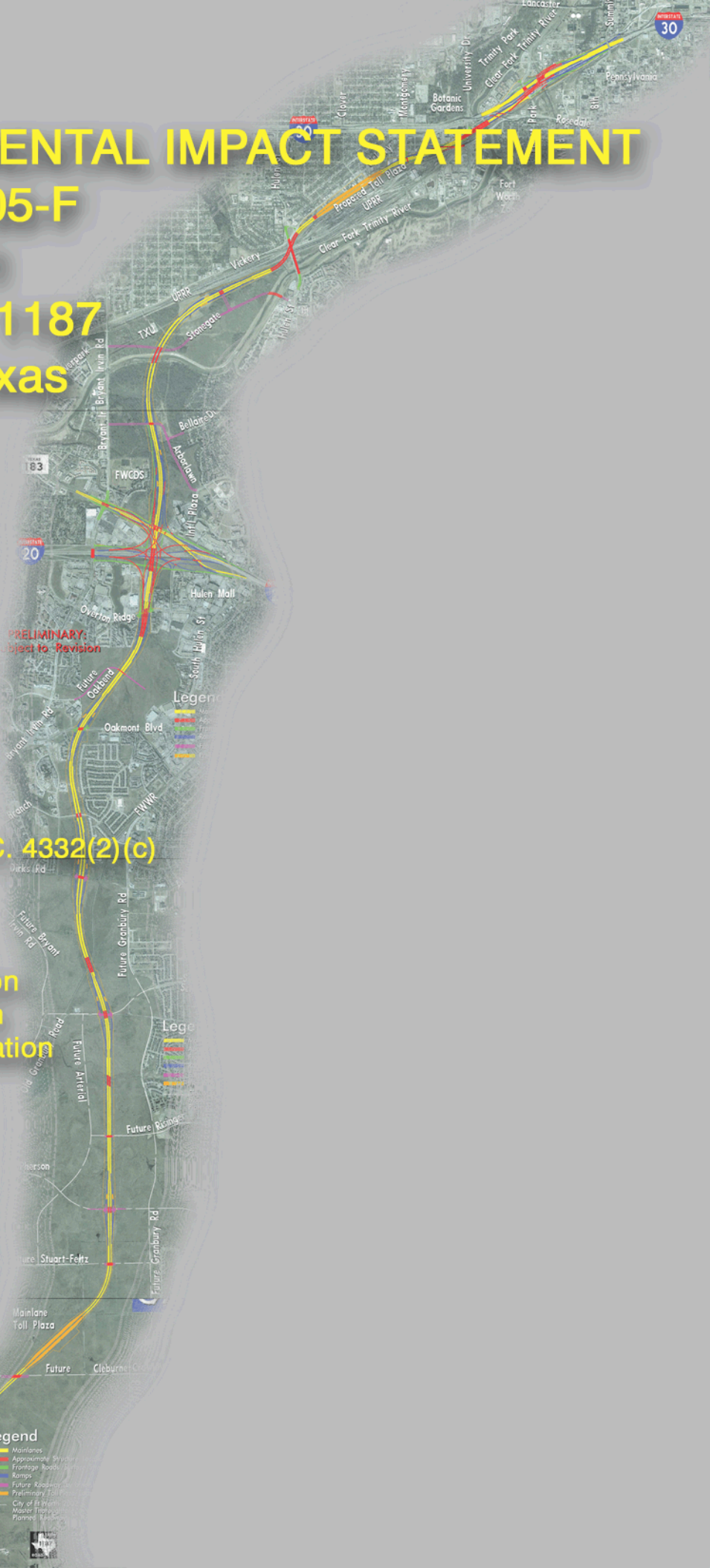
CSJ 0504 02 008
CSJ 0504 02 013

Submitted Pursuant to 42 U.S.C. 4332(2)(c)

Prepared by:

US Department of Transportation
Federal Highway Administration
Texas Department of Transportation
North Texas Tollway Authority

October 2004



FHWA-TX-EIS-99-05-F

STATE HIGHWAY 121
FROM INTERSTATE HIGHWAY 30
To FARM-To-MARKET 1187 In TARRANT COUNTY, TEXAS

CSJ: 0504-02-008

CSJ: 0504-02-013

FINAL

ENVIRONMENTAL IMPACT STATEMENT

Submitted Pursuant to 42 U.S.C. 4332(2)(c)

U.S. Department of Transportation - Federal Highway Administration
Texas Department of Transportation
and
North Texas Tollway Authority

10/27/04
Date

Federal Highway Administration

10-27-04
Date

Texas Department of Transportation

10-20-04
Date

North Texas Tollway Authority

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The action proposed is the construction of State Highway 121, a multi-lane controlled access roadway on new alignment, from Interstate Highway 30 to Farm-to-Market 1187 in Tarrant County. The total project length would be approximately 15 miles. A portion of the roadway is proposed as a tollroad.

Comments on this Final Environmental Impact Statement are due 45 days from the date the notice of availability is published in the Federal Register.

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PREFACE

PREFACE

Throughout the history of this project, the roadway has been referred to by several different names. For the purposes of this document, the recommended project/tollroad is identified as State Highway 121. This Final Environmental Impact Statement for SH 121 from Interstate Highway 30 to Farm-to-Market Road 1187 has been prepared in accordance with regulations developed by the Council on Environmental Quality for the National Environmental Policy Act, U.S. Department of Transportation and Federal Highway Administration. The structure of this document is as follows:

Summary: Provides a summary of the document.

Chapter 1 – Project History: Presents the SH 121 project development history.

Chapter 2 – Purpose and Need: Presents the purpose and need for the project along with an overview of local and regional transportation goals. Specific transportation problems are presented along with a discussion of the purpose and need for transportation improvements in the southwest quadrant of the City of Fort Worth.

Chapter 3 – Alternatives: Provides a comparison and analysis of options considered including roadway options, various Build alternatives, the No-Build alternative, the recommended alternative and congestion management strategies in conjunction with the proposed alternatives.

Chapter 4 – Affected Environment: Describes the existing social, economic and natural environmental conditions in the study area without the influence of the recommended project. The discussion provides a description of the environment in which the project would take place and describes the relevant resources in the study area.

Chapter 5 – Environmental Consequences: Discusses potential impacts of the recommended project alternatives on the man-made and natural environments.

Chapter 6 – Public and Agency Involvement: This chapter summarizes the public and agency involvement efforts.

Chapter 7 – Recommended Alternative: Identifies the recommended Build alternative.

Chapter 8 – Summary of Mitigation Measures: Potential mitigation measures are described for regulated impacts due to the recommended alternative.

Chapter 9 – Agency Coordination and Comments

This document also contains eight appendices:

Appendix A provides a list of preparers.

Appendix B provides a list of recipients.

Appendix C provides the City of Fort Worth authorizations.

Appendix D contains the Notice of Intent letters.

Appendix E contains the Southwest Fort Worth Subarea Study.

Appendix F contains agency coordination and communications.

Appendix G provides the City of Fort Worth Project Development Team Recommendations

Appendix H provides a list of acronyms, abbreviations and definitions used in the document and their definitions.

Volume Two of the document contains the April 22, 2003 Public Hearing documentation consisting of:

- Public Hearing summary and analysis
- Public Hearing comment and response report
- Public Hearing transcript
- Written comments from the Public Hearing process

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SUMMARY

SUMMARY

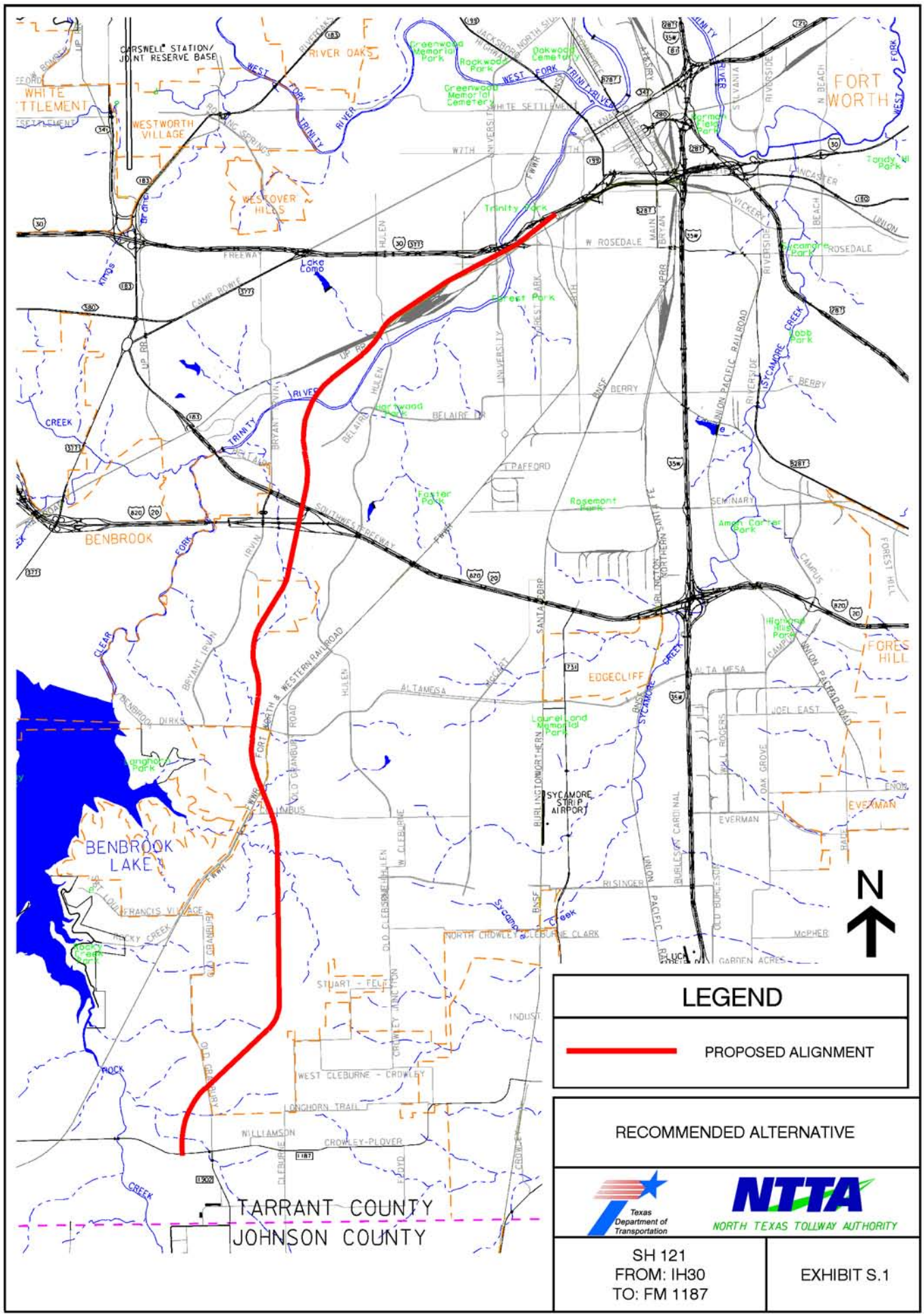
S 1.0 Description of Proposed Action

The proposed State Highway (SH) 121 project is a multi-lane controlled access tollroad from Interstate Highway (IH) 30 near downtown Fort Worth in Tarrant County to Farm-to-Market Road (FM) 1187, for a total project length of approximately 15 miles (mi). Exhibit S.1 represents the recommended alternative. Exhibit S.2 through Exhibit S.5 provides a geographical representation of the project study corridor (PSC). The entire facility is proposed on a new alignment. It would traverse a large portion of the City of Fort Worth (City) with major interchanges at IH 30 and IH 20/SH 183.

IH 30 (the northern terminus) is a major IH that facilitates traffic moving east-west through the Dallas/Fort Worth (DFW) area. FM 1187 (the southern terminus) is a major arterial, included on the National Highway System that serves traffic moving through southern Tarrant County. The Federal Highway Administration (FHWA) approved the limits of the project as logical termini.

The proposed action would provide a major link in the regional transportation network. Construction of the proposed SH 121 is part of the North Central Texas Council of Governments' (NCTCOG) regional transportation plan and the City of Fort Worth's *Master Thoroughfare and Comprehensive Plans*. The proposed SH 121 would provide a needed alternate route to the already congested urban arterials serving southwest Tarrant County.

The proposed action would be a divided tollroad. From the northern terminus at IH 30 to Altamesa Boulevard the proposed facility would ultimately be six lanes. From Altamesa Boulevard to the southern limit at FM 1187, the ultimate facility would be four lanes. However, until warranted due to future increases in traffic volume, only a part of the ultimate six/four-lane facility is being proposed at this time. As currently proposed, the facility would vary from six lanes between IH 30 and Altamesa Boulevard to four lanes from Altamesa Boulevard to FM 1187. Limited frontage road access would be provided where needed for local traffic circulation. The typical right-of-way (ROW) width for the project varies from 220 feet (ft) to 400 ft, with additional ROW width required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SH 121
FROM: IH30
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EXHIBIT S.1

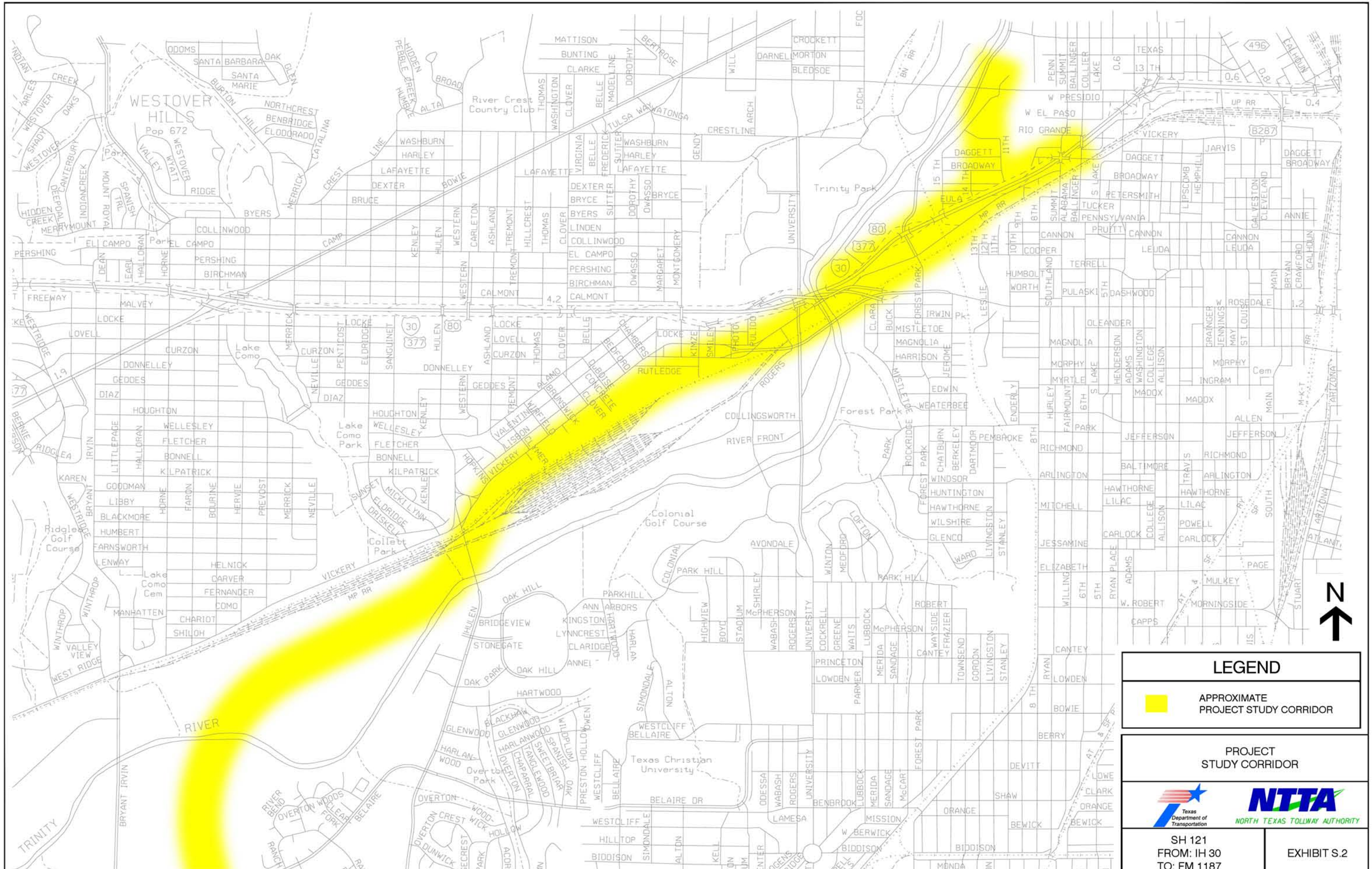
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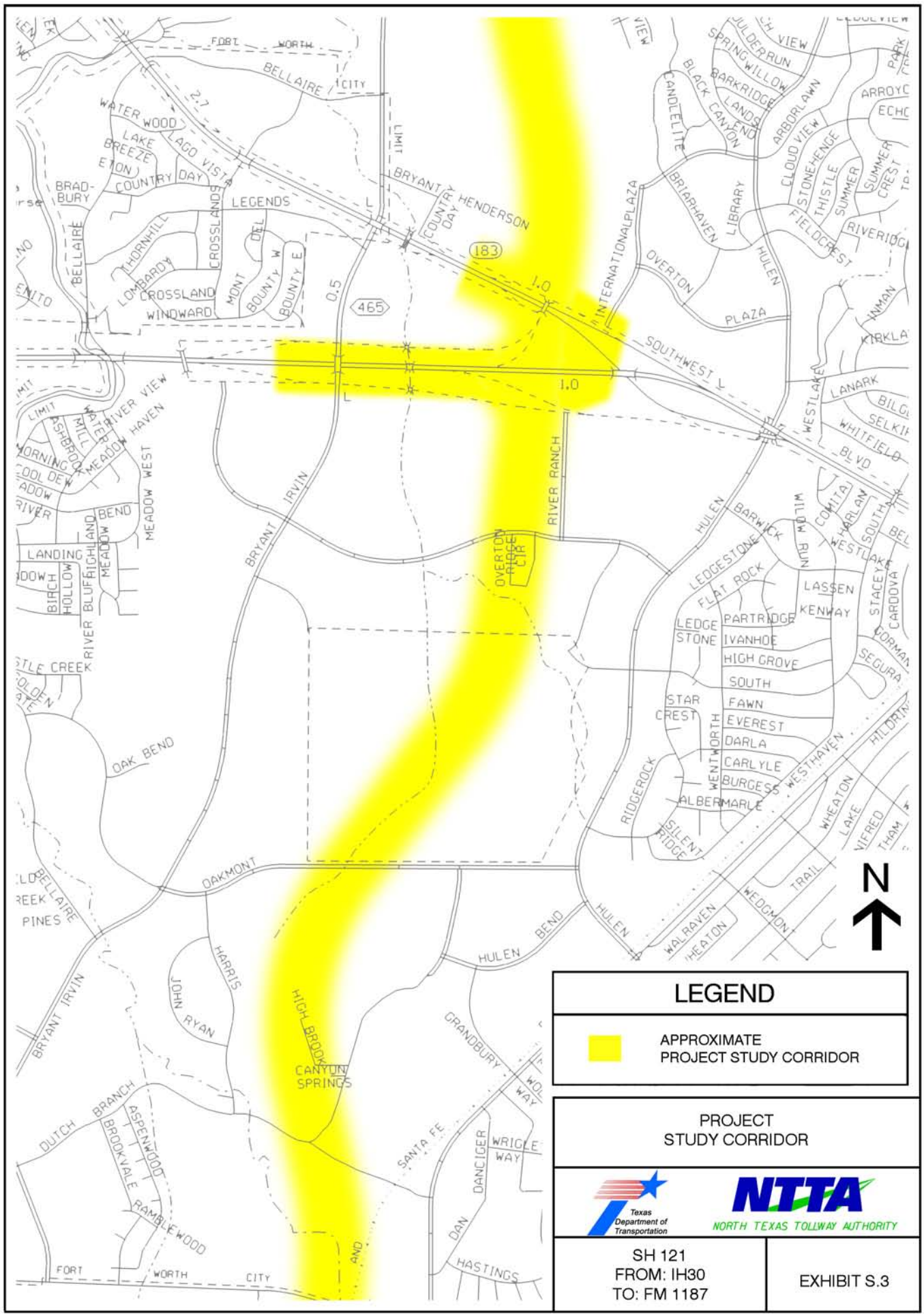
EXHIBIT S.2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SUMMER
SUMMER CREST
FIELDCREST
RIVERIDGE
INMAN
KIRKLA
LANARK
WHITFIELD
BLVD
WESTLAKE
RIVER VIEW
MILL
WATER
ASHBROOK
MEADOW HAVEN
MEADOW WEST
BEND
HIGHLAND
MEADOW
LANDING
BIRCH
HOLLOW
RIVER BLUFF
BRYANT IRVIN
RIVER RANCH
OVERTON RIDGE CIR
BARWICK
WILLOW RUN
COMITA
HARLAN
SOUTH
LEDGESTONE
FLAT ROCK
LASSEN
KENWAY
STACEY
CORDOVA
LEDGE STONE
PARTRIDGE
IVANHOE
HIGH GROVE
SOUTH
FAWN
EVEREST
DARLA
CARLYLE
BURGESS
ALBERMARLE
STAR CREST
WENTWORTH
RIDGEROCK
SILENT RIDGE
WESTHAVEN
WHEATON
LAKE
TRAIL
WEDGMON
WALRAVEN
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PINES
HARRIS
JOHN RYAN
HIGH BROOK
CANYON SPRINGS
GRANDBURY
WAY
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HASTINGS
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N
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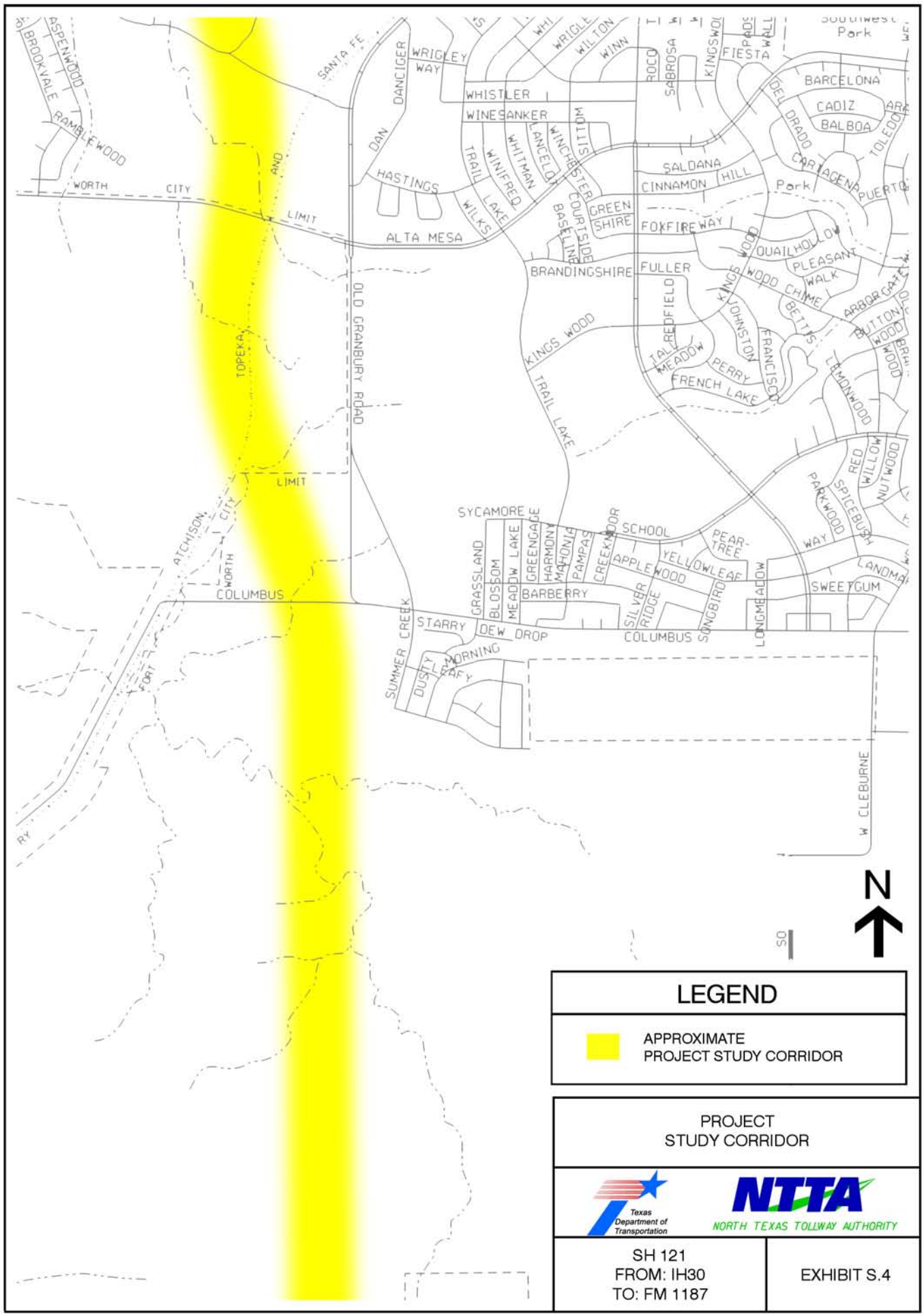
APPROXIMATE PROJECT STUDY CORRIDOR
PROJECT STUDY CORRIDOR
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT S.3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FROM: IH30
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SANTA FE
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WINESANKER
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ALTA MESA
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OLD CRANBURY ROAD
TOPEKA
ATCHISON
WORTH CITY LIMIT
COLUMBUS
SYCAMORE
SCHOOL
STARRY
DEW DROP
MORNING
SUMMER CREEK
W CLEBURNE
SWEETGUM
LANDMA
BARCELONA
CADIZ
BALBOA
FIESTA
SALDANA
CINNAMON HILL
FOXFIREWAY
QUAILHOLLOW
PLEASANT WALK
ARBORGATE
FRENCH LAKE
PERRY
JOHNSTON
FRANCISCO
LEMONWOOD
RED WILLOW
SPICEBUSH
PARKWOOD
NUTWOOD
YELLOWLEAF
APPLEWOOD
PEAR-TREE
SILVER RIDGE
SONGBIRD
LONGMEADOW
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BLOSSOM
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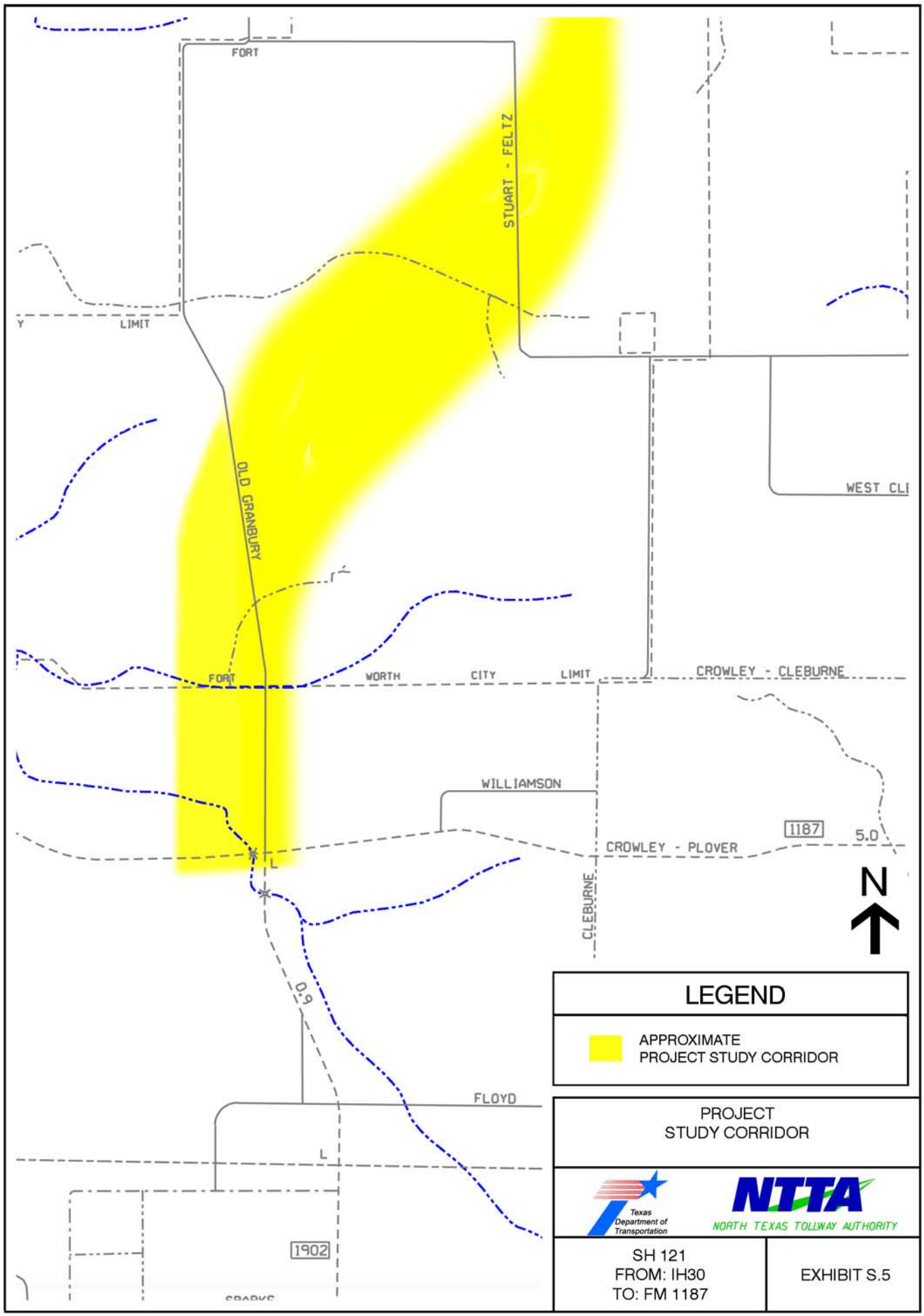
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Transportation
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SH 121
FROM: IH30
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EXHIBIT S.5

at interchanges. The recommended alternative would require acquisition of approximately 635 acres (ac).

Though proposed as a multi-phase constructed facility, the action described in this document is consistent with the *2004 Metropolitan Transportation Plan* (MTP), *Mobility 2025 – 2004 Update*, the *2004 - 2006 Transportation Improvement Plan* (TIP) and conforms to the *Clean Air Act Amendments of 1990* (CAAA) per the U.S. Department of Transportation (DOT) on April 8, 2004. The Motor Vehicle Emissions Budget in the State Implementation Plan was found to be adequate for transportation conformity purposes effective November 6, 2000 by the US Environmental Protection Agency (see 65 Federal Register 63074). Since that time, modifications to the concept and scope of identified projects submitted by local governments and the Texas Department of Transportation (TxDOT) have required revisions to the air quality conformity determination. The most current conformity determination continues to meet the requirements of the SIP, the *Clean Air Act* (CAA) found in 42 *United States Code* (USC) 7504, 7506 (c) and (d) as amended on November 15, 1990 and the transportation conformity rule found in 40 *Code of Federal Regulations* (CFR) Parts 51 and 93. Additionally, the project comes from an operational Congestion Management System (CMS) that meets all requirements of 23 CFR-Highways, Parts 450 and 500.

A previously proposed route was designated as a Texas SH in October 1973, following a Public Hearing and approval of a recommended alignment by the Texas Highway Commission. Following refinement of route location and study limits, a toll facility became the only viable option for funding. The project is now proposed to be a part of the North Texas Tollway Authority (NTTA) system (Please see discussion in Chapter 1.0, Project History and in Chapter 3.2, Freeway and Tollroad Options).

S 2.0 Major Actions Proposed by Other Government Agencies

The City is currently planning the extension of Bellaire Drive/Arborlawn Drive from its current terminus to Bryant Irvin Road. The proposed extension would be extremely effective in improving local traffic circulation. Future development of the proposed outer loop (Loop 9), which is planned

to follow the current alignment of FM 1187 in the southern part of Tarrant County, is under consideration pending further study.

No other major actions are currently proposed by other government agencies that would influence the proposed action.

S 3.0 Reasonable Alternatives Considered

This document includes a detailed account of the history of the project, including the consideration of various modal and alignment alternatives. Four Build alternatives and the No-Build were identified in the Draft Environmental Impact Statement (DEIS). During the Public Hearing, the City presented a resolution identifying an additional Build alternative. Therefore five Build alternatives identified as A, B, C, C/A and D, in addition to the No-Build, are presented in this document. The Build alternatives vary with respect to their interchanges and footprint.

Due to the 40-year history of the project and subsequent land use patterns that have evolved, the proposed Build alternatives are essentially confined to the same horizontal alignment with the vertical profile varying among the alternatives. In addition to vertical profile modification, there are various locations where different plan concepts have been proposed depending on the alternative. The Build alternatives were proposed by different agencies, studies and continuing public involvement. The City's recommended alternative is primarily Alternative A with modifications.

The following alignment description is applicable to all five build alternatives. The recommended project would begin west of Summit Avenue at IH 30 with a tie-in to Forest Park Boulevard. It would proceed west between Vickery Boulevard and the Union Pacific Railroad (UPRR), crossing over the UPRR before proceeding south and over the Clear Fork of the Trinity River to the SH 183/IH 20 interchange. From this point the alignment would proceed south to its terminus at the intersection of FM 1187.

The Alternative C/A would incorporate much of the City's Resolution No. 2923 in so far as is feasible and practicable. Based on public involvement and the assessment of the affected environment, the Alternative C/A is identified as the recommended alternative, which best meets the purpose and need of the project.

S 4.0 Major Environmental Impacts

The recommended alternative would offer improved access and a less congested alternative route to local businesses, residential and commercial properties. A negative aesthetic impact would occur during construction of the proposed facility. In the long-term, the paved arteries and overpasses would affect the current rural and scenic nature in the southern end of the project within the project corridor. Short-term impacts to existing pedestrian and bicycle facilities would be limited to the construction phase of the project. Other short-term impacts such as soil erosion and sediment-laden runoff from construction areas could temporarily impact rivers and streams along the project. However, both temporary and permanent erosion control structures could be employed to reduce or eliminate sediment discharges into receiving waters. Short-term air and noise impacts would also occur during the construction phase. However, with the use of proper abatement measures these impacts would be minimized.

Acquisition of additional ROW for project construction would require the relocation of commercial, residential, City property and a place of worship. The relocation would take place along approximately 3 miles of the proposed SH 121.

S 5.0 Issues of Public Deliberation

S 5.1 Governmental Agencies

The Fort Worth City Council endorsed the proposed SH 121 project with a seven votes to two votes, on December 8, 1998. The proposal received much debate and public input, ending in the authorization of Resolution No. 2474 in support of the proposed SH 121 (Appendix C, Attachment 3). A Mayor and Council Communication (Ref. No. C-17178) was also signed on this date,

authorizing the, " … Southwest Parkway Interlocal Agreement Between the City, TxDOT and the NTTA."

The Fort Worth City Council opted to consider the appointment of an independent committee to re-evaluate the "downtown" section of the proposed facility, near IH 30 and Forest Park Boulevard. From January 1999 until December 2000, the City initiated three separate review committees: the Citizens Advisory Committee (CAC), the Peer Review Team (PRT) and the Project Development Team (PDT). After the PDT presented the review and recommendations of the three independent committees, the recommendations were presented to the City Council. These recommendations were subsequently approved by the City Council and submitted to NTTA and TxDOT for review. The PDT's recommended alternative, as well as an additional alternative derived from the recommendations, is included within this document (Please refer to Appendix C).

NTTA and TxDOT have diligently analyzed the public's concerns expressed during the Public Hearing process. This resulted in revised studies based on updated data, an expanded discussion of secondary and cumulative impacts and an overall improvement in the readability of the document.

It has been determined that there are no changes to the project that would result in substantial environmental impacts not previously considered in the DEIS nor is there new information relevant to environmental concerns that would result in substantial impacts not evaluated in the DEIS. As a result of this "hard look" NTTA and TxDOT recommended proceeding to this Final Environmental Impact Statement (FEIS). The FHWA has concurred with this approach.

Due to public interest in this project, the City has requested additional public involvement as this project advances. While not traditionally provided at the FEIS stage, NTTA, TxDOT and FHWA have agreed to provide an additional Public Hearing after the FEIS would be made available to the public. Before the execution of the Record of Decision (ROD), a summary of this additional Public Hearing and analysis of comments would also be made available to the public. Comments not previously addressed in the FEIS would be noted in the ROD.

S 5.2 Public

To date, public sentiment regarding SH 121 has been mostly positive and supportive of the project. Persons raising objections to the project have been generally opposed to specific plan elements of the facility, but continued to support the overall project. The creation of the CAC, authorized in January, 1999, by City Council Resolution No. 2482 (Appendix C, Attachment 4), has provided a means for citizens to voice many of these concerns and work together with the NTTA and TxDOT to incorporate desired aesthetic and urban design standards and in general, provide citizen input on matters of public interest. In addition to the CAC, the PDT developed alternatives during a six-month process between June 2000 and December 2000. The PDT process included monthly workshops and public meetings to solicit comments from the public.

Following the 2003 Public Hearing, the City in Resolution 2982 (Please refer to Appendix C, Attachment 6) established the Citizens' Advisory Group (CAG). The charge of the CAG is to provide input on the project's features and themes to the City Council in the succeeding phases of project development, following the ROD. Additional information on public involvement is described in Volume 2.

S 6.0 Major Unresolved Issues with Other Agencies

There are no unresolved issues with other agencies. Coordination efforts among TxDOT, NTTA, FHWA and the City are ongoing.

S 7.0 Federal Actions Required for the Proposed Action

Under Section 404 of the *Clean Water Act* (CWA) it is anticipated that construction of the project would require a United States Army Corps of Engineers (USACE) Individual Permit (IP) for the crossings over the Clear Fork of the Trinity River. It is also anticipated that a Section 404 Nationwide Permit (NWP) No. 14 would be required at several of the other minor tributary crossings. Because the affected streams and rivers are not classified as navigable, neither a United States Coast Guard (USCG) Section 9 permit nor a USACE Section 10 permit would be required.

Coordination with the USACE concerning permits for this project would be conducted during the detailed design of the project. In addition, Texas Commission on Environmental Quality (TCEQ) Section 401 of the CWA Best Management Practices (BMP) for erosion control would be implemented in association with any Section 404 permits.

Because this project would disturb more than one acre, the project would be required to obtain a TCEQ Phase II Texas Pollutant Discharge Elimination System (TPDES) Construction General Permit. This would be accomplished by filing a Notice of Intent (NOI) to comply with the TPDES stating that NTTA and TxDOT would have a Storm Water Pollution Prevention Plan (SW3P) in place during construction of the project. No long-term water quality impacts are expected as a result of the project.

No other permit requirements have been identified. Land transfers from Federal agencies would not be required in order to construct the project. No other Federal actions required for the proposed action have been identified.

CHAPTER 1

PROJECT HISTORY

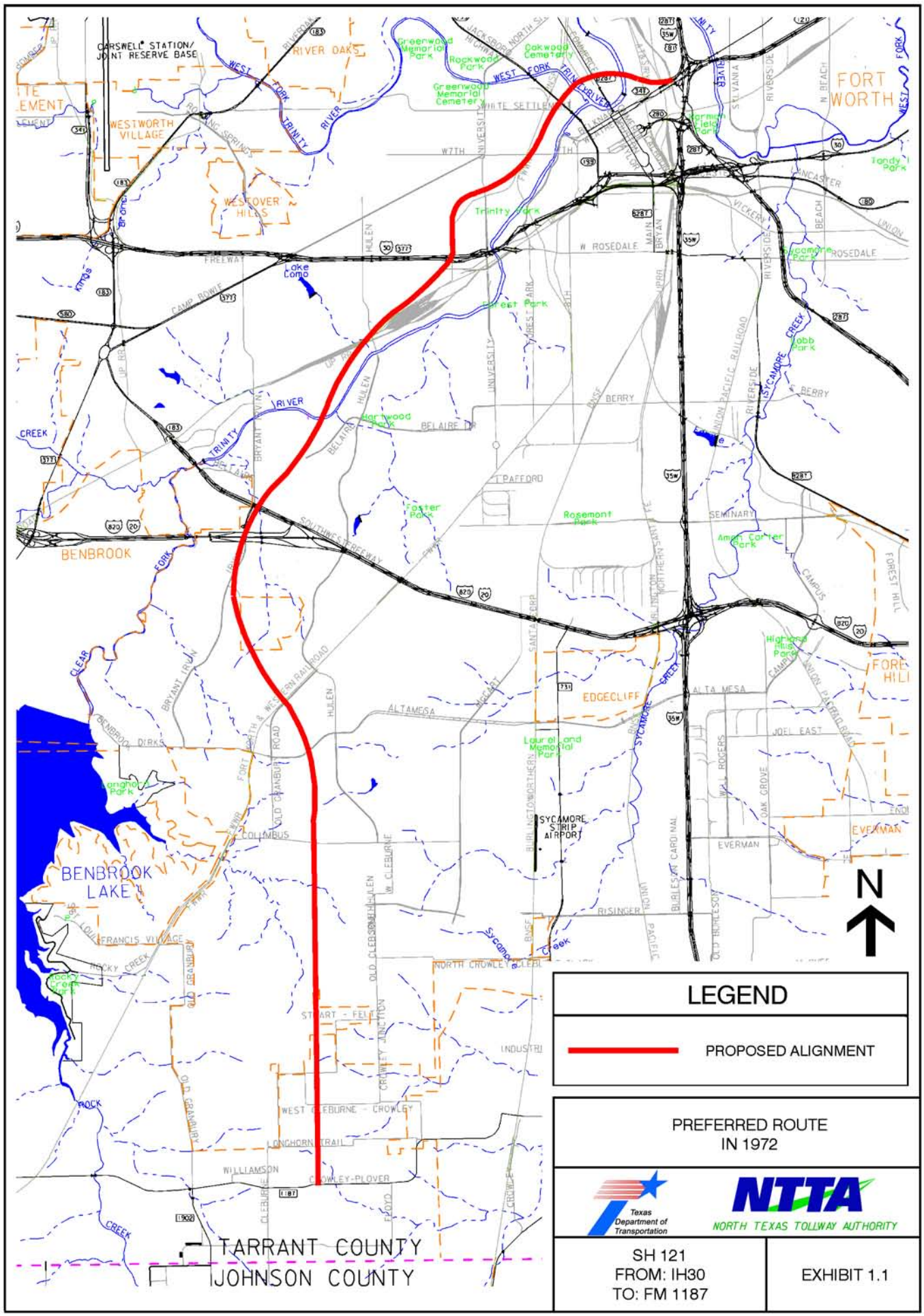
1.0 PROJECT HISTORY

In 1962, a radial freeway through the southwest quadrant of Fort Worth was placed on the *Fort Worth Metropolitan Area Thoroughfare Plan*. The Texas Highway Commission, by Minute Order (MO) 53297 dated August 1, 1963, authorized the development of a comprehensive and continuing Urban Transportation Plan, which indicated the need for the development of a freeway in the City from IH 35W to the Tarrant-Johnson County Line. In 1964, this "Northside-Southwest Freeway" was included in the *1964-85 Dallas/Fort Worth Regional Transportation Study*.

The Texas Highway Commission, through MO 64014 dated July 9, 1970 (Please refer to Appendix C), directed that preliminary design and environmental studies be completed, followed by a Public Hearing, leading to the possible designation of a southwest radial freeway as a SH. In January 1972, representatives from the NCTCOG, Tarrant County, the City and TxDOT, in conjunction with members of a consultant team, completed the Route Study Report for the Northside-Southwest Freeway. The study resulted in the 1972 recommendation of a preferred route, shown as Exhibit 1.1 for the proposed freeway.

A Draft Environmental/Section 4(f) Statement Administrative Action for the Northside-Southwest Freeway was prepared by the City Planning Department in conjunction with TxDOT in March of 1972. The report was later approved by the FHWA for circulation and comments in July of 1972. TxDOT issued an Administrative Route Approval on July 17, 1972, for the purpose of holding a route Public Hearing.

On May 2, 1973, TxDOT, the City, Tarrant County and NCTCOG conducted a Public Hearing at the Round-Up Inn. The recommended 1973 route ran from the connection of IH 35W and SH 121 crossing IH 30 alongside Montgomery Street and then proceeding south along the UPRR, crossing the railroad at Hulen Street. At this meeting the attending residents, city planners, Garden Club officials, City Park and Recreation board members, TxDOT officials and the Chamber of Commerce, endorsed a recommended route (Route A on Exhibit 1.2). Route A was then added to the Texas highway system by the Texas Highway Commission in October of 1973, giving priority to the area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EDGECLIFF
SYCAMORE STRIP AIRPORT
Lake Como
Trinity Park
Rosemont Park
Foster Park
Longhorn Park
Greenwood Memorial Park
Rockwood Park
Cakwood Cemetery
Greenwood Memorial Cemetery
Farmer Field Park
Sandy Park
Sycamore Park
Hobb Park
Amon Carter Park
Highland Hills Park
Laurel Land Memorial Park
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CAMP BOWIE
BERRY
BELAIRE DR
PAFFORD
SEMINARY
SOUTHWEST FREEWAY
ALTAMESA
ALTA MESA
JOEL EAST
COLUMBUS
EVERMAN
RISINGER
NORTH CROWLEY CLEBURNE
WEST CLEBURNE - CROWLEY
LONGHORN TRAIL
WILLIAMSON
CROWLEY-PLOVER
TARRANT COUNTY
JOHNSON COUNTY
N
LEGEND
PROPOSED ALIGNMENT
PREFERRED ROUTE
IN 1972
Texas Department of Transportation
NTTA
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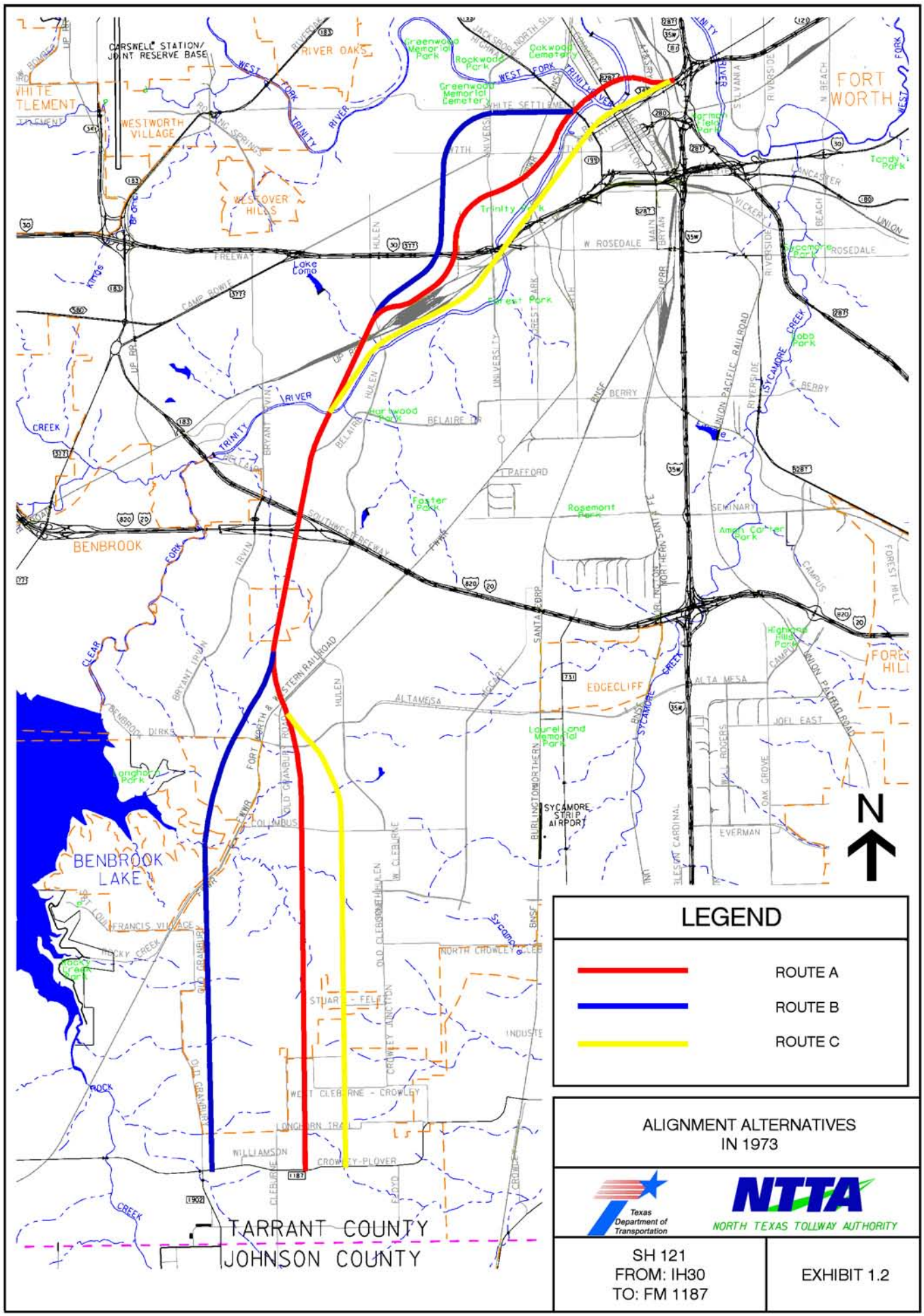
TO: FM 1187
EXHIBIT 1.1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SYCAMORE STRIP AIRPORT
Lake Como
Trinity Park
Forest Park
Rosemont Park
Foster Park
Longhorn Park
Rocky Creek Park
Greenwood Memorial Park
Rockwood Park
Oakwood Cemetery
Greenwood Memorial Cemetery
Tandy Park
Sycamore Park
Lobb Park
Highland Hills Park
Amon Carter Park
Laurel Land Memorial Park
WEST FORK TRINITY RIVER
CLEAR FORK
SYCAMORE CREEK
ROCKY CREEK
W ROSEDALE
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BERRY
BELAIRE DR
ALTAMESA
ALTA MESA
JOEL EAST
EVERMAN
SEMINARY
PAFFORD
NORTH CROWLEY
WILLIAMSON
CROWLEY-PLOVER
WEST CLEBURNE - CROWLEY
LONGHORN TRAIL
FRANCIS VILLAGE
COLUMBUS
DIRKS
FREEWAY
CAMP BOWIE
SOUTHWEST FREEWAY
FORT WORTH & WESTERN RAILROAD
UNION PACIFIC RAILROAD
BNSF
TARRANT COUNTY
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ROUTE A
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ROUTE C
ALIGNMENT ALTERNATIVES
IN 1973
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 1.2

from IH 35W to IH 20. In January 1974, SH 121 from IH 35W to IH 20 was included as part of the Federal Aid Highway System. On October 4, 1974, Route A was approved by the THC under MO 68084 (Please refer to Appendix C) and it was designated as SH 121.

After advanced planning and before detailed design and ROW studies were completed for the 1974 approved route, the national economy had begun to decline with the onset of the fuel shortage crisis. Subsequent inflation of construction costs resulted in the establishment of the TxDOT statewide 20-year Project Development Plan (PDP). It was created to manage allocation of limited funding for roads and highways. Though part of the proposed SH 121 (from IH 35W to SH 199) was included in the 10 year Advance Planning Schedule, most of the route was deferred pending a later revision of the funding plan. With this indefinite deferment of construction, efforts to preserve ROW along the project corridor were abandoned and several new buildings have been constructed.

In the late 1970's and early 1980's, the concept of a "Cultural District" that encompassed museums, the Will Rogers Complex, Casa Mañana, Farrington Field, the Botanic Garden, Trinity Park and Forest Park had begun to emerge in Fort Worth. What was once a widely supported alignment for the proposed SH 121 was now strongly opposed by many of its original proponents due to the "splitting" effect it would have on this newly identified Cultural District.

The subarea planning study conducted by NCTCOG in cooperation with the City was completed in April of 1984. The study, *Southwest Fort Worth Subarea Study: Evaluation of Transportation Alternatives* examined 18 functional and location alternatives for SH 121 (Please see Appendix E). The alternatives studied included the "existing plus committed improvements," a Transportation Systems Management (TSM) strategy, three parkway alternatives, an alternative with a tollroad segment (from IH 20 to IH 30), eleven freeway alternatives and one rail alternative. Based on a comparative analysis of the alternatives, with respect to engineering, traffic performance, cost and environmental impacts, the 11.7 mi "Freeway - East Alignment" was recommended as the preferred route. The report also recommended that the section between IH 30 and Sycamore School Road be constructed in the first phase while assuring that ROW between the IH 35W and SH 121 intersection

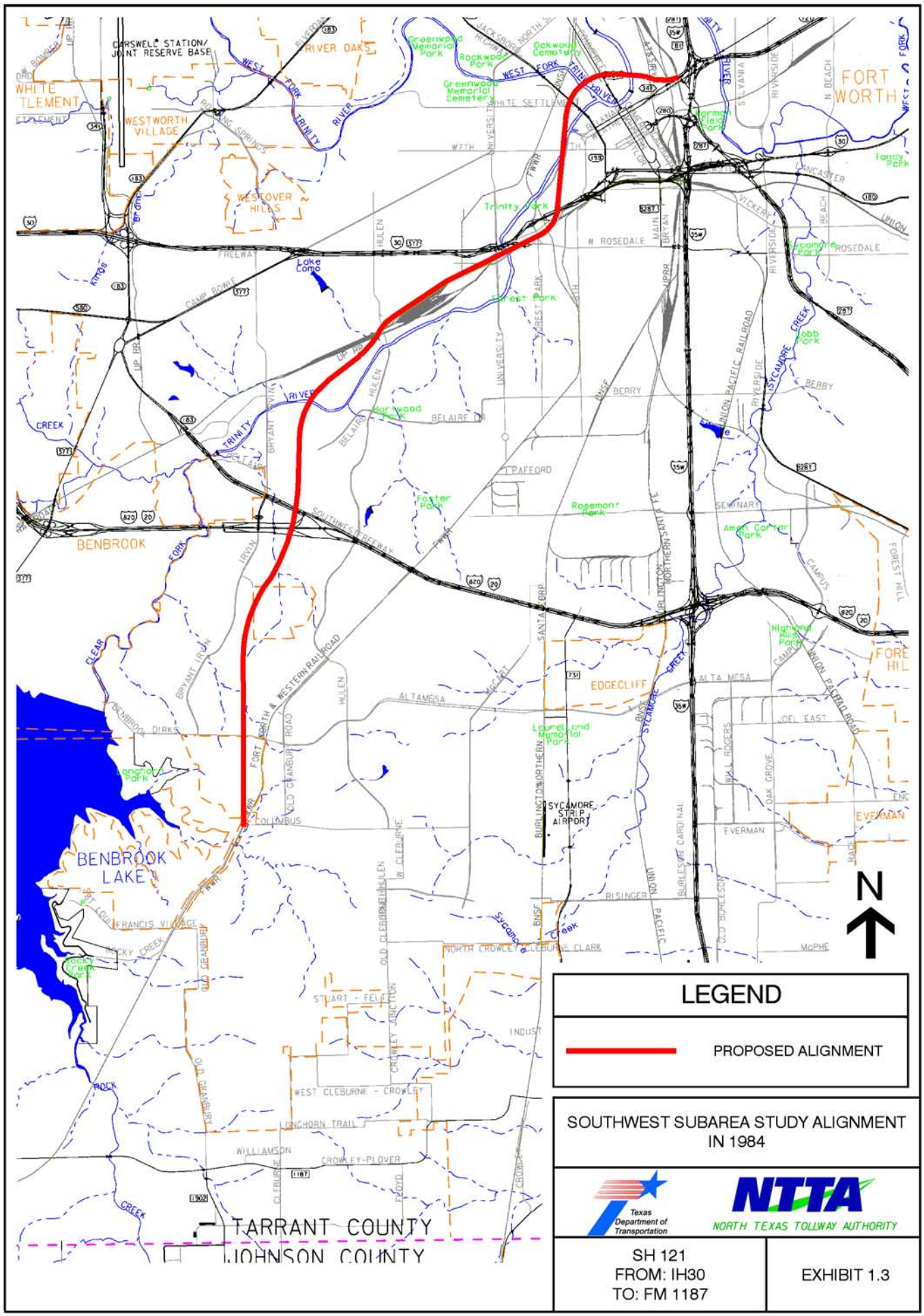
and IH 30 would be protected for phase two construction. This route was then endorsed by the Fort Worth City Council.

In December 1984, the City commissioned the development of schematic plans for a portion of the proposed alignment to resolve various preliminary design issues that had been identified. Studies concluded the route was feasible, but required a plan to relocate the Trinity River 150 to 200 ft into Trinity Park. This eastern route was embraced and endorsed by the City Council, the Tarrant County Commissioners Court, the Fort Worth Chamber of Commerce, the Cultural District Committee, the school district, the water district, the Streams and Valleys Committee, the Fort Worth Planning Commission and the Fort Worth Garden Club (Please see Exhibit 1.3). The USACE concurred with the alignment shift. This report was concluded in June 1985.

In response to the community's concerns, the Texas Highway Commission canceled its previous route approval and authorized preliminary engineering and environmental studies to establish a new route alignment. These studies were authorized by MO 83516 and MO 84030 and approved by the TxDOT Commission on August 29, 1985 and January 30, 1986, respectively. MO 83516 authorized preliminary engineering for SH 121 from IH 35W to FM 1187 and MO 84030 authorized a feasibility study for SH 121 from FM 1187 to SH 174 in Johnson County.

On February 4, 1986, the RTC adopted *Mobility 2000: The Regional Transportation Plan for North Central Texas* prepared by the NCTCOG. The proposed roadway was included as a designated freeway to FM 1187 and as a proposed freeway south of FM 1187. TxDOT included SH 121 from IH 35W north of downtown Fort Worth to SH 174 in their 20-year PDP. SH 121 was designated as a project that required local commitment in order to improve cost effectiveness.

The City and Tarrant County, having reached consensus on the freeway's route from downtown to McPherson Road, commissioned a location study for the proposed SH 121 between McPherson Road and FM 1187 in order to secure ROW donations. The location study analyzed two routes: a westerly alignment, Alternative A, which crossed FM 1187 along the existing FM 1902 alignment then used major portions of FM 1902 and an existing county road before connecting to SH 174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BENBROOK LAKE
EDGECLIFF
SYCAMORE STRIP AIRPORT
TARRANT COUNTY
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SOUTHWEST SUBAREA STUDY ALIGNMENT
IN 1984
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 1.3

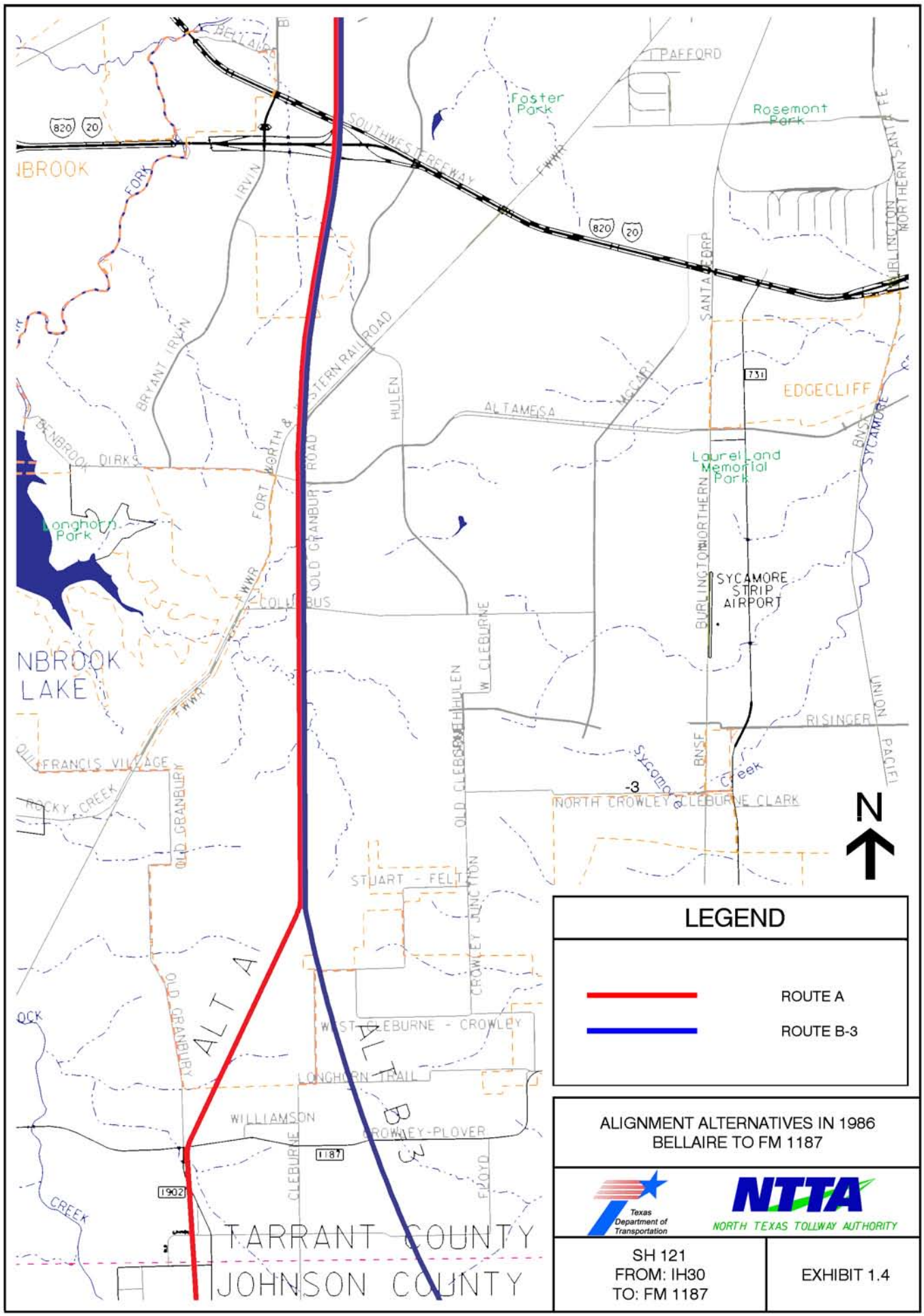
(about one mile north of Joshua); and an eastern alignment (Alternative B-3) that followed a southeastern direction from McPherson Road and connected to SH 174 about 1.5 mi north of Joshua. Exhibit 1.4 depicts the alignments studied. In February 1986, this study recommended the western alternative as being more cost effective and more conducive to phased construction.

In March 1987, TxDOT engaged the services of a consulting firm to conduct environmental studies and recommend routes for the freeway. During project development, a decision was made to separate the proposed SH 121 into two projects for public involvement and environmental study purposes. The point of division was determined to be IH 20, creating a project from the junction of IH 35W and SH 121 in the north to IH 20 and a project from IH 20 to SH 174 or United States Highway (US) 67 in Johnson County.

In May 1987, with the intent of accelerating the construction process for the proposed SH 121, the Tarrant County Commissioners proposed the creation of a county tollroad authority named the "Tarrant County Tollroad Authority." The bill proposing the creation of the agency was rejected.

In June 1987, the Fort Worth City Council and the Tarrant County Commissioners Court requested that the TxDOT, Texas Turnpike Authority Division (TTA) conduct a feasibility study for converting all or portions of the proposed SH 121 into a toll facility. The Texas Highway Commission approved the feasibility study on July 29, 1987. Subsequently, in July 1987, TTA retained a consultant team to study the costs of the project, the location of the tollbooths and the financial viability of the proposed toll facility. The proposed 9.2 mi long study included a six-lane tollroad from IH 35W north of the Central Business District (CBD) to Montgomery Street and a four-lane turnpike to IH 20 near Hulen Street. However, plans to build this segment of SH 121 as a tollroad were stopped in November 1987 when the results of these studies revealed that the proposed SH 121 would pay for only 16 percent of its estimated $315 million dollar cost.

As part of the environmental assessment (EA) process, TxDOT sponsored a public meeting to discuss suggested routes for the proposed SH 121 from IH 20 to SH 174 or US 67. The meeting was held on November 12, 1987, at the First Baptist Church in Crowley. At this meeting, the local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ROUTE A
ROUTE B-3
ALIGNMENT ALTERNATIVES IN 1986
BELLAIRE TO FM 1187
Texas Department of Transportation
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SH 121
FROM: IH30
TO: FM 1187
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SOUTHWEST FREEWAY
Foster Park
Rosemont Park
EDGECLIFF
Laurel Land Memorial Park
Longhorn Park
SYCAMORE STRIP AIRPORT
NBROOK LAKE
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HULEN
W CLEBURNE
RISINGER
NORTH CROWLEY CLEBURNE CLARK
STUART - FELT
WEST CLEBURNE - CROWLEY
LONGHORN TRAIL
WILLIAMSON
CROWLEY-PLOVER
ALT A
ALT B3
TARRANT COUNTY
JOHNSON COUNTY

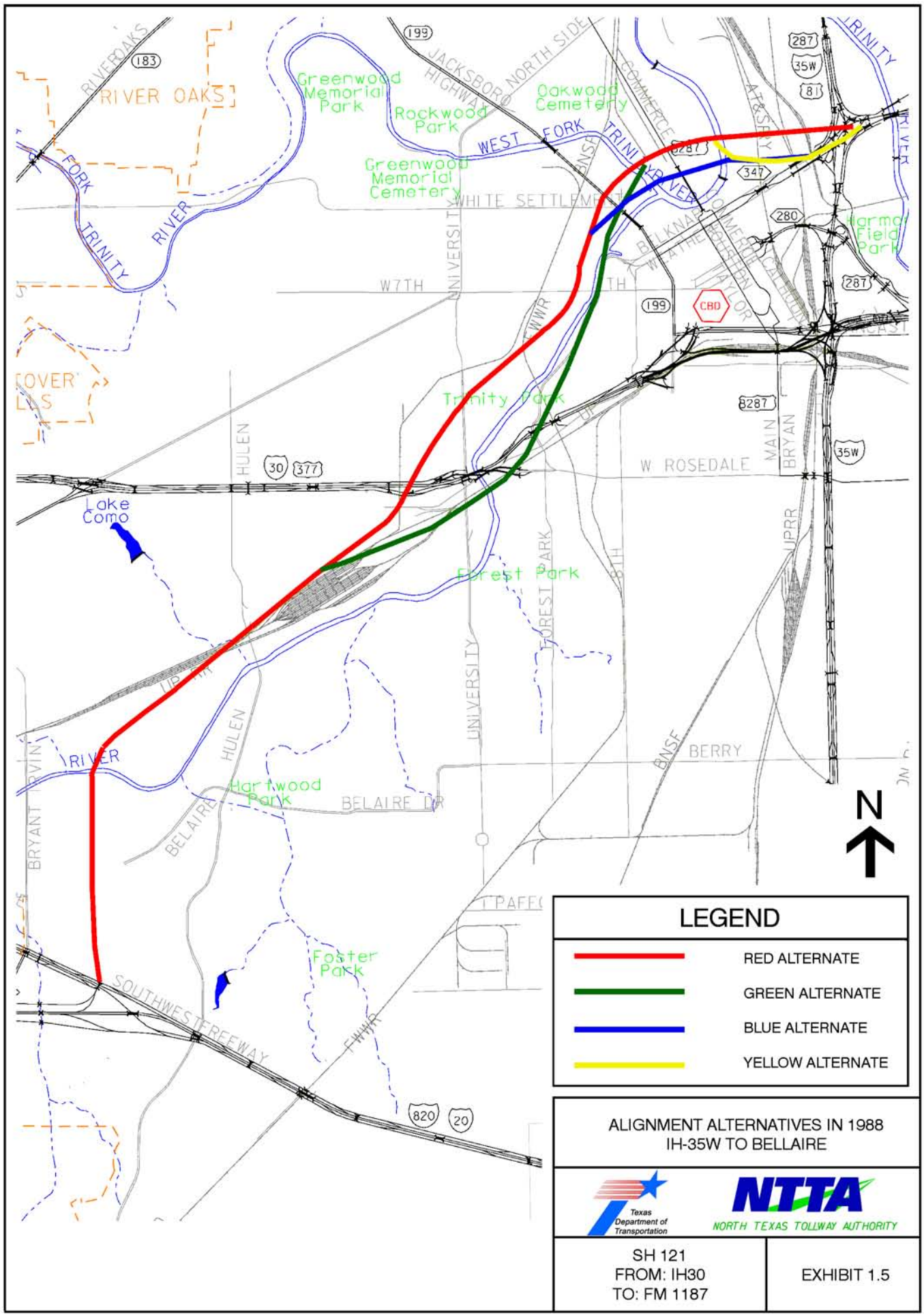
governments showed unanimous support for the extension of SH 121. However, the cities adjacent to SH 174 (Burleson, Joshua and Crowley) supported the extension of SH 121 terminating at various points along SH 174. There was no agreement on the location of the southern terminus by these cities. At the November 12, 1987 meeting, the City of Burleson presented two reports entitled: Analysis of Proposed Extension of Southwest Freeway SH 121 and Alternative Evaluation for Southern Extension of Southwest Freeway SH 121. Both of these reports supported an alternative that connects the proposed SH 121 with SH 174 just north of Burleson's city limits between Joshua and Burleson, north of FM 917.

On May 17, 1988, a public meeting was held at the Fort Worth Tarrant County Convention Center to discuss the alternative alignments being studied for the proposed SH 121 from IH 35W to IH 20. No opposition to the proposed facility was voiced at that time. Specific comments on the alternatives tended to support both the "Red" and "Green" alternatives (Please see Exhibit 1.5). Following the meeting, however, numerous written comments were received by TxDOT, many stating that they had not been adequately informed about the meeting. The majority of the comments received heavily supported the "Green" alternative due to the impacts of the "Red" alternative on the Cultural District.

EAs were prepared by TxDOT in July 1988 and September 1988 for the two projects. A NOI to prepare an Environmental Impact Statement (EIS) for the proposed SH 121 from IH 20 to SH 174 or US 67 in Johnson County was published in the Federal Register on August 4, 1988.

On October 12, 1989, a DEIS for the proposed SH 121 from IH 20 to SH 174 or US 67 in Johnson County was submitted and approved by the FHWA for further processing. The proposed action for this project would result in the construction of a four/six lane controlled access highway on new location, with frontage roads on each side of the highway, from IH 20 to US 67 in Johnson County.

The proposed SH 121 from IH 35W to IH 20 was approved by the FHWA for further processing on March 28, 1990. An NOI to prepare an EIS was published in the Federal Register on April 5, 1990. The proposed action would result in the construction of an eight-lane controlled access highway on


RIVER OAKS
Greenwood Memorial Park
Rockwood Park
Oakwood Cemetery
Greenwood Memorial Cemetery
WEST FORK TRINITY RIVER
WHITE SETTLEMENT
W 7TH
Trinity Park
Forest Park
Lake Como
W ROSEDALE
MAIN
BRYAN
HULEN
UNIVERSITY
FORT WORTH
BERRY
BNSF
UPRR
Hartwood Park
BELAIRE DR
Foster Park
SOUTHWEST FREEWAY
CBD
N
LEGEND
RED ALTERNATE
GREEN ALTERNATE
BLUE ALTERNATE
YELLOW ALTERNATE
ALIGNMENT ALTERNATIVES IN 1988
IH-35W TO BELLAIRE
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 1.5

new location from IH 20 to IH 35W with frontage roads only in those areas where they would be essential to maintain local street circulation and continuity.

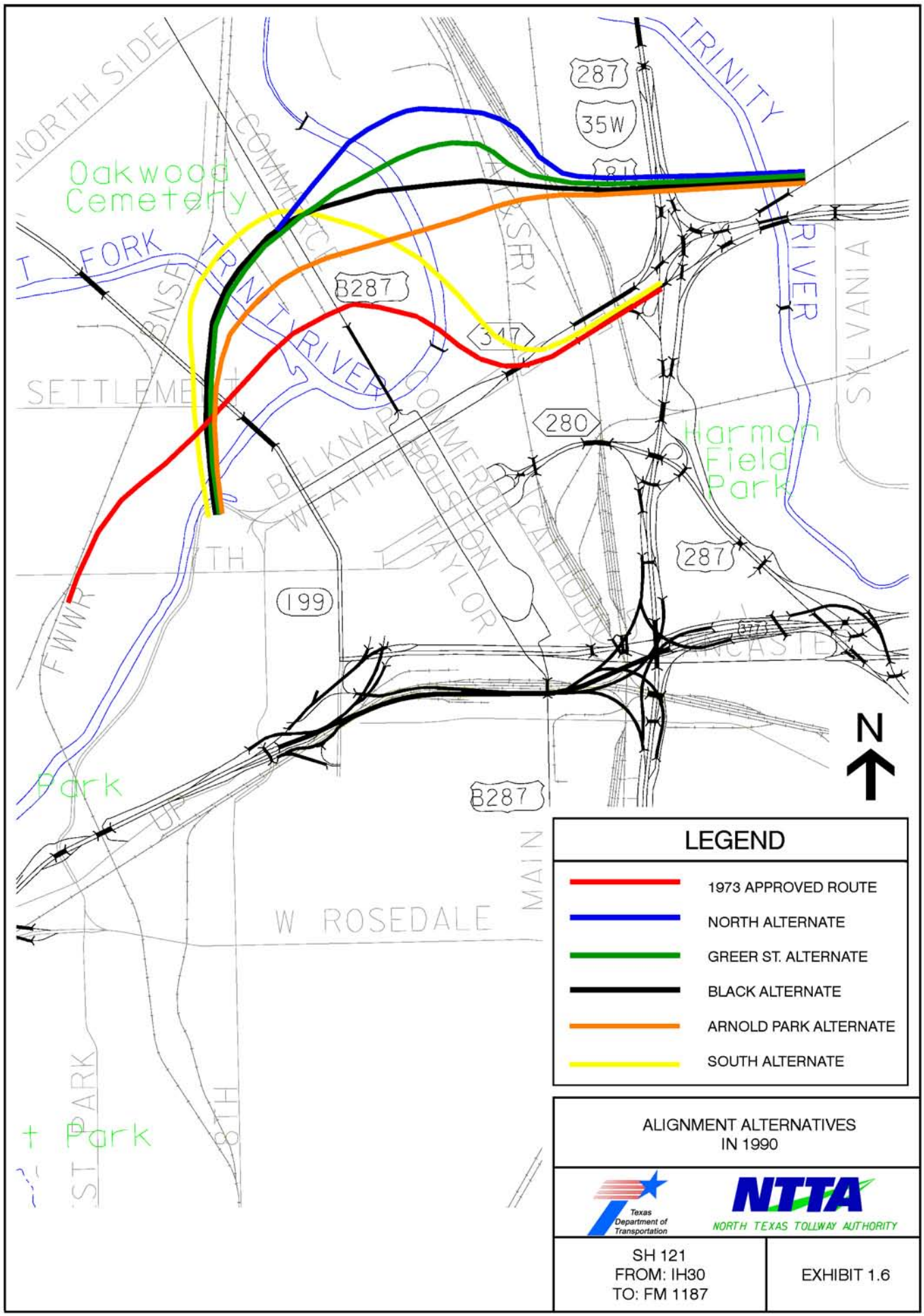
A second public meeting for the proposed SH 121 from IH 35W to IH 20 was held on October 25, 1990, at the Baptist Community Center to discuss the alternative alignments being studied. Most comments supported the "North" alternative, which would extend SH 121 from IH 35W north across Cold Springs Road near Dumpground Road, then north between Poindexter and Pavilion Streets and across North Calhoun and North Main Streets just north of North 6th Street. The alternative would then cross the Trinity River and Henderson Street. The area residents expressed opposition to the "Greer Street" alternative (Please see Exhibit 1.6).

This project was included in the NCTCOG *1990 TIP* for the DFW Metropolitan Area.

The availability of funds for transportation projects was restructured under the *Intermodal Surface Transportation Efficiency Act* (ISTEA), passed into legislation in December 1991, causing a major shift in the allocation of funding. Faced with reduced opportunities for funding and a large price tag on the proposed freeway facility from IH 35W to US 67 (estimated at over $750 million), a SH 121 Task Force was established to keep the project moving forward.

The 1991 ISTEA legislation allowed for tollroad bond funds to be augmented with Federal transportation funds to build tollroads under certain conditions. In light of this new legislation, the concept of building all or part of the proposed SH 121 as a tollroad was revived.

On September 29, 1992, a delegation from the City, Tarrant and Johnson Counties and the Fort Worth Chamber of Commerce appeared before the Texas Transportation Commission. The delegation proposed several local initiatives, including ROW donations and participation in frontage road construction, to reduce project costs. With a favorable response from the Commission, the project was authorized for further study.


NORTH SIDE
Oakwood Cemetery
T FORK
TRINITY RIVER
COMMERCE
BNSF
SETTLEMENT
BELKNAP
WEATHERFORD
HOUSTON
TAYLOR
CALHOUN
ANSLEY
TRINITY
RIVER
SYLVANIA
Harmon Field Park
287
35W
81
B287
347
280
199
FWWR
TH
W ROSEDALE
MAIN
Park
UP
PARK
8TH
+ Park
N
LEGEND
1973 APPROVED ROUTE
NORTH ALTERNATE
GREER ST. ALTERNATE
BLACK ALTERNATE
ARNOLD PARK ALTERNATE
SOUTH ALTERNATE
ALIGNMENT ALTERNATIVES
IN 1990
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 1.6

On January 21, 1993, a Public Hearing was held for the proposed SH 121 from IH 20 to SH 174 or US 67 in Johnson County at the First Baptist Church in Crowley. The project was received with minimal opposition.

In July 1993, a DEIS for the proposed SH 121 from IH 35W to IH 20 was also submitted for FHWA review, however, final approval was not given and a Public Hearing was not held. TxDOT included this project in Phase I of the 1993 Transitional PDP to be financed out of Category 3A - National Highway Mobility System when funds became available.

In 1994, the SH 121 Task Force retained a consulting firm to study alternatives and proposals for the project. The primary goals of this study were to: i) reduce project costs; ii) minimize the number of interchanges; iii) minimize frontage roads; and iv) explore alternative financing options for the facility. Due in large part to the fact that the previously proposed freeway project would have difficulty obtaining full funding due to financial constraints, the study resulted in a finding that a toll facility was likely to be the best remaining viable option. A detailed feasibility study for the development of SH 121 as a tollroad was commissioned by the Fort Worth City Council in October 1994. To date, the proposal has gained both political and community consensus from all affected local entities.

The feasibility study segmented the route and identified four priority levels for the corridor: i) from SH 199 to Overton Ridge Boulevard; ii) from Overton Ridge Boulevard to FM 1187; iii) from IH 35W to SH 199, and iv) from FM 1187 to US 67 in Cleburne. The study also proposed reducing construction costs by minimizing frontage roads and grade-separated intersections while relocating portions of the facility in Johnson County and in the CBD of Fort Worth.

A detailed tollroad traffic and revenue study was completed in December 1997, for the NTTA (created in 1997). This report investigated the feasibility of constructing a tollroad that would extend from an intersection of IH 30 southwest of the Fort Worth CBD to Altamesa Boulevard (8.5 mi). A shorter alternative that would extend from IH 30 to Overton Ridge Boulevard was also investigated. This study was developed in sufficient detail to be used in support of bond financing.

Backed by a positive recommendation by the study, preliminary schematic and environmental work continued on the proposed toll facility. A NOI for the revised project limits (IH 30 to FM 1187) was filed in both the Texas and Federal Registers on May 20, 1998 and May 14, 1998, respectively (Appendix D). On June 4, 1998, a public meeting was held jointly by the NTTA and TxDOT to discuss the alignment and preliminary environmental issues with citizens. A majority of the comments received were in support of the project. The meeting was adjourned with an assurance from NTTA and TxDOT that there would be further opportunities for public input throughout the development of the project.

Following the public meetings of 1998, development of the preliminary schematics and environmental studies continued. As the preliminary schematics were developed they were provided to various local agencies for review. During the inter-agency review, City public officials questioned the plan of the SH 121/IH 30 interchange. Local officials felt the plan was too intrusive to the nearby residential areas and requested the overall size of the interchange be reduced. As proposed, the SH 121/IH 30 interchange provided several directional connections between SH 121, IH 30 and Forest Park Boulevard. The Forest Park Boulevard direct connections were included to accommodate traffic bound to and from the CBD. Earlier traffic analyses indicated IH 30 would be unable to carry those volumes destined for the CBD from SH 121 and as such, Forest Park Boulevard was chosen as an additional route. Although the Forest Park connections appeared to be justified, public officials requested their elimination and proposed the re-evaluation of the interchange in an effort to reduce its size.

In January 1999, the City formed the CAC to advise the City Council prior to the selection of their desired alternative. The first of a series of meetings was held in March 1999. In all, a total of seven committee meetings were held, culminating in the presentation of recommendations to the City Council in October 1999. Based on these recommendations, NTTA and TxDOT developed a new interchange plan known then as the "Modified Design" henceforth in this document referred to as Alternative B. This plan removed the direct connections between IH 30 and Forest Park Boulevard and replaced the access to Forest Park Boulevard by providing conventional ramps to frontage roads.

However, in order to provide access between the CBD and SH 121, ramps between SH 121 and Forest Park Boulevard were retained.

By February 2000, a preliminary DEIS was completed and submitted to FHWA for review. As the review process began NTTA, TxDOT and local officials continued to evaluate the SH 121/IH 30 interchange.

Unsatisfied with the recommendations of the CAC, the City formed a PRT to further review the SH 121/IH 30 interchange. The PRT was comprised of engineers and architects specializing in various fields of urban highway design. The PRT was requested to review the proposed plan developed by NTTA and TxDOT as well as to suggest alternatives or improvements. In April of 2000, the PRT evaluated the proposed alignment of SH 121 and its plan relationships with IH 30, University Drive and Forest Park Boulevard. By the end of April 2000 the PRT presented their observations and recommendations to the City Council resulting in the City's decision to pursue further detailed study of the PRT's recommendations. In May of 2000 the City formed a PDT. The PDT was comprised of local community leaders and was responsible for the oversight of the detailed study as well as selecting an independent consultant team to perform the study. This study would re-examine the SH 121/IH 30 interchange from the City's perspective and develop additional alternatives in cooperation with the public.

Over the course of the next six months the City's consultant team evaluated the previous alternatives, developed additional alternatives and presented their findings before the PDT and the public. Workshops and public meetings were held once a month beginning in August and concluding in October 2000 to solicit comment and direction from the PDT and the public.

As the study continued, the scope of the evaluation expanded to include the remainder of the project corridor to McPherson Road. In December 2000, the PDT made its recommendations to the City Council. These recommendations included the "A1R1" SH 121/IH 30 interchange alternative, to be referred to henceforth as Alternative A, with modifications to the typical section of the facility, as well as alternative interchange plan at several of the various grade separations occurring along the

corridor. The City Council approved the recommendations and presented their findings to NTTA and TxDOT in December 2000.

Upon review of the PDT recommendations, NTTA and TxDOT determined certain integral plan elements of Alternative A violated safety and design criteria. In an effort to address the PDT's recommendations, NTTA and TxDOT developed an additional alternative comprised of the desirable plan elements from the previously developed alternatives. This "Combination Alternative", to be referred to henceforth as Alternative C, was developed during the spring of 2001.

On June 4 and June 7, 2001, public meetings were jointly conducted by the NTTA and TxDOT to discuss the current alternatives being studied. The location of the June 4 meeting was Will Rogers Memorial Center-Amon G. Carter Exhibits Hall and the location of the June 7 meeting was the Trinity Valley School. Three alternatives were presented to the public and both written and verbal comments were solicited. The alternatives differ in specific preliminary design aspects (i.e., interchange configuration), however they share similar horizontal alignment (Please see Exhibit 1.7). The three alternatives presented included Alternative A (the PDT's recommended alternative), Alternative B (the CAC's "Modified" Alternative) and Alternative C (the "Combination" Alternative). The project was met with minimal opposition. Public comment focused on the various plan alternatives throughout the project corridor.

After the June 2001 public meetings, the alternatives have been refined to incorporate and address public comment. The alignment for Alternative C has been relocated south of McPherson to offer the City flexibility with its zoning plan. The DEIS was updated to include a discussion of Alternatives A, B, C and D and was approved by FHWA in December 2002.

A Public Hearing was held for the subject project on Tuesday April 22, 2003 at 7:00 p.m. in the Round Up Inn Room of the Amon G. Carter Jr. Exhibits Hall, Will Rogers Memorial Center, 3400 Burnett-Tandy Drive in Fort Worth, Texas, to present project information and receive comments concerning the proposed construction of SH 121 from IH 30 to FM 1187. Notices announcing the Public Hearing were published in *The Fort Worth Star Telegram* January 26 and February 9, 2003

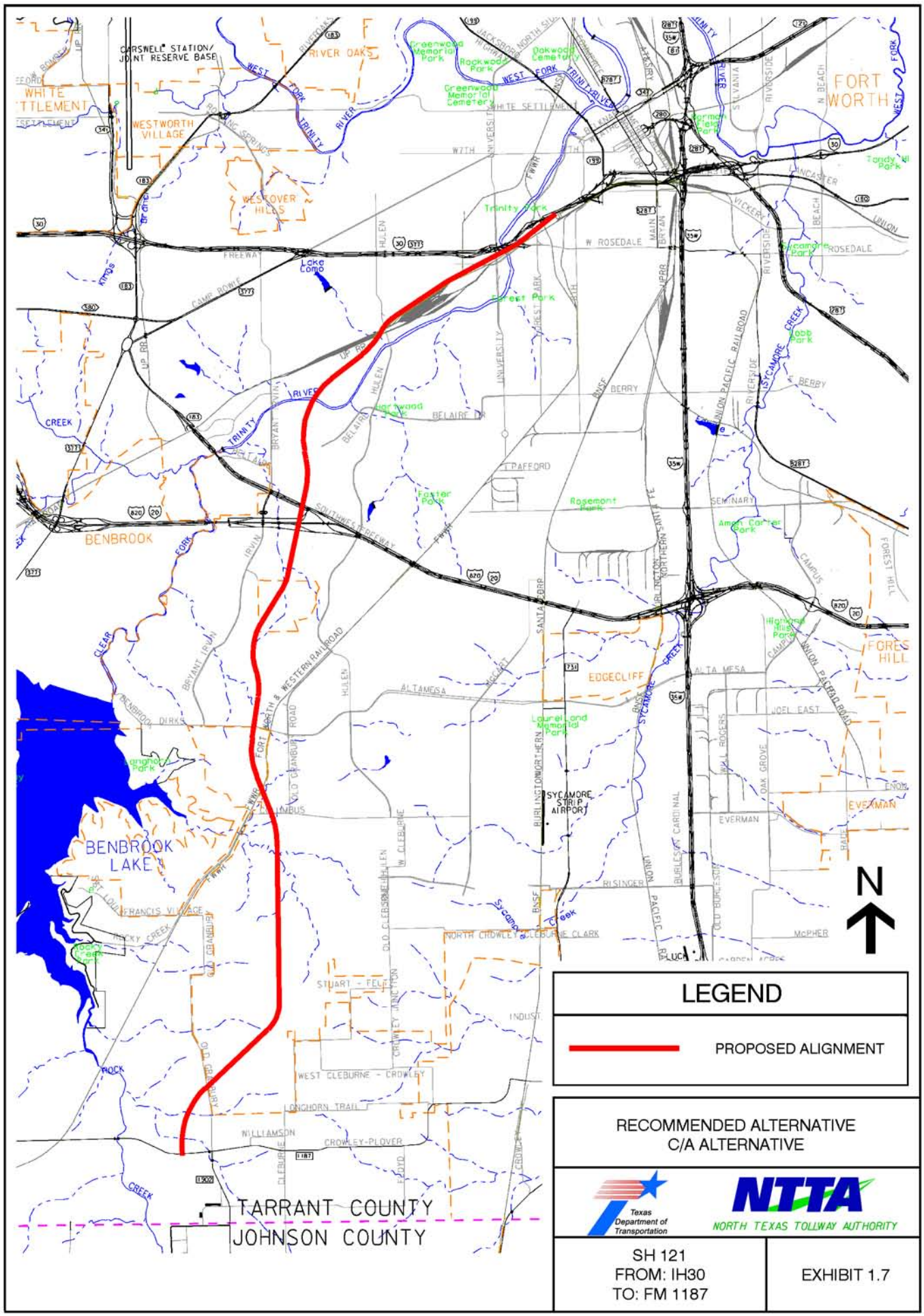

CARSWELL STATION/
JOINT RESERVE BASE
RIVER OAKS
WHITE SETTLEMENT
WESTWORTH VILLAGE
WESTOVER HILLS
FORT WORTH
BENBROOK
BENBROOK LAKE
EDGECLIFF
FOREST HILL
SYCAMORE STRIP AIRPORT
TARRANT COUNTY
JOHNSON COUNTY
N
LEGEND
PROPOSED ALIGNMENT
RECOMMENDED ALTERNATIVE
C/A ALTERNATIVE
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
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EXHIBIT 1.7

and in other local newspapers. Copies of the Public Hearing notice were mailed to property owners adjoining the project. A total of 227 individuals attended the Public Hearing.

A Public Hearing agenda with relevant project information and a list of TxDOT contacts was made available at the Public Hearing. Schematic overview maps were also made available to the public along the walls of the auditorium. A film that introduced the proposed SH 121 to the public was available adjacent to the meeting room for viewing continuously during the Public Hearing. During the Public Hearing, the City presented Resolution No. 2923 which adopted the PDT recommendations, Alternative A, as the City's locally recommended alternative with modifications (Appendix C). The Public Hearing documentation is contained in Volume 2 of this FEIS.

After the Public Hearing in August 2003, the City adopted Resolution No. 2982, which created the SH 121 CAG. The CAG was established to provide a process for stakeholder involvement related primarily to the development of corridor enhancements and amenities.

NTTA and TxDOT have diligently analyzed the project based on concerns expressed during the Public Hearing process. This resulted in revised studies based on updated data, an expanded discussion of secondary and cumulative impacts and an overall improvement in the readability of the document.

It has been determined that there are no changes to the project that would result in substantial environmental impacts not previously considered in the DEIS nor is there new information relevant to environmental concerns that would result in substantial impacts not evaluated in the DEIS. As a result of this "hard look," NTTA and TxDOT recommended proceeding to this FEIS. The FHWA concurred with this approach.

Due to public interest in this project, the City has requested additional public involvement as this project advances. While not traditionally provided at the FEIS stage, NTTA, TxDOT and FHWA have agreed to provide an additional Public Hearing after the FEIS would be made available to the public. Before the execution of the ROD, a summary of this additional Public Hearing and analysis

of comments would also be made available to the public. Relevant comments not previously addressed in the FEIS would be noted in the ROD.

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CHAPTER 2

PURPOSE AND NEED

2.0 PURPOSE AND NEED

2.1. Purpose and Need for the Project

Continued growth and urbanization in the DFW region has resulted in the need for more efficient transportation systems to accommodate existing and future traffic demand between the CBD of Fort Worth and newly developed and developing areas in southwest Tarrant County with a financially viable, effective and timely solution. According to the April 2003 NCTCOG's *2030 Demographic Forecast*, the year 2000 total population for North Central Texas was 5,067,400 and was projected to grow approximately 56 percent to 9,107,900 by the year 2030.

NTTA and TxDOT propose to construct a tollroad with controlled access beginning at IH 30 and proceeding generally southwest approximately 15 mi to FM 1187 in Tarrant County, Texas. The purpose of this recommended project is to:

- Improve regional mobility,
- Increase people and goods carrying capacity,
- Alleviate further overburdening of the local transportation system.

2.2. Supporting Documentation – Purpose and Need

This section of the document provides a compilation of the supporting information for the purpose and need. It is provided as a reference and to add further clarification and background.

2.2.1. Demographics and Population Demand

Population Growth

Continued growth and urbanization in the DFW region, particularly in Tarrant County, has resulted in the need for more efficient transportation systems to accommodate existing and future traffic demand. According to an April 2003 report from NCTCOG, the Metroplex was one of the fastest growing areas in the United States. This trend is expected to continue through the year 2030.

According to the April 2003 NCTCOG's *2030 Demographic Forecast*, North Central Texas is projected to have a 2030 population of 9.1 million persons in 3.4 million households and non-construction employment of 5.4 million jobs. The rate of growth projected through three decades represented in this forecast is at a magnitude never before experienced in the North Central Texas region.

According to the NCTCOG Research and Information Services, the year 2004 total population for the Metroplex is 5,856,350. Since January 2003, the region added 146,400 new persons for a January 2004 total, which marks the eighth consecutive year to add over 100,000 persons to the region.

Population Growth by County

As the Metroplex continues to attract new industry and businesses, the associated increases in population and employment begin to inflict a measurable strain on the existing transportation systems. According to the April 2003 NCTCOG's *2030 Demographic Forecast*, the four NCTCOG core counties, Collin, Dallas, Denton and Tarrant, captured 90 percent of all the household growth in the region in 2000. Tarrant County led all counties in the region by adding 39,950 persons from January 2003 to January 2004, pushing the total population of Tarrant County to 1,589,200 residents. Tarrant County is projected to lead all the NCTCOG counties in absolute growth by capturing 21 percent of all the projected household growth during the 30-year forecast period. Additionally, Johnson County is expected to triple its 2000 household total by the year 2030.

2.2.2. Growth of Major Employers

According to the NCTCOG's *June 2004 Major Employers List*, there are 944 major employers in the North Central Texas Region. Major employment establishments are those that have a minimum of 250 full-time and part-time workers. Major employers in the North Central Texas region combine to employ 790,450 persons, representing 25 percent of all employment in the region. Tarrant County has 227 major employer sites, most of which are concentrated in the City's CBD and along IH 35W north and south of downtown. Major employment centers that would be served by the proposed

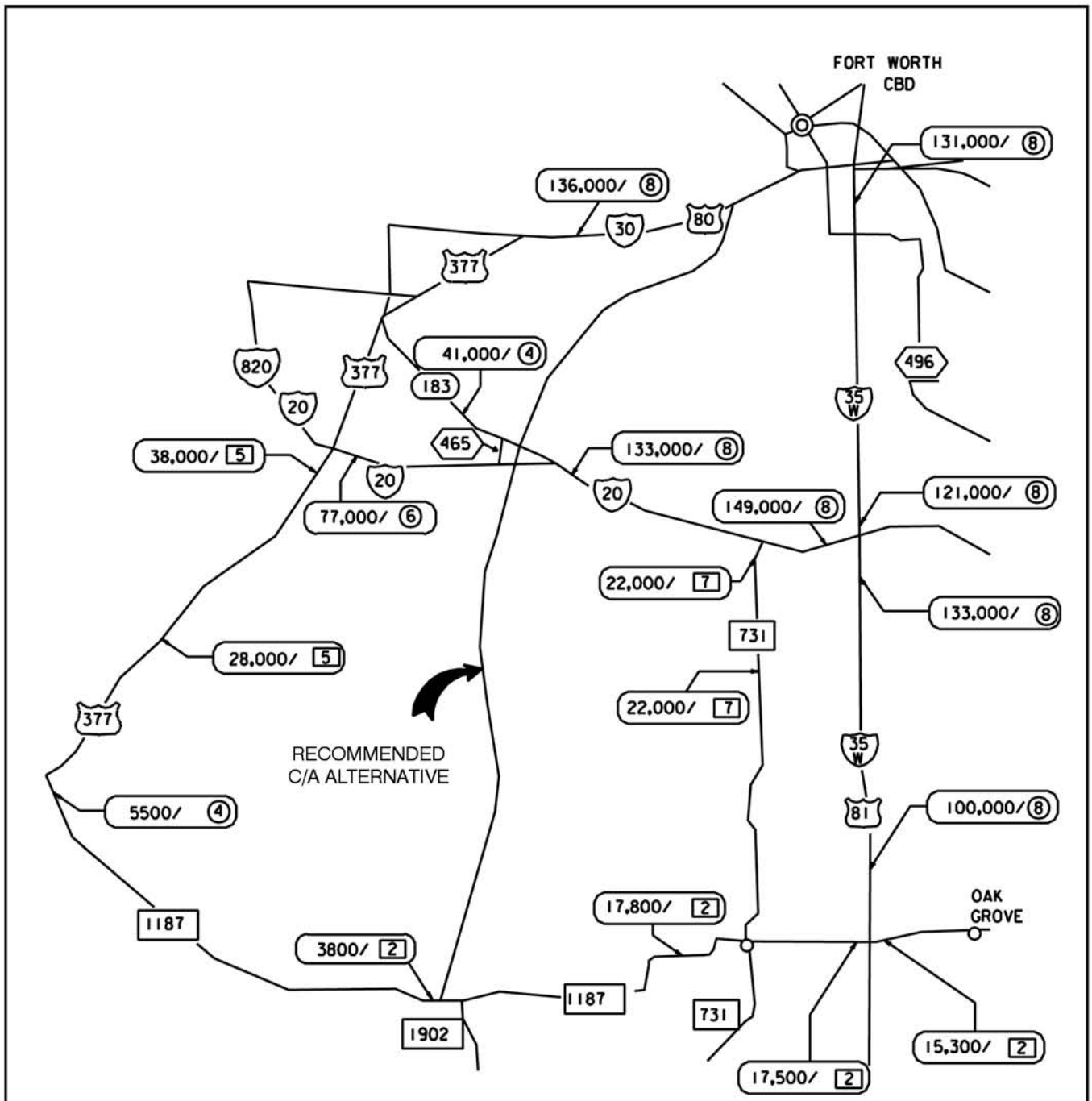
facility include the Fort Worth CBD, the West Fort Worth Hospital District and the Southwest Fort Worth market area. In 2004, Lockheed Martin Corporation in Fort Worth led all major employers in the 16-county region with 16,800 workers.

2.2.3. Growth and Traffic Demand

Rapid growth in the DFW area is surpassing the area's transportation system's ability to accommodate traffic demand. Congestion is no longer limited to the traditional peak hour periods or to the CBD. Factors such as population growth, employment growth, automobile ownership, single-occupant vehicle travel and increased development, have all contributed to the increase in vehicle miles traveled (VMT) across the region. According to NCTCOG's *2025 Mobility Update* report, in 1999, transportation demand for the region was 125-million VMT. In the year 2025, this figure is expected to increase to over 200 million VMT.

Major arterials that provide north-south access near the PSC (Exhibit 5.2 through Exhibit 5.5) are Bryant Irvin Road and South Hulen Street. Other arterials that provide northeast-southwest access include Vickery Boulevard, Granbury Road and Camp Bowie Boulevard. Motorists who wish to travel between the Fort Worth CBD and southwest Fort Worth currently use the existing freeway system, in combination with the various other major arterials. These movements are made difficult due to congestion on the freeways and because of frequent traffic lights and slower speed limits along local arterials. Observed traffic patterns on these facilities indicate heavy commuter use, with the average weekday traffic substantially higher than average weekend traffic.

Existing traffic volumes were obtained for the various freeway and arterial facilities serving the project study area. Traffic data for arterials and for freeways are presented in Exhibit 2.1 and Exhibit 2.2. The level of service (LOS) is a letter designation that describes a range of operating conditions, from free flow operation at LOS A to forced, or breakdown conditions at LOS F. The LOS at which various facilities were operating can be determined by referring to Table 2-1 that shows the recommended maximum average daily traffic (ADT) volumes for various facility types at different



LEGEND

XX,XXX/X	2002 ANNUAL AVERAGE DAILY TRAFFIC ○ - DIVIDED FACILITY □ - UNDIVIDED FACILITY
20	INTERSTATE HIGHWAY
80	U.S. NUMBERED HIGHWAY
183	STATE HIGHWAY
465	LOOP OR SPUR
731	FARM OR RANCH ROAD

N

EXISTING TRAFFIC VOLUMES FOR ON-STATE FACILITIES

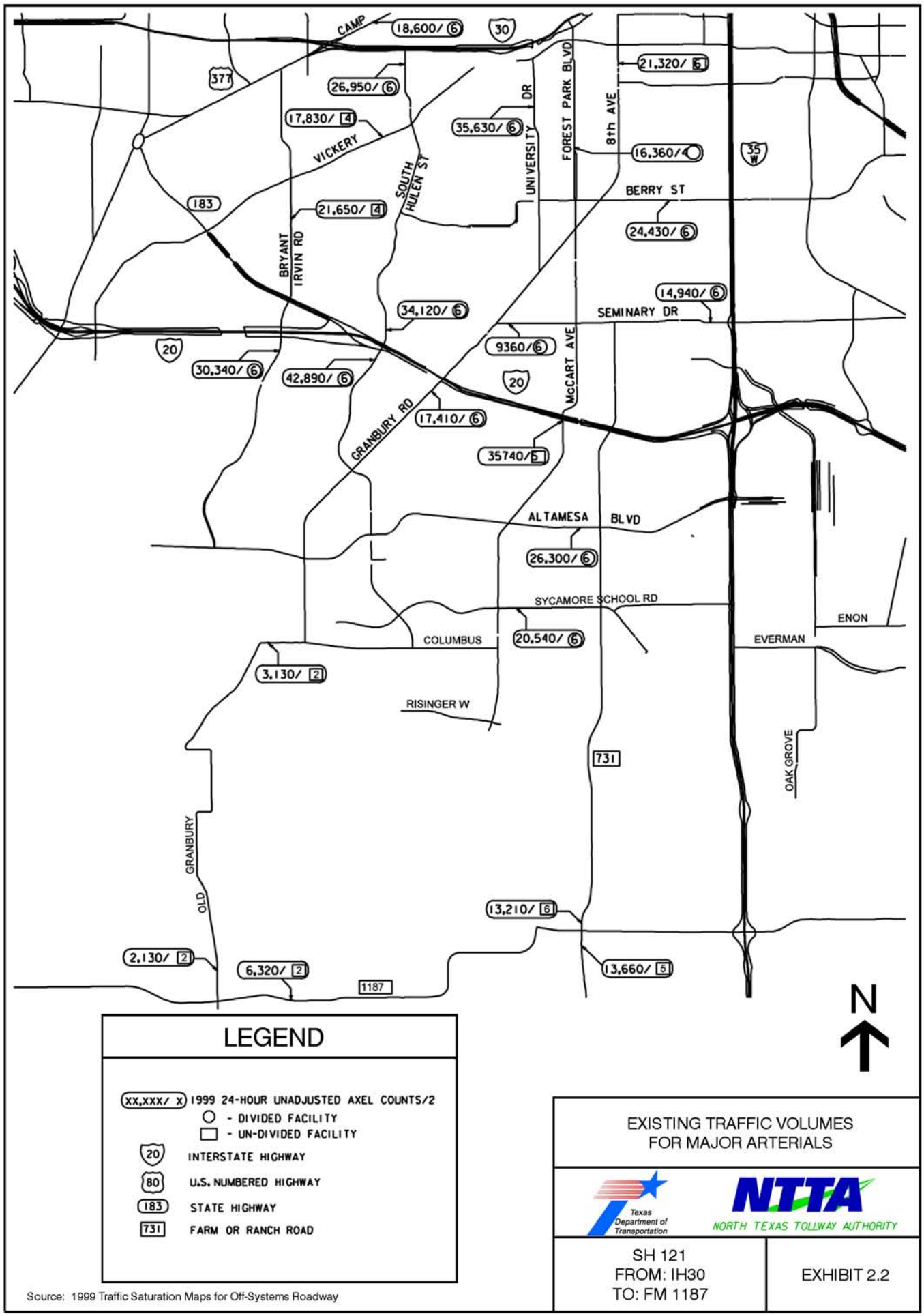
Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 2.1

Source: Base Map 2002 TxDOT Traffic Map, Fort Worth District, Texas Department of Transportation Transportation Planning and Programming Division


CAMP
18,600/ 6
30
377
26,950/ 6
17,830/ 4
VICKERY
35,630/ 6
UNIVERSITY DR
FOREST PARK BLVD
8th AVE
21,320/ 5
16,360/4
35 W
SOUTH HULEN ST
183
21,650/ 4
BRYANT IRVIN RD
BERRY ST
24,430/ 6
14,940/ 6
34,120/ 6
SEMINARY DR
20
9360/6
McCART AVE
30,340/ 6
42,890/ 6
GRANBURY RD
17,410/ 6
35740/5
ALTAMESA BLVD
26,300/ 6
SYCAMORE SCHOOL RD
ENON
COLUMBUS
20,540/ 6
EVERMAN
3,130/ 2
RISINGER W
731
OAK GROVE
GRANBURY
OLD
13,210/ 6
2,130/ 2
6,320/ 2
1187
13,660/ 5
N
LEGEND
XX,XXX/ X 1999 24-HOUR UNADJUSTED AXEL COUNTS/2
- DIVIDED FACILITY
- UN-DIVIDED FACILITY
20 INTERSTATE HIGHWAY
80 U.S. NUMBERED HIGHWAY
183 STATE HIGHWAY
731 FARM OR RANCH ROAD
EXISTING TRAFFIC VOLUMES
FOR MAJOR ARTERIALS
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 2.2
Source: 1999 Traffic Saturation Maps for Off-Systems Roadway

flow conditions. An examination of Table 2-1 and Exhibit 2.2 indicates Bryant Irvin Road (30,430), Hulen Street (42,890), University Drive (36,630) and McCart Avenue (35,740) are operating at worse than tolerable levels of service.

Table 2-1 – Recommended Maximum Average Daily Traffic* and Level of Service

Roadway Class	Good Flow LOS A-B	Tolerable Flow LOS C-D	Capacity Flow LOS E
Urban Freeways			
4-lane	44,000	52,800	64,400
6-lane	66,000	79,200	96,600
8-lane	88,000	105,600	128,800
Urban Divided Streets			
4-lane	16,100	19,100	23,000
6-lane	23,500	27,900	33,000
8-lane	29,400	34,900	42,000
Urban Undivided Streets			
2-lane	7,700	9,100	11,000
4-lane	12,600	14,900	18,000
6-lane	19,800	23,500	28,300
Rural Freeways			
4-lane	20,800	31,600	42,000
6-lane	31,200	47,400	63,000
Rural Divided Highways			
4-lane	15,800	20,100	29,500
6-lane	23,400	29,800	43,400
Rural Undivided Highways – Rolling Terrain			
2-lane	2,200	3,800	10,000
Rural Undivided Highways – Level Terrain			
2-lane	3,200	5,300	13,500
4-lane	9,500	13,000	17,600
6-lane	15,000	19,500	27,100

Source: TxDOT Design Division, Austin, TX.

* *The volumes assume a percentage of trucks and do not require adjustment to passenger car equivalents. The table is not meant for design purposes but rather for planning evaluations to indicate when tolerable flows are no longer accommodated.*

2.2.4. Regional Transportation Plan

Background

The regional transportation plan is Federally mandated and serves as a guide for Federal, State and local transportation expenditures. Beginning in the early 1970s, Metropolitan Planning Organizations (MPOs) have been responsible for developing and maintaining a MTP. Passage of the ISTEA and its successor, TEA-21, enacted June 9, 1998, greatly advanced the role of MPOs in the

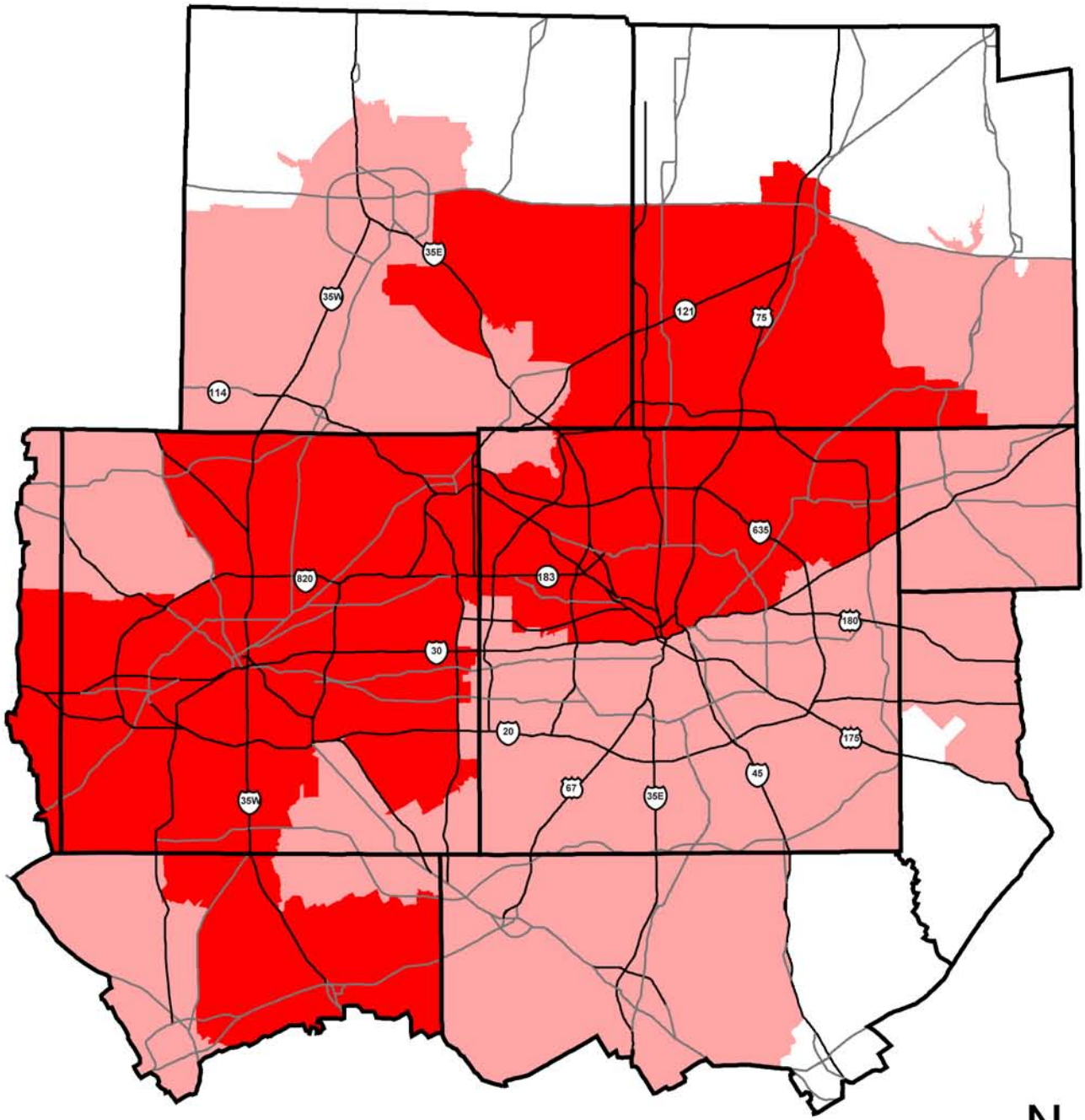
overall transportation planning process by placing more emphasis on the need for a centralized mechanism to guide and enhance transportation investments.

NCTCOG and the MTP

NCTCOG, together with the RTC serves as the MPO for the DFW region. Since the early 1970s, there have been seven transportation plans published by NCTCOG. These are, the *Total Transportation Plan for the North Central Texas Region for 1990*, completed in 1974; *Mobility 2000 – The Regional Transportation Plan for North Central Texas*, completed in 1986; *Mobility 2010 - The Regional Transportation Plan for North Central Texas* completed in 1990; *Mobility 2010 Plan Update*, completed in 1993; *Mobility 2020 - The MTP*, completed and published in September 1997; and *Mobility 2025 Plan Update - The MTP*, completed and published in January of 2000 and *Mobility 2025 – 2004 Update*, published in 2004.

Following in the guidelines of the previous plan, *Mobility 2020*, the current plan, *Mobility 2025 - 2004 Update*, was developed following completion of the transit and highway model validation for the base year 1995. The plan is based on regional transportation needs identified through the process of forecasting future travel demand, evaluating system alternatives and selecting those options which best meet the mobility needs of the region. A series of travel forecasts were performed including commuter and light rail alternatives, High Occupancy Vehicle (HOV) and express lanes, freeways, tollroads and arterial street improvements. In addition, a system of bicycle and pedestrian facilities was developed. Throughout the planning process, close coordination among local governments, NTTA, TxDOT and transit authorities was maintained.

An evaluation of the 2025 baseline forecast was accomplished to identify future congested locations and quantify transportation system needs. In order to assess regional system performance and to further assess project specific system performance following implementation of congestion reduction strategies, a variety of quantifiable performance measures were included in the study. With the *Mobility 2025-2004 Update* recommendations in place (which include proposed SH 121), peak hour congestion levels would occur as illustrated in Exhibit 2.3. Specific legislative requirements also had



LEGEND

- Areas of Moderate Peak-Period Congestion
- Areas of Severe Peak-Period Congestion

Annual Cost of Congestion = $11.8 Billion

MOBILITY 2025 2004 UPDATE

North Central Texas Council of Governments Transportation

2025 CONGESTION - WITH IMPROVEMENTS

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

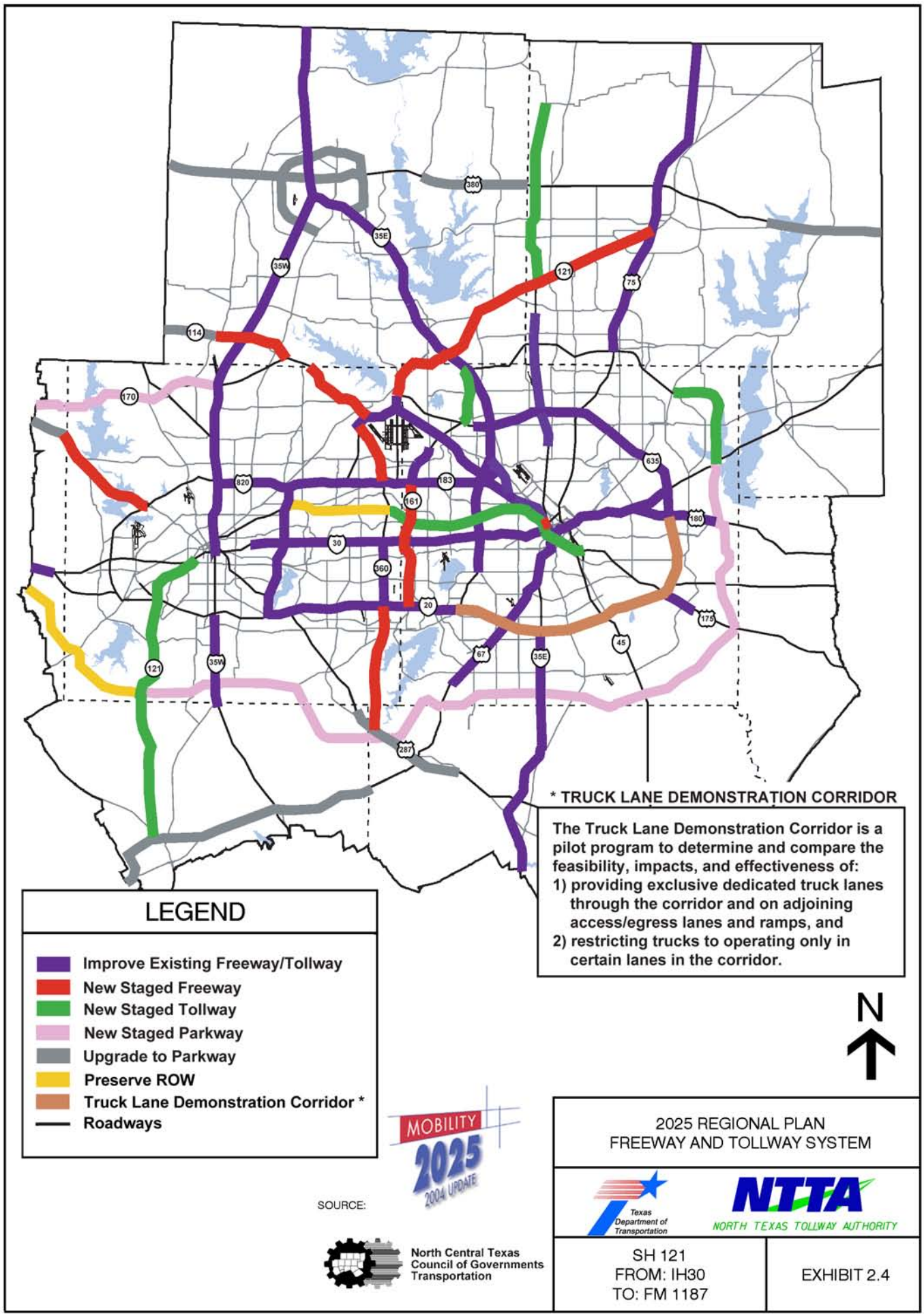
EXHIBIT 2.3

to be addressed in the MTP. The CAAA of 1990 established the requirement that all areas designated as non-attainment for exceeding the National Ambient Air Quality Standards (NAAQS) must make conformity determinations on MTPs and TIPs before they are approved. Collin, Dallas, Denton and Tarrant Counties are all designated non-attainment areas for ground level ozone (O_3) for 1-hour and 8-hour O3 standard. Under 8-hour standard, ozone concentrations for the average of the annual fourth highest daily eight-hour maximum over a three-year period cannot be at or above 85ppb. A demonstration of transportation conformity for added capacity projects to the 8-hour O3 standard is not required until the end of the EPA one-year grace period. The EPA one-year grace period will end June 15, 2005. *Mobility 2025 - 2004 Update* is required to be in conformity with the SIP for air quality. In accordance with Federal regulations, *Mobility 2025 – 2004 Update* is constrained to available financial resources. Currently, the proposed action is a part of the NCTCOG's *Regional Transportation Plan (Mobility 2025 – 2004 Update)* and is included in the *2004-2006 TIP* for North Central Texas. The proposed action would provide a major link in the future regional transportation network.

Mobility 2025 – 2004 Update is the defining vision for transportation systems and services in the DFW Metroplex. In addition to the freeway/tollroad and rail proposals, *Mobility 2025 – 2004 Update* recommends other improvements in the SH 121 study area, including TSM and travel demand management (TDM) strategies and non-motor vehicle alternatives. In order to aid financing the proposed action, a freeway system evaluation of *Mobility 2025 - 2004 Update* recommended the construction of SH 121 as a "new staged tollroad" (Please see Exhibit 2.4). The recommendation was based on a tollroad study, submitted to the Texas Transportation Commission in July 1995, in which alternative financing was sought for the $750 million proposed freeway facility. The findings of this study are discussed in Chapter 3.0, Alternatives Analysis.

2.2.5. Transportation Demand

The CMS is a systematic process for managing traffic congestion. The CMS provides information on transportation system performance, alternative strategies for alleviating congestion and enhancing the mobility of persons and goods to levels that meet State and local needs. Proposed SH 121 is

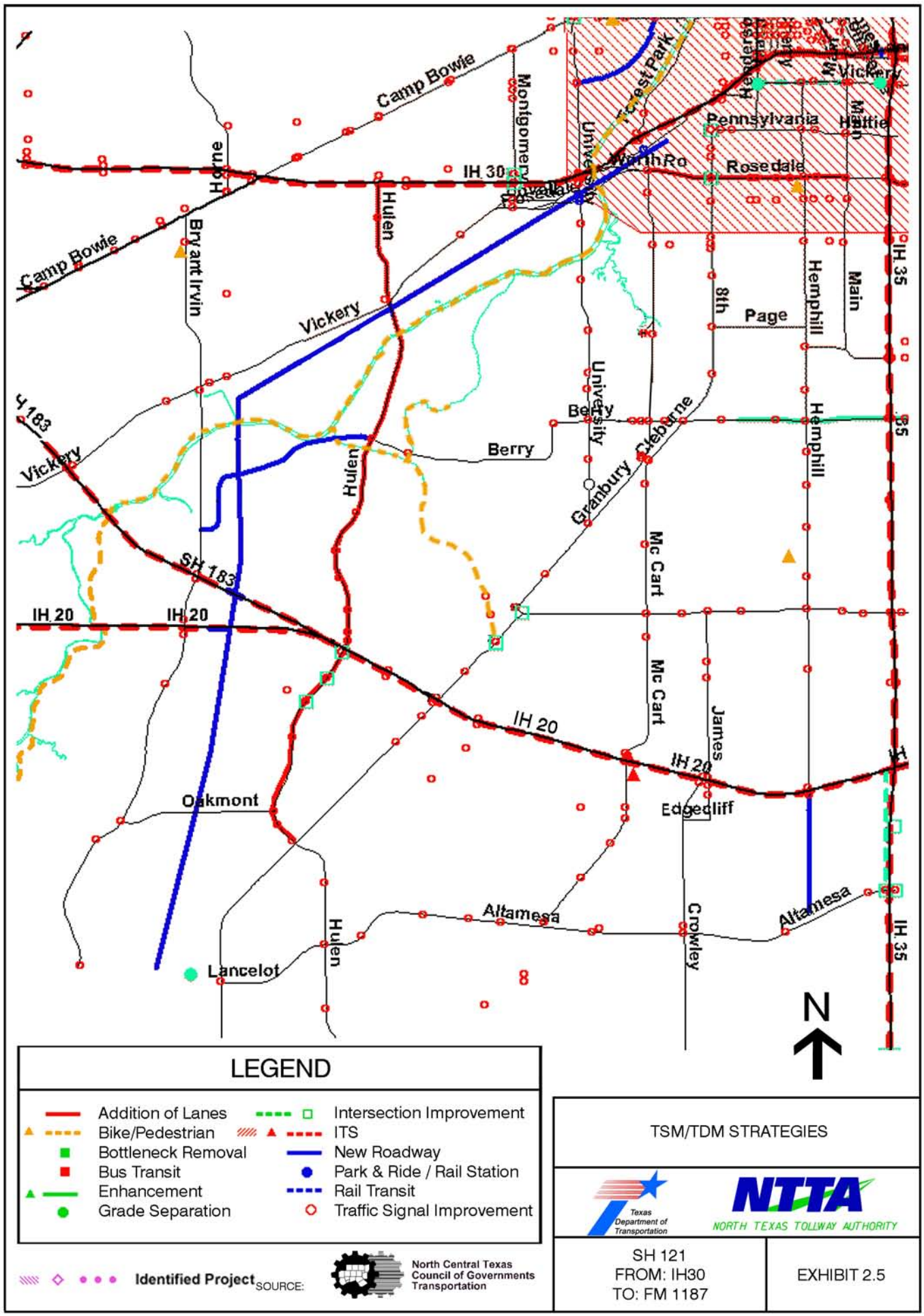

380
35E
35W
121
75
114
170
635
820
183
161
180
30
360
20
175
45
67
35E
35W
121
287
* TRUCK LANE DEMONSTRATION CORRIDOR
The Truck Lane Demonstration Corridor is a pilot program to determine and compare the feasibility, impacts, and effectiveness of:
1) providing exclusive dedicated truck lanes through the corridor and on adjoining access/egress lanes and ramps, and
2) restricting trucks to operating only in certain lanes in the corridor.
LEGEND
Improve Existing Freeway/Tollway
New Staged Freeway
New Staged Tollway
New Staged Parkway
Upgrade to Parkway
Preserve ROW
Truck Lane Demonstration Corridor *
Roadways
N
MOBILITY 2025 2004 UPDATE
SOURCE:
North Central Texas Council of Governments Transportation
2025 REGIONAL PLAN
FREEWAY AND TOLLWAY SYSTEM
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 2.4

included in the NCTCOG's current operational CMS, which meets all requirements of 23 CFR 500.109.

Operational improvements and travel demand reduction strategies are commitments made by the region at two levels: program level and project level implementation. Program level commitments are inventoried in the regional CMS, which was adopted by NCTCOG. They are included in the financially constrained MTP. Future resources are reserved for their implementation. The CMS element of the plan carries an inventory of all project commitments (including those resulting from major investment studies) detailing type of strategy, implementing responsibilities, schedules and expected costs. At the project programming stage, travel demand reduction strategies and commitments would 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 Single Occupancy Vehicle (SOV) facility implementation and project specific elements.

Various strategies, including TSM, TDM, capital improvements, land-use strategies and other transportation control measures (TCM) have been evaluated for their effectiveness and feasibility. TSM/TDM strategies in the project vicinity are depicted on Exhibit 2.5. Strategies have been recommended based on ease and cost of implementation, congestion benefits, air quality benefits as well as benefit-cost ratios. The evaluation of projects for inclusion in the TIP are based on current cost-effectiveness, air quality and energy conservation, local cost participation, intermodal/multimodal/social mobility and project inclusion in the Regional CMS or SIP as a Transportation Control Measure.

Several regional and specific strategies to reduce congestion have been considered: operational improvements, traffic flow improvements, HOV lanes, improved transit service facilities, light/commuter rail service, bicycle and pedestrian improvements, TDM such as employer trip reduction (ETR) programs, area wide ridesharing (carpooling and van pooling) and voluntary no-drive days. Specific measures are discussed in the following.



LEGEND

- Addition of Lanes
- Bike/Pedestrian
- Bottleneck Removal
- Bus Transit
- Enhancement
- Grade Separation
- Intersection Improvement
- ITS
- New Roadway
- Park & Ride / Rail Station
- Rail Transit
- Traffic Signal Improvement
- Identified Project

SOURCE: North Central Texas Council of Governments Transportation

TSM/TDM STRATEGIES

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 2.5

Specific Transportation System Management and Transportation Demand Management Strategies

Operational improvements: Operational improvements can range from implementation of incident detection and management programs to adding capacity. The CMS for the DFW region recommends that electronic surveillance and response technology (including intelligent transportation systems [ITS] and motorists information systems) be installed and operated on freeways to alleviate congestion. In addition, the CMS recommends that motorists assistance teams (i.e., TxDOT Courtesy Patrol) patrol congested freeway corridors during normal peak hours.

The existing ITS is approximately 55 percent complete in Tarrant County. It includes dynamic message signs on roadways to alert drivers of traffic conditions and video cameras to monitor traffic conditions. ITS and motorists assistance programs are designed to detect and quickly respond to incidents and accidents in order to lessen the severity of nonrecurring traffic congestion.

TxDOT Courtesy Patrol is presently being used to manage incidents on major freeway sections within Tarrant County. Duties of the Courtesy Patrol include aiding stranded motorists (flat tires, fuel and mechanical problems) and providing traffic control for police and fire departments during responses to roadway accidents. Additionally, these measures can also be used to manage the transportation system and help it operate more efficiently.

Traffic flow improvements: The objectives of traffic flow improvements are to maximize the carrying capacity of the roadways, reduce the number of vehicles in queues, increase overall speed, increase roadway capacity and reduce stops and delays. These improvements, also known as TSM improvements, are relatively low cost and easily implemented. Included are items such as: traffic signal retiming/synchronization; restriping to gain additional lanes; adding turning bays; restricting turning movements; and removing bottlenecks. *Mobility 2025-2004 Update* lists specific types of TSMs for the region, which include: retiming/synchronization of traffic signal locations (including across local jurisdictional boundaries); locations for intersection improvements; and freeway bottleneck removal.

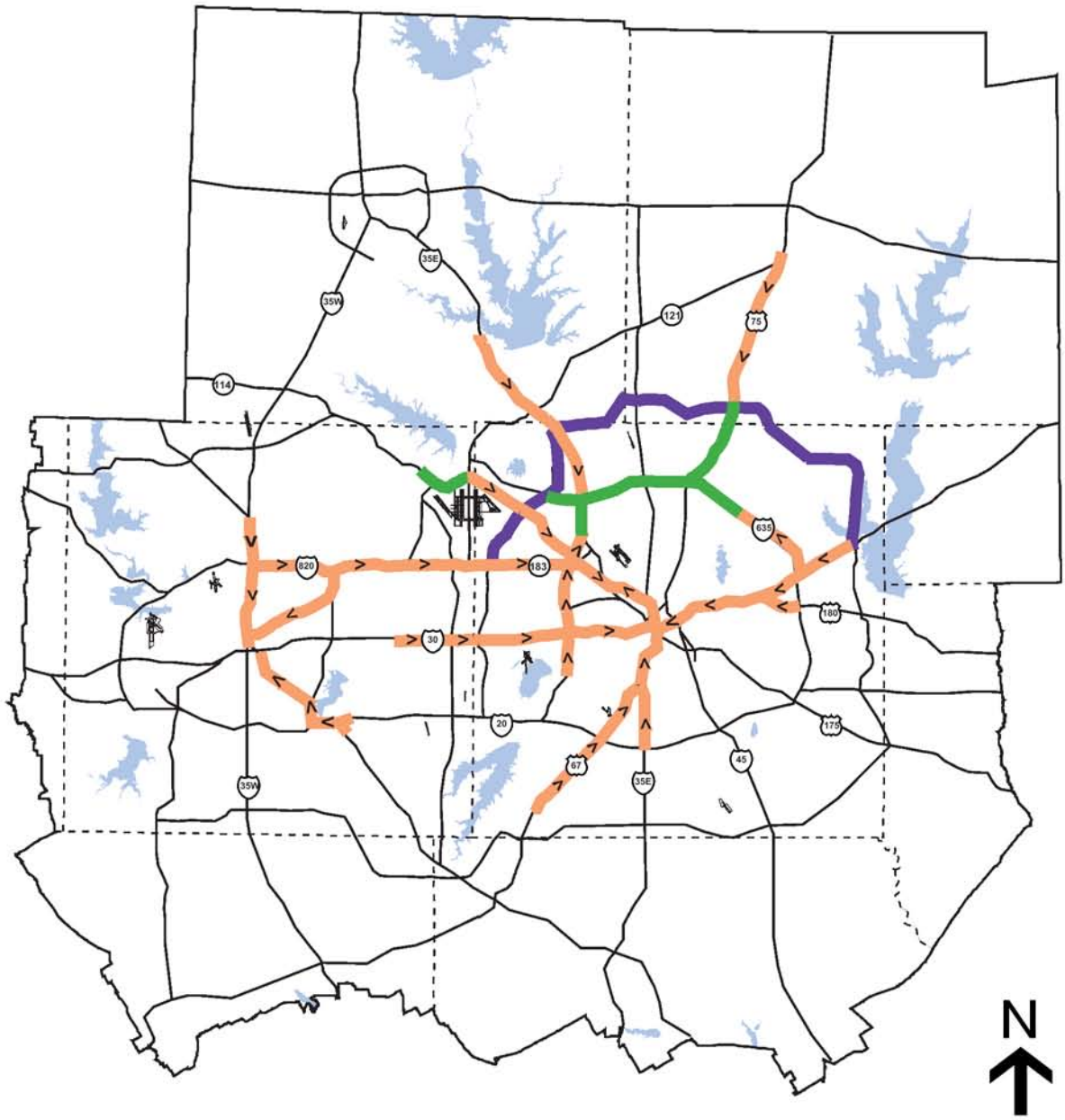
HOV lanes: *Mobility 2025 – 2004 Update* recommends the use of HOV lanes based on current and projected traffic congestion. Candidate HOV corridors were analyzed by forecasting peak hour direction HOV usage for carpools/vanpools and express bus ridership using the DFW Regional Travel Model. Upon completion of the HOV forecast, the peak hour direction warrant of 2,200 persons was applied to each candidate HOV facility and was then checked for peak hour congestion. HOV lanes for the region are identified on Exhibit 2.6.

Rail Systems: *Mobility 2025 – 2004 Update* recommends the use of rail systems such as the Dallas Area Rapid Transit (DART) light rail system and the Trinity Railway Express (TRE). TRE operates between the Fort Worth and Dallas CBDs. The majority of this commuter line uses the former Chicago Rock Island & Pacific Railroad. Primarily, the line serves east-west commuters with stations at various locations in the cities of Dallas, Irving, Arlington, Richland Hills and Fort Worth. Future and existing rail lines under study by NCTCOG are depicted on Exhibit 2.7.

Bicycle and pedestrian improvements: On a regional level, *Mobility 2025 – 2004 Update* explores the opportunities for integrating bicycle and pedestrian traffic into the overall intermodal network in North Central Texas (Please see Exhibit 2.8). Bicycling and walking can also be considered as an effective mode of transportation for home to school, entertainment, shopping, movement between and within residential neighborhoods and recreation.

Mobility 2025 – 2004 Update suggests coordinating on-road bikeways with programmed roadway improvements or new construction and developing a regional veloweb, a companion off-system bicycle system. On-road bicycle provisions do not necessarily imply a separate lane would be dedicated for bicycle traffic. A 14-foot wide outside lane, 12-foot wide lane with a two-foot curb offset is beneficial to both bicyclists and motor vehicles.

TDM: TDM describes a wide range of actions aimed at improving mobility by lessening the travel demand on the transportation system during peak periods. TDM is also a tool to reduce air pollution and help solve transportation-related problems at individual work sites. TDM strategies encourage



LEGEND

- REVERSIBLE
- MANAGED HOV/INTEGRATED TOLLWAY
- TWO-WAY
- ROADWAYS

MOBILITY 2025 2004 UPDATE

2025 REGIONAL PLAN
HOV AND MANAGED FACILITY SYSTEM

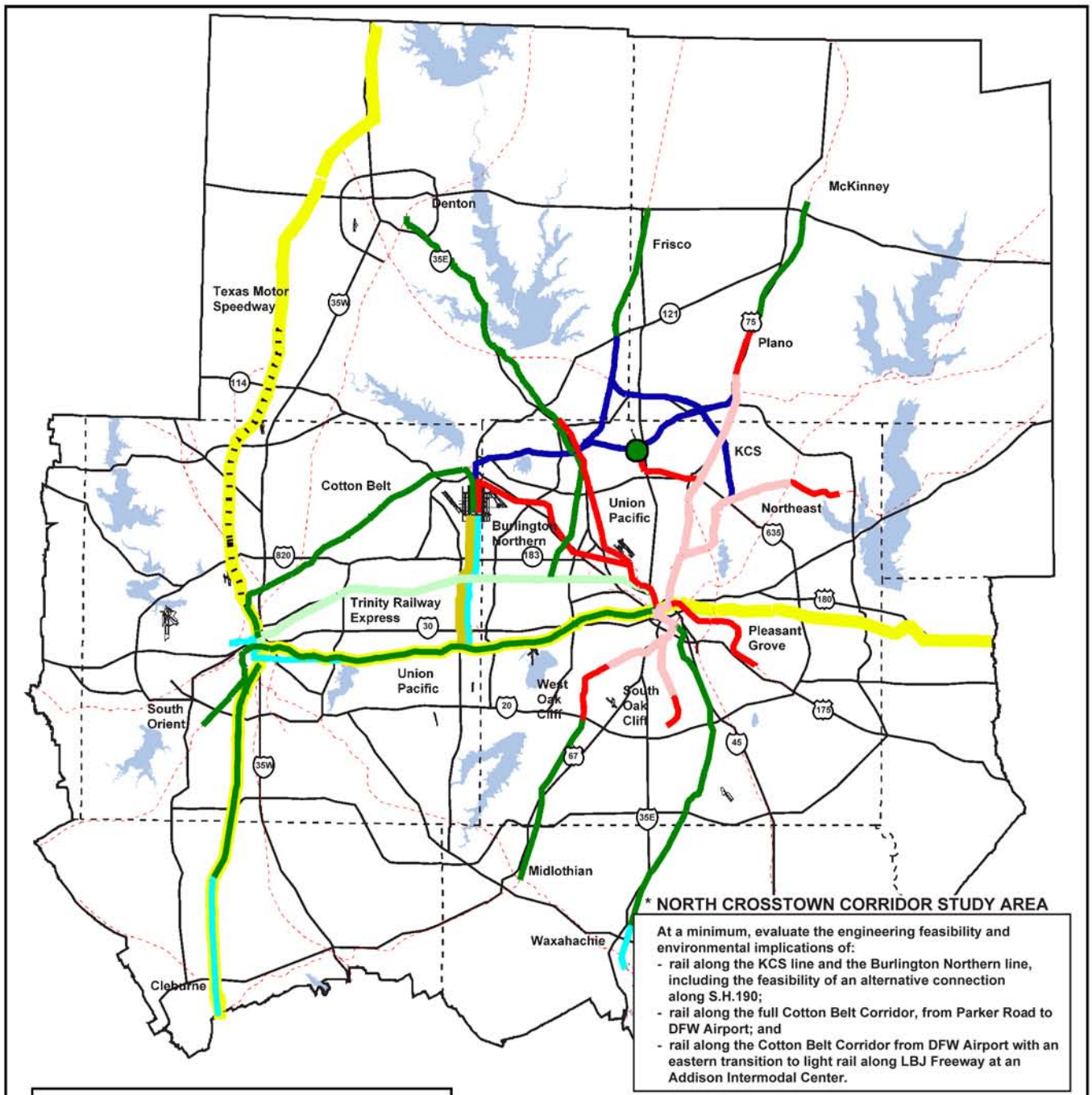
Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SOURCE: North Central Texas Council of Governments Transportation

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 2.6



LEGEND

- Future Light Rail
- Existing Light Rail
- Future Regional Rail
- Existing Regional Rail
- Future Rail
- Special Events
- Future Intercity Rail
- Existing Intercity Rail
- North Crosstown Corridor Study*
- Possible Eastern Terminus
- Roadway
- Existing Rail Corridors

N

MOBILITY 2025 2004 UPDATE

FUTURE AND EXISTING RAIL SYSTEM

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SOURCE: North Central Texas Council of Governments Transportation

SH 121
FROM: IH30
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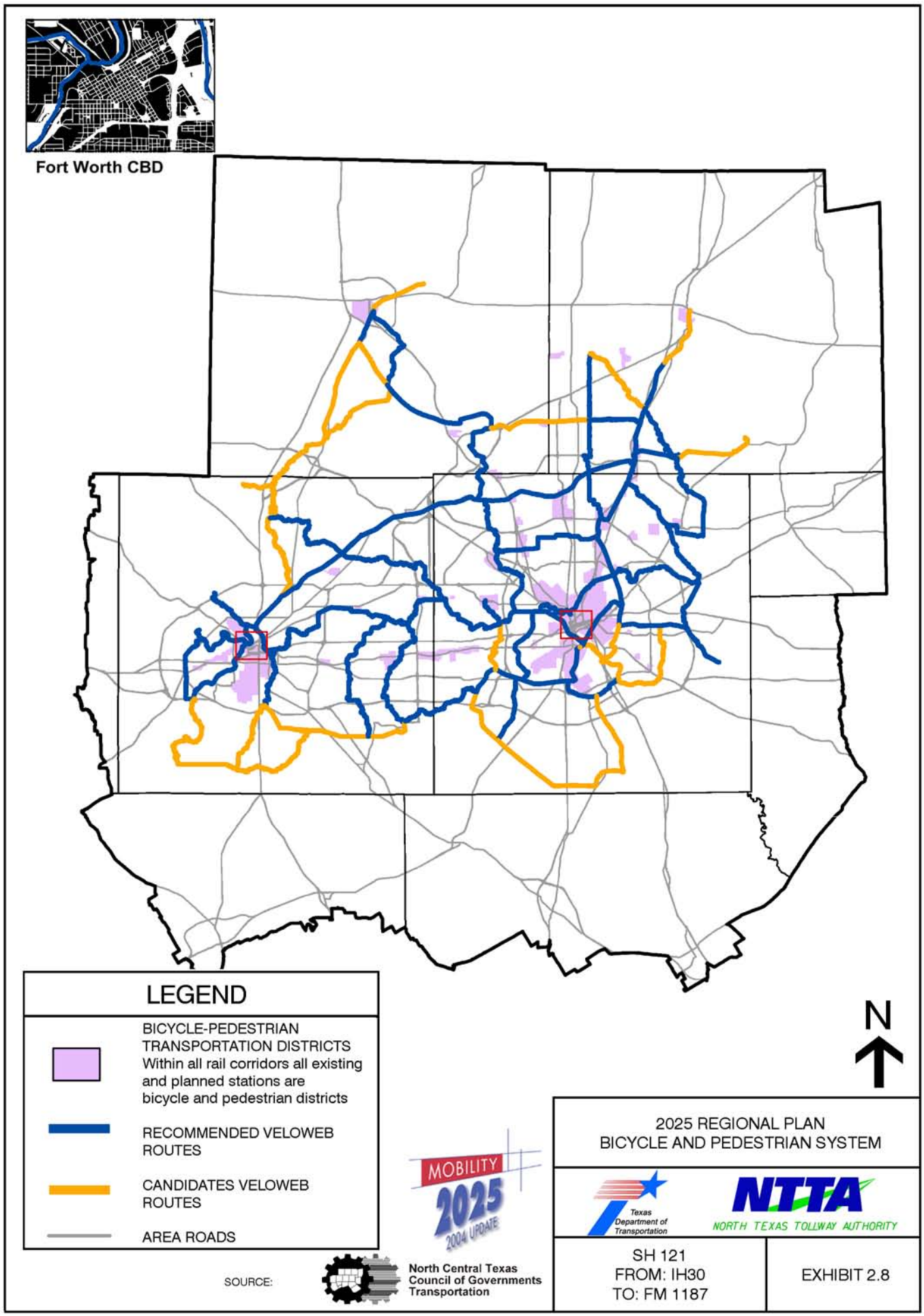
EXHIBIT 2.7


Fort Worth CBD
LEGEND
BICYCLE-PEDESTRIAN TRANSPORTATION DISTRICTS Within all rail corridors all existing and planned stations are bicycle and pedestrian districts
RECOMMENDED VELOWEB ROUTES
CANDIDATES VELOWEB ROUTES
AREA ROADS
N
MOBILITY 2025 2004 UPDATE
SOURCE:
North Central Texas Council of Governments Transportation
2025 REGIONAL PLAN
BICYCLE AND PEDESTRIAN SYSTEM
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 2.8

travelers to use other alternatives to driving alone, especially at the most congested times of the day. Examples include congestion-pricing schemes, incentives to increase use of alternative modes of travel and ETR (employee trip reduction) programs. The following describes the TDM strategies being promoted in the DFW area.

ETR programs: An ETR program is a concept based on either voluntary or mandatory ETR ordinances to reduce employee commute vehicle trips. Such plans are primarily aimed at public and private employers with at least 100 employees at a single location and are predicted to increase vehicle ridership by 25 percent among participating employees. ETR programs can include numerous elements such as: variable work hours, telecommuting, carpooling/vanpooling incentives, parking management strategies, pedestrian/bicycle incentives and subsidized transit passes, etc.

Telecommuting: Telecommuting is working at a location other than the conventional office. The place may be a home or an office close to home. Telecommuting does not necessarily require a computer nor does it have to be a full-time arrangement. One potential effect associated with telecommunicating is the opportunity for increased non-work related trips.

Parking Management: Parking management techniques such as priority carpool/vanpool parking and parking pricing/allowance can be incorporated into an ETR program. Parking management, park-and-ride lots and fringe parking were also considered as options to reduce congestion. Parking management is a set of strategies used to balance the supply and demand for parking while addressing related issues such as traffic congestion, air pollution and commuter mobility. These strategies are applicable within the CBD where there is a high density of employment and parking fees. At this time, there are no ordinances requiring employers to charge for parking, provide bicycle parking or limit parking in the DFW region, nor has any local government passed an ordinance stipulating the rates to be charged for parking.

Park-and-Ride Lots: At least two park-and-ride lots have been constructed in the region since 1990 with additional opportunities being investigated. *Mobility 2025 – 2004 Update* anticipates the construction of additional park-and-ride lots by the year 2025.

Area-wide Ridesharing: Area-wide ridesharing is considered as a potential traffic congestion reduction measure. The DFW CMS cites ridesharing programs as key elements of the regions TDM efforts. Carpooling and vanpooling are likely to be of primary interest to people who live a long way from work - round trips averaging 25 mi or more for carpools and 30 mi or more for vanpools. For shorter trips, the added time to pick up and drop off passengers and the inconvenience of conforming to a fixed travel schedule would probably outweigh any cost savings or incentives. Home-based work trip information showed round trip work distances of 25 mi or more accounted for 40 percent of the trips in the study area while 33 percent were 30 mi or greater. The availability and cost of parking can be another consideration in the decision to carpool/vanpool.

Vanpool Services Incorporated (VPSI) is a regional vanpool facilitator through the Fort Worth Transit Authority (FWTA). Currently, their service provides 15-person passenger vans for vanpools in the study area. FWTA offers rideshare-matching services to create compatible rideshare arrangements. Also, through the Congestion Mitigation and Air Quality Improvement Program(CMAQ), FWTA offers incentives to start and maintain vanpools.

2.2.6. Congestion Management Systems Summary

NTTA, TxDOT and the NCTCOG would continue to promote appropriate congestion reduction strategies through the CMAQ program, the CMS and the MTP. According to NCTCOG, the congestion reduction strategies considered for the area would help alleviate congestion within the region but would not eliminate it.

2.2.7. Safety/Roadway Deficiencies

Similar to most large cities, the existing roadway system in Fort Worth was originally laid out for a historical time period in a more centralized city. Although major reconstruction of the freeway

system is occurring, many of the thoroughfares and local streets forced to serve as thoroughfares, are inadequate in width (capacity), sight distances, safety design features and continuity. There is no direct route of a southwest-to-central orientation similar to what would be provided by the proposed facility.

Additionally, the user demands for many of these urban roadways cause them to carry more traffic than they were designed for, thus leading to congested conditions. This congestion leads to higher costs to the traveling public.

Without major improvements, including disruptive reconstruction of the existing roadway network, the existing system would continue to become more congested. The increased congestion would lead to hazardous and unsafe conditions that would likely result in higher accident rates.

The proposed facility, by providing a direct and continuous southwest-to-central major traffic arterial, would improve access and travel time of public safety vehicles and emergency services. The proposed facility would also provide a controlled access highway that would complement the existing City of Fort Worth's *Master Thoroughfare Plan*.

2.2.8. Funding and Legislation

Section 1602 of the *Transportation Equity Act* (TEA) for the 21st Century (TEA-21, P.L. 105-178, June 9, 1998), known as the High Priority Projects Program provides designated funding for specific projects (commonly referred to as demonstration projects) identified by Congress and is now included in 23 USC.117. TEA-21 includes 1,850 of these projects, each with a specified amount of funding over the six years of TEA-21. The designated funding can only be used for the projects as described in the law [1601(a)]. With support from U.S. House of Representatives member Kay Granger of the 12th District (R-Texas), funding in the amount of $25 million has been earmarked specifically for the construction of SH 121 from IH 30 to the Tarrant/Johnson County Line (plus an additional $7 million to extend to US 67 in Cleburne), under this category of TEA-21.

The SH 121 study was authorized by MOs No. 83516 and 84030 and approved by the Texas Transportation Commission on August 29, 1985 and January 30, 1986, respectively. MO No. 83516 was accepted by the City on October 15, 1985, by a Fort Worth City Council and Mayor communication (Number G-6454). The Commissioners Court of Tarrant County adopted MO No. 83516 by resolution on November 25, 1985.

Environmental review and approval of the proposed facility is governed by the *National Environmental Policy Act* (NEPA) and its implementing regulations; regulations and procedural guidelines of the FHWA (23 CFR 771 and 772) TxDOT guidelines and 43 *Texas Administrative Code* (TAC) Chapter 2, Subchapter C.

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CHAPTER 3

ALTERNATIVES

3.0 ALTERNATIVES ANALYSIS

The alternatives section is divided into sections for clarity. Section 3.1 provides a brief introduction. Section 3.2 provides a comparative analysis of the freeway and tollroad options. Section 3.3 focuses on the alternatives retained for detailed study. Section 3.4 provides for a description of the No-Build Alternative. Section 3.5 provides additional information by comparing the Build and No-Build Alternatives. Section 3.6 of the Alternatives Analysis chapter provides additional information on other proposed transportation actions planned in the PSC.

3.1. Introduction

A range of alternatives was developed for the recommended project. Each of these alternatives was evaluated for its ability to meet the purpose and need of this project. In accordance with the Council on Environmental Quality (CEQ) guidelines, 23 CFR 771 and FHWA Technical Advisory 6640.8A, all reasonable alternatives were evaluated.

A means for direct access between the CBD of Fort Worth and Southwest Tarrant County has been studied over an extended period of time. The proposed facility has been identified, revised and supported throughout the history of the project. Proposed alignments for the recommended Build Alternatives are the product of numerous route location studies in which various functional and/or location alternatives were identified to meet a growing transportation need. Over the project's approximately 40-year history, the City's emerging development patterns have refined many of the early alternatives. The various agencies responsible for the development of this project have incorporated and included public input in the development of the alternatives.

Previous studies have analyzed different alternatives including a freeway facility at differing locations, several tollroad alternatives, a rail alternative and other strategic initiatives aimed at reducing congestion and optimizing the existing transportation network. Therefore, both modal and Build Alternatives have been considered. These studies have culminated with the recommendation of an alignment capable of meeting the purpose and need and obtaining public support for the

project. To offer a historical perspective of the recommended project, early alternatives that were considered for this project are described in Chapter 1.0, Project History.

3.2. Freeway and Tollroad Options

Details of development of the project including freeway and tollroad options are described in Chapter 1.0, Project History.

3.2.1. Freeway Option

The project has been postponed on several occasions due to changes in funding availability, alignment and the City's development of the Cultural District. However, the overriding reason for the continued postponement of the SH 121 project as a freeway has been the lack of funding. Therefore, this alternative was eliminated from further study.

3.2.2. Tollroad Option

At the request of the City, the NTTA has taken the project under consideration as a tollroad. NTTA's participation creates a funding option to offset the lack of public funds and the estimated construction costs. The Build alternatives involve the construction of a multi-lane controlled access tollroad, with plans for phased construction as traffic demand and demographic trends dictate.

3.3. Description of the Build Alternatives Retained for Detailed Study

In addition to a No-Build alternative, four build alternatives were carried forward for detailed study in the DEIS. Combinations of these build alternatives evolved as a result of public participation and extensive City involvement. The City presented the combination alternative (Alternative C/A) on April 22, 2003 during the comment phase of the DEIS Public Hearing as detailed in a City Council resolution. The Alternative C/A is carried forward and incorporates much of the City's suggestions in so far as is feasible and practicable. This combination alternative is discussed in detail in Section 3.3.1, The Combination Alternative.

Because of changes in land use development patterns that have evolved over time, the proposed Build alternatives are essentially confined to the same horizontal alignment with the vertical profile varying among the alternatives. In addition to vertical profile modification there are various locations where different plan concepts have been proposed depending on the alternative. These plan concepts, for the most part, are limited to variances in the typical section and variances in the plan of several of the proposed interchanges located along the project. These plan concepts were proposed by different agencies or studies.

Five build alternatives included in this FEIS have been identified based on an agency or study recommendations: Alternative A resulted from the City's PRT and PDT; Alternative B resulted from the City's CAC; Alternative C was developed from Alternative A to respond to safety and established design concerns; and Alternative D was brought forward from studies and public input. Alternative C/A is a combination of Alternatives A and C. Thus, although the proposed alternatives share the same or similar alignments, the varying preliminary design concepts have established independent alternatives identified by the planning team and have been presented to the public as Alternatives A, B, C, C/A and D. Each of the five detailed study alternatives evaluated consist of a facility that would ultimately provide a six-lane section from IH 30 to just south of IH 20 and a four-lane section from south of IH 20 to the project's terminus at FM 1187; and would include frontage roads only in those locations where they would be essential to maintain local street circulation and continuity.

Initially the facility is proposed to be constructed as a four-lane urban tollroad from IH 30 to just south of IH 20 (near Altamesa/Dirks Road) and a two-lane rural highway section to the southern terminus, FM 1187. This initial phase of construction would include the acquisition of the ultimate ROW to allow for future widening to the ultimate six/four-lane section as warranted. South of IH 20 the two-lane rural highway section would serve as the interim facility until such time that funding becomes available to construct the ultimate four-lane tollroad section.

Federal guidelines have been put in place to discourage the selection of an alternative based on preservation of land (whether dedicated by local government, donated by individuals or acquired

through advanced or hardship acquisition) in an effort to maintain a sense of equal and non-biased representation for all citizens. In the Report of the Secretary of Transportation to the U.S. Congress on Preservation of Transportation Corridors, Issued pursuant to Section 1017(c), Public Law lot-240 submitted November 3, 1994 it states, "Any preservation initiative, either by police power or acquisition, must supplement or enhance the options available for providing an environmentally benign transportation facility." The report also makes clear that, "Not every area or project is a candidate for such a program. Effort would have to be made to ensure that NEPA concerns are appropriately addressed during the systems planning effort and maintained throughout the alignment selection process. Greater coordination with the public, the development community and the environmental interest groups would be encouraged. Protection of environmentally sensitive resources would be maintained."

Within this understanding, developers, city planners and transportation officials have continued to work cooperatively to preserve a corridor for the proposed facility in order to minimize, as much as possible, future relocations and/or neighborhood fragmentation. The recommended project has been included in various Fort Worth sector plans and land use maps since the City's endorsement of the route location in 1985. As early as July 1983, several development plats in the southern section of the project corridor (IH 20 to Altamesa/Dirks Road) were approved on the basis of the proposed alignments for extension of Bryant Irvin Road and SH 121.

The current alignment was developed in close cooperation with the City's planning department, resulting in a fairly restrictive undeveloped corridor suitable for tollroad use. The proximity of two major arterials, i.e., Hulen Street and Bryant Irvin Road, on either side of the study corridor, placed constraints on establishing alignment alternatives. South of Altamesa/Dirks Road, the alignment was located within the limited corridor available with the planned extensions of Bryant Irvin Road to the west and Granbury Road to the east.

The alternatives share a similar horizontal alignment and, therefore, the following alignment description is applicable to all five alternatives: The proposed SH 121 project would begin west of Summit Avenue at IH 30 with a tie-in to Forest Park Boulevard. It would proceed west between

Vickery Boulevard and the UPRR, crossing over the railroad near Hulen Street and over the Trinity River before proceeding south to the SH 183/IH 20 interchange. From this point the alignment would proceed south to its terminus in the vicinity of the intersection of FM 1187 and FM 1902. Exhibit 3.1 depicts the various alternatives on one map for comparison.

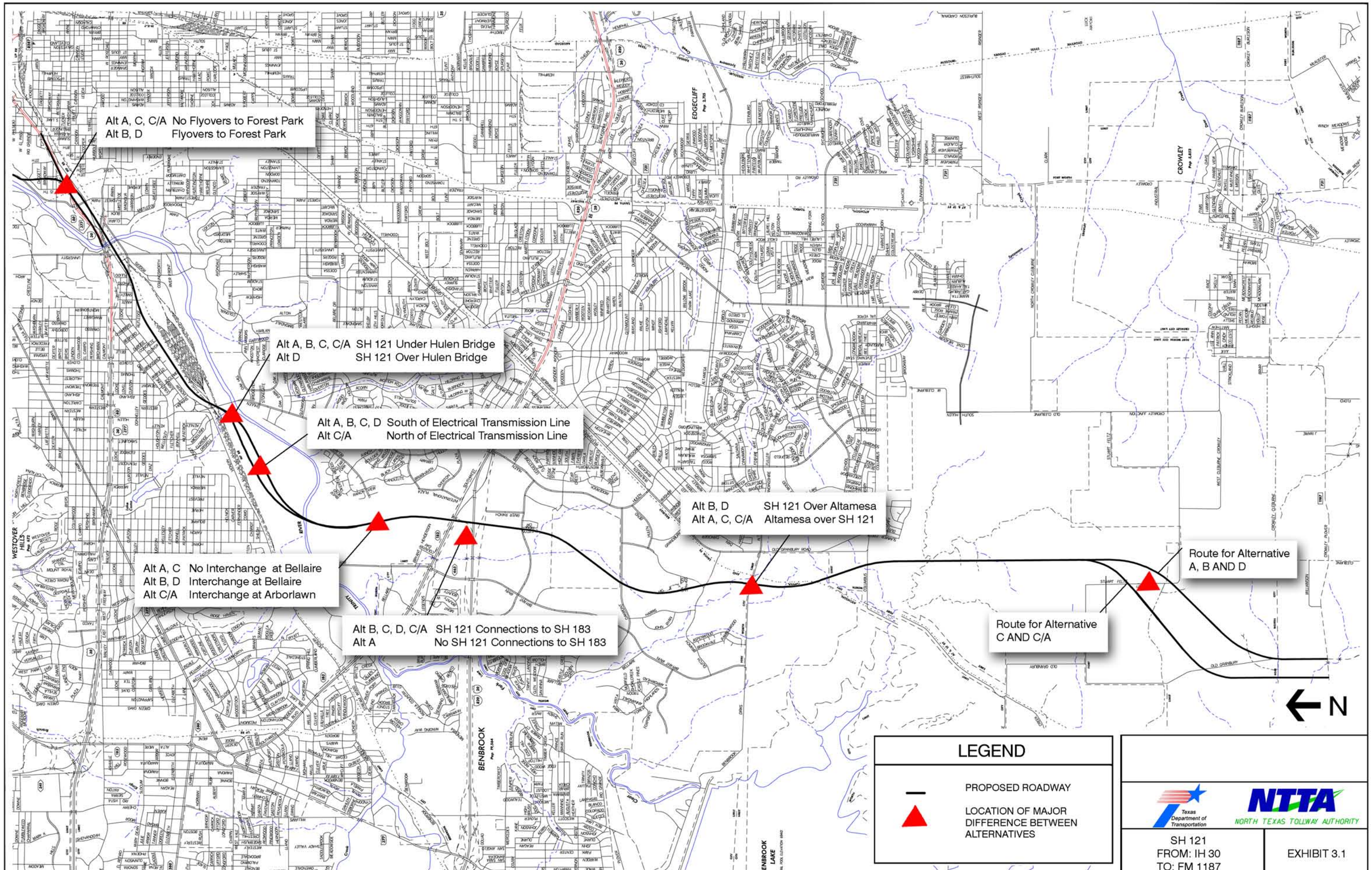
Although the Build alternatives generally share a similar horizontal alignment, plan concepts particular to each Build alternative determine the width of the typical sections as well as interchanges and grade separations between the SH 121 facility and the various existing roadways along the project corridor. As such, the following is a discussion of the five Build alternatives in terms of their typical sections and the interchanges that occur along the proposed alignment.

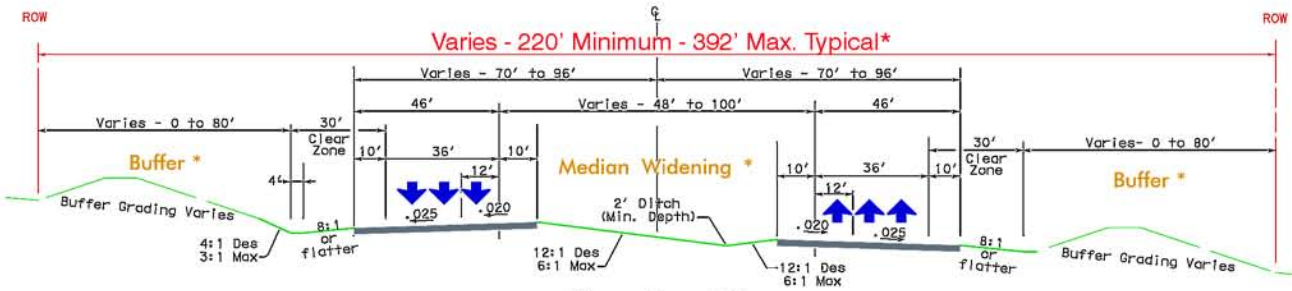
3.3.1. The Combination Alternative, Alternative C/A

Alternative C/A evolved from the City's desire to include the intent of the Alternative A interchange design at IH 30, to move the mainlanes and Stonegate Boulevard interchange north of the electrical transmission line and to maintain the PDT efforts where possible while avoiding ROW impacts to existing and ongoing development south of IH 20.

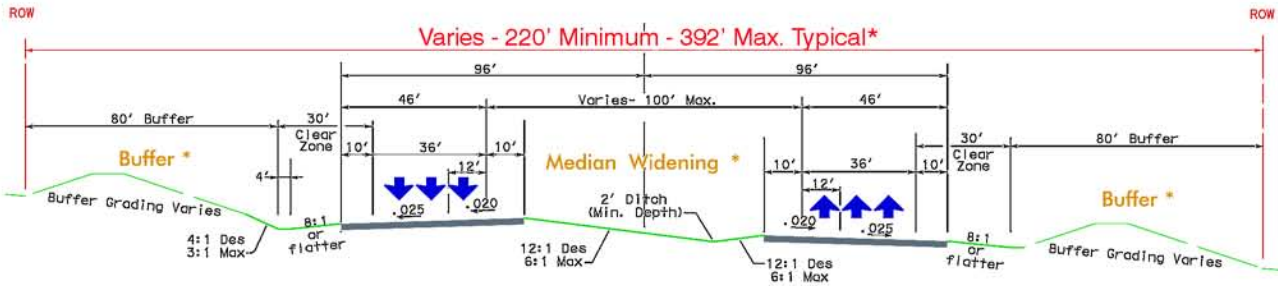
The typical section for the Alternative C/A would consist of two to three travel lanes in each direction divided by a median. The median would vary from 48 to 100 ft in width. The alternative would have ten-foot inside and outside shoulders. The minimum ROW for this alternative would be 220 ft with additional ROW needed at the interchanges to widen medians and buffers.

Typical Sections are depicted in Exhibit 3.2. Exhibit 3.3 through Exhibit 3.6 depicts the alignment of the alternative through the corridor.

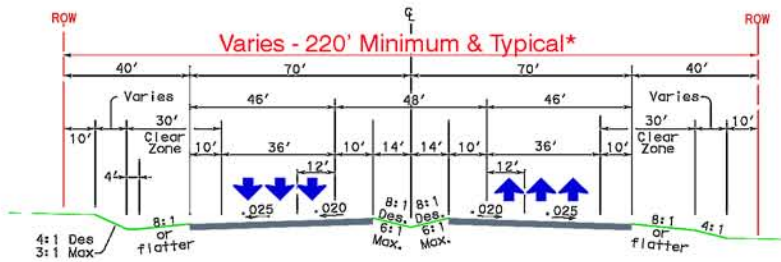

Alt A, C, C/A No Flyovers to Forest Park
Alt B, D Flyovers to Forest Park
Alt A, B, C, C/A SH 121 Under Hulen Bridge
Alt D SH 121 Over Hulen Bridge
Alt A, B, C, D South of Electrical Transmission Line
Alt C/A North of Electrical Transmission Line
Alt B, D SH 121 Over Altamesa
Alt A, C, C/A Altamesa over SH 121
Alt A, C No Interchange at Bellaire
Alt B, D Interchange at Bellaire
Alt C/A Interchange at Arborlawn
Alt B, C, D, C/A SH 121 Connections to SH 183
Alt A No SH 121 Connections to SH 183
Route for Alternative A, B AND D
Route for Alternative C AND C/A
N
LEGEND
PROPOSED ROADWAY
LOCATION OF MAJOR DIFFERENCE BETWEEN ALTERNATIVES
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 3.1



Alternative C/A
Typical Section
(Includes Median Widening and Buffers in Certain Locations
as prescribed by the City of Fort Worth's Preferred Alternative)



Alternatives A and C
Typical Section
(Includes Median Widening and Buffers in Certain Locations)



Alternatives B and D
Typical Section

*Note that maximum ROW dimensions given are for "typical" sections and do not reflect interchange effects.

Frontage Roads are included in some sections, mainly in the IH20 and IH30 interchanges. However, frontage roads are not "typical" on this project thus are not reflected in these typical sections.

TYPICAL SECTIONS

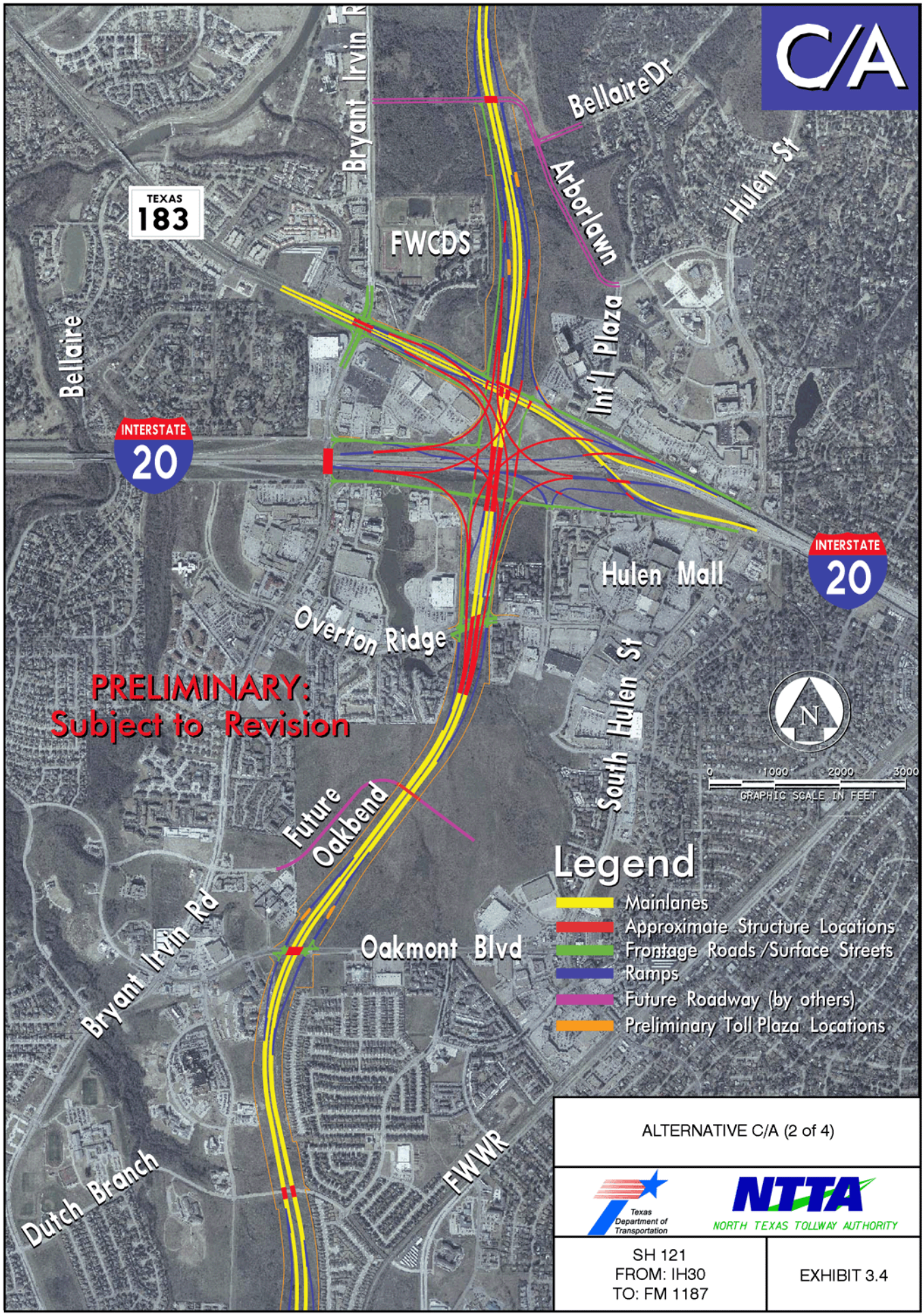
Texas Department of Transportation

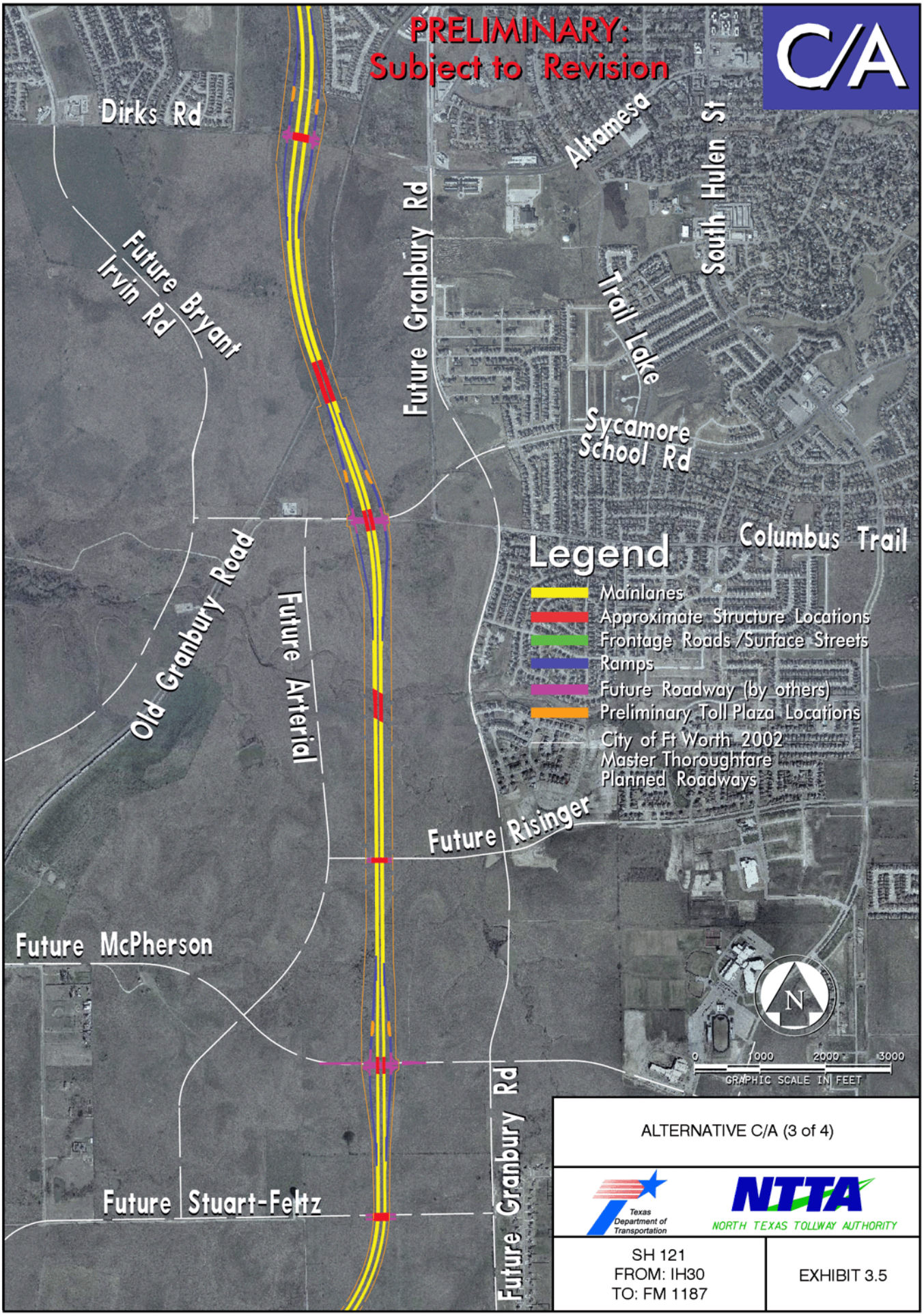
NTTA NORTH TEXAS TOLLWAY AUTHORITY

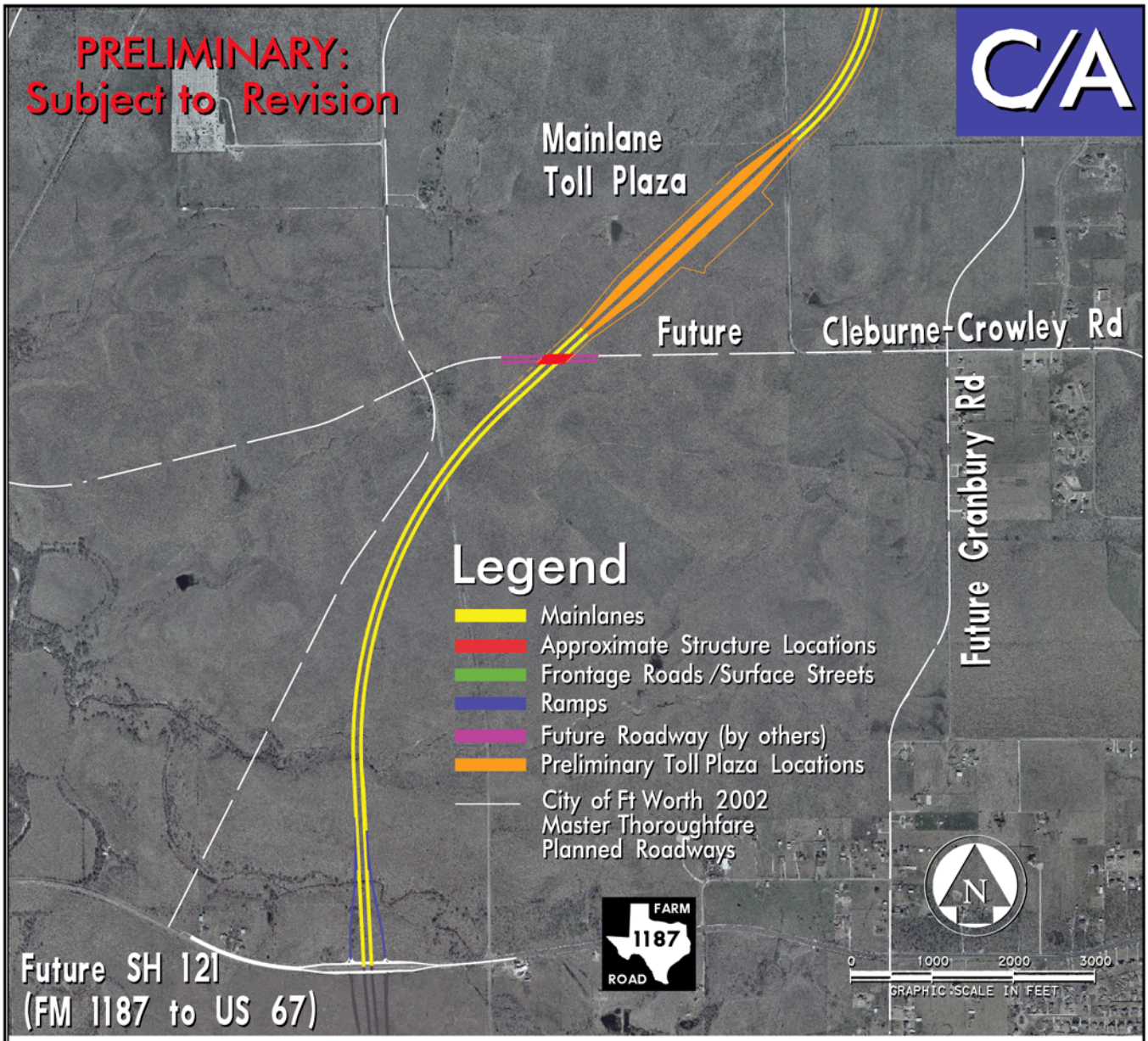
SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.2

C/A
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
Preliminary Toll Plaza Locations
Camp Bowie
Clover
Montgomery
Botanic Gardens
University Dr.
Trinity Park
Clear Fork Trinity River
Lancaster
7th
Summit
Pennsylvania
8th
Rosedale
Forest Park
FWWR
INTERSTATE 30
Vickery
Hulen St
Proposed Toll Plaza
UPRR
Fort Worth Zoo
Clear Fork Trinity River
Vickery
UPRR
Stonegate
TXU
Hulen St
TCU
University Dr.
Berry
Vickery
Riverpark
Bryant Irvin Rd
Bellaire Dr
PRELIMINARY:
Subject to Revision
0 1000 2000 3000
GRAPHIC SCALE IN FEET
ALTERNATIVE C/A (1 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 3.3


C/A
Bryant Irvin R
Bellaire Dr
Arborlawn
Hulen St
TEXAS
183
FWCDS
Bellaire
Int'l Plaza
INTERSTATE
20
INTERSTATE
20
Hulen Mall
Overton Ridge
PRELIMINARY:
Subject to Revision
South Hulen St
N
0 1000 2000 3000
GRAPHIC SCALE IN FEET
Future
Oakbend
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
Preliminary Toll Plaza Locations
Bryant Irvin Rd
Oakmont Blvd
Dutch Branch
FWWR
ALTERNATIVE C/A (2 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 3.4


PRELIMINARY:
Subject to Revision
C/A
Dirks Rd
Altamesa
South Hulen St
Future Granbury Rd
Future Bryant Irvin Rd
Trail Lake
Sycamore School Rd
Columbus Trail
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
Preliminary Toll Plaza Locations
City of Ft Worth 2002 Master Thoroughfare Planned Roadways
Old Granbury Road
Future Arterial
Future Risinger
Future McPherson
Future Stuart-Feltz
Future Granbury Rd
N
0 1000 2000 3000
GRAPHIC SCALE IN FEET
ALTERNATIVE C/A (3 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 3.5



ALTERNATIVE C/A (4 of 4)

Texas Department of Transportation

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.6

At IH 30, the Alternative C/A would tie into the downtown IH 30 improvements, including IH 30 and the connections to Macon Street, Cherry Street and Lancaster Avenue. This alternative would connect ramps from SH 121 with Forest Park Boulevard at a signalized intersection south of IH 30 and north of the UPRR. A half diamond interchange would serve Forest Park Boulevard with a ramp from eastbound IH 30 to Summit Avenue. A full diamond interchange is proposed at Summit Avenue and IH 30.

Access to Summit Avenue and Forest Park Boulevard in this alternative would be a split diamond with the ramps from and to the west at Forest Park Boulevard and ramps to and from the east at Summit Avenue, in addition to a ramp from westbound IH 30 to Forest Park Boulevard. IH 30 to the east would have direct access to and from SH 121.

Access from University Drive to northbound SH 121 and eastbound IH 30 would be provided. Traffic from Summit Avenue would be able to access westbound IH 30 and southbound SH 121 via separate ramps off of the frontage road near the St. Paul Lutheran Church. A ramp would be provided from the IH 30-to-SH 121 direct connection to University Drive, utilizing the existing Vickery Boulevard bridge, which would no longer be needed for eastbound traffic. A portion of this bridge is proposed to accommodate pedestrian/bicycle traffic from each side of the river.

Proceeding to the southwest adjacent to the UPRR, the tollroad would cross over the Clear Fork of the Trinity River and University Drive and under the Vickery Boulevard connections to Rosedale Street and the extended Montgomery Street. The mainlane toll plaza would be located between Montgomery Street and Hulen Street with the SH 121 alignment between Vickery Boulevard and the UPRR. A split diamond interchange would serve Montgomery Street and University Drive with access to Rosedale Street. Vickery Boulevard would continue to have access to Rosedale Street. Most of the improvements that would be acquired as part of the ROW acquisition process would occur between Summit Avenue and Hulen Street.

At Hulen Street, SH 121 would pass under the Hulen Street bridge and over the UPRR. The Hulen Street bridge would be rebuilt and widened as part of this project at a slightly higher profile. Stonegate Boulevard is proposed to be extended to the west and would cross under SH 121 with a diamond interchange north of the electrical transmission line, but south of the UPRR. Stonegate Boulevard would serve as access to and from Hulen Street.

The alignment would curve to the south at this location and would cross over the Clear Fork of the Trinity River. This river crossing would span as much of the river as possible with proper clearances for the existing bike trail and maintenance road. It also would allow for future roads on each side of the river. The median on SH 121 would be widened in this area and 80-foot buffers outside the clear zone are included on each side of SH 121.

SH 121 then would cross under the future Arborlawn Drive with a diamond interchange. A frontage road would run south from Arborlawn Drive past the Fort Worth Country Day School, to Overton Ridge Boulevard. The widened median would end near the Arborlawn Drive extension, but the buffers would continue where possible.

A fully directional interchange with IH 20 is planned, including direct connections from SH 121 on the south to SH 183 to the west. SH 121 would cross under the existing SH 183 frontage road and over a lowered SH 183, then over existing IH 20 and the IH 20 eastbound frontage road. A diamond interchange would be included at Overton Ridge Boulevard. Overton Ridge would not be lowered or reconstructed. A frontage road would run northbound from Overton Ridge to the existing SH 183 frontage road. The frontage road would not continue north from the intersection with the SH 183 westbound frontage road.

South of Overton Ridge Boulevard the median would be widened where feasible. Where possible, the landscape buffers would be included except where they would displace current development, such as apartments and homes. At Dutch Branch Road, the existing roadway would not be lowered or reconstructed.

Alternative C/A would cross under the future Oakbend Trail and existing Oakmont Boulevard as well as under a future reconstructed Altamesa/Dirks Road. The tollroad would pass over the existing Dutch Branch Road. A diamond interchange is planned for Oakmont Boulevard with a full diamond interchange at Altamesa/Dirks Road. Ramp toll plazas would be included at the interchanges south of Hulen Street, with the exception of the IH 20 interchange.

South of Altamesa/Dirks Road, SH 121 would cross over the Fort Worth and Western Railroad (FWWRR) and the future Sycamore School Road with a diamond interchange at Sycamore School Road. From this point, SH 121 would continue south and pass under the future Risinger Road and over future McPherson Road with an interchange at McPherson Road.

It then would cross under future roads at Stewart-Feltz Road and Cleburne-Crowley Road, with a mainlane toll plaza between Cleburne-Crowley Road and FM 1187. After crossing Stewart-Feltz Road, SH 121 would curve to the southwest in accordance with the *2002 Fort Worth Master Thoroughfare Pla*n. This curve to the southwest would be the same as Alternative C, but would differ from Alternatives A, B and D.

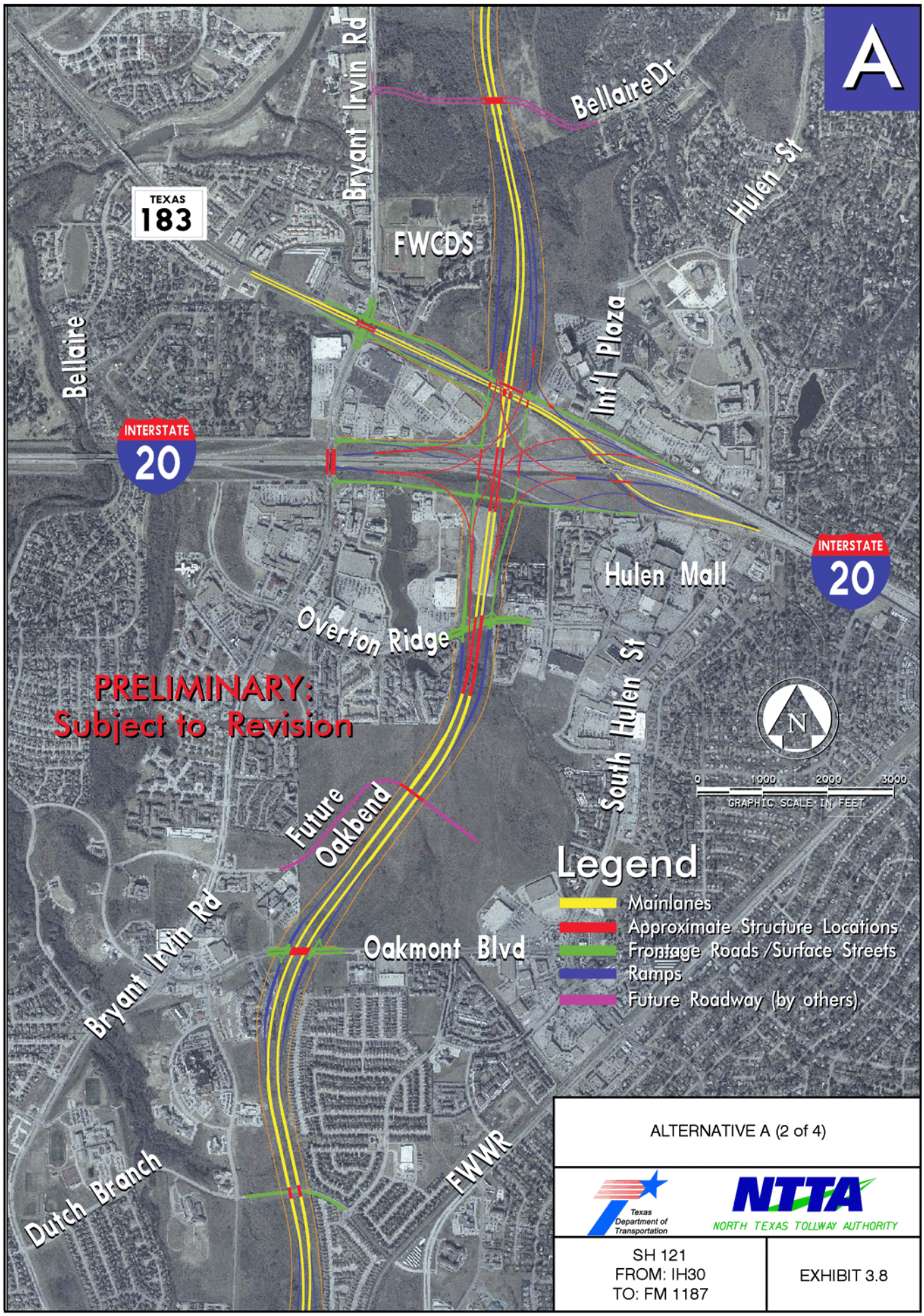
3.3.2. Alternative A

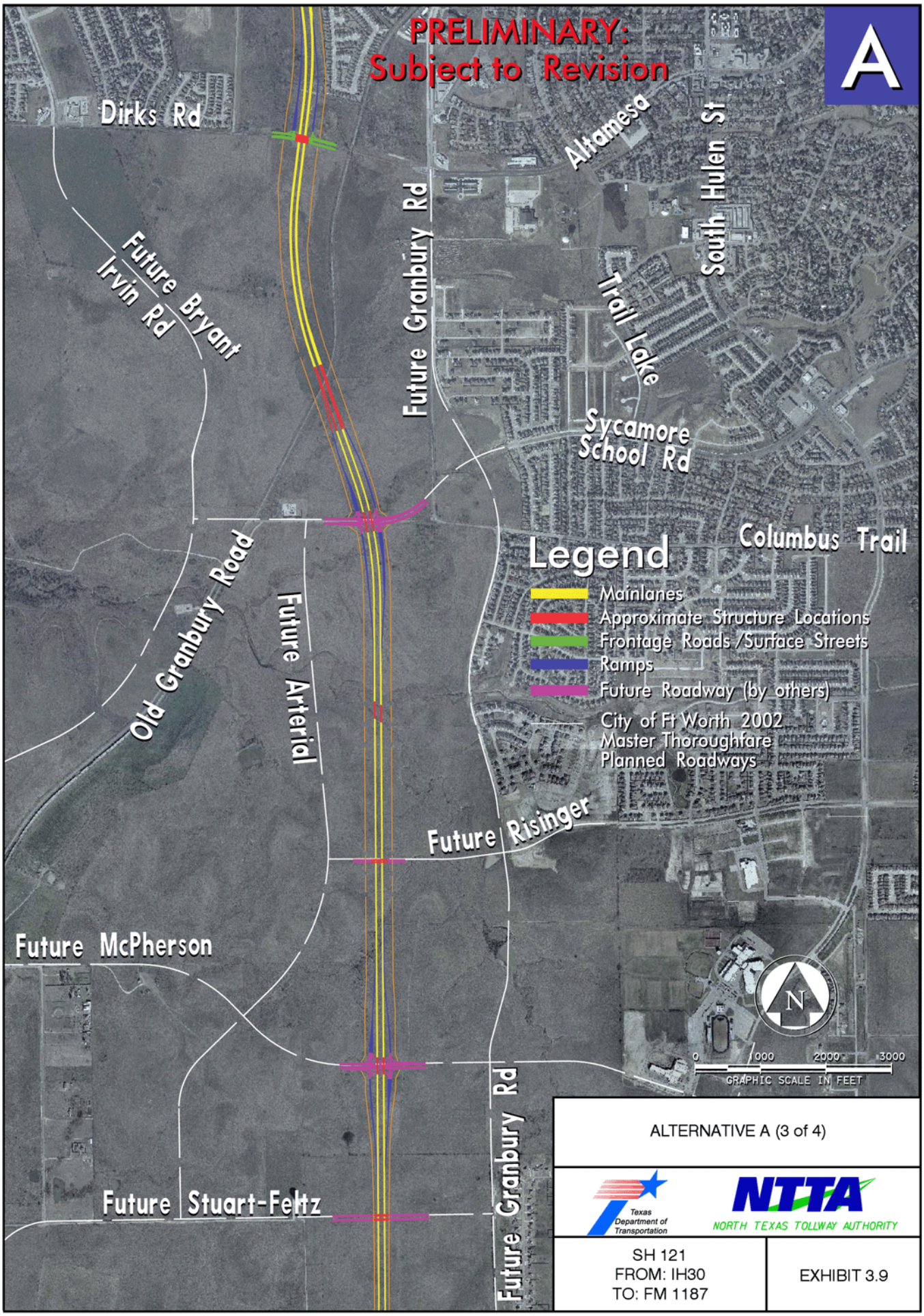
The typical section for Alternative A would consist of two to three travel lanes in each direction divided by a median. The median would vary from 48 to 100 ft in width. The alternative would have ten-foot inside and outside shoulders. The minimum ROW for this alternative would be 220 ft with additional ROW needed at the interchanges and for widened medians and buffers.

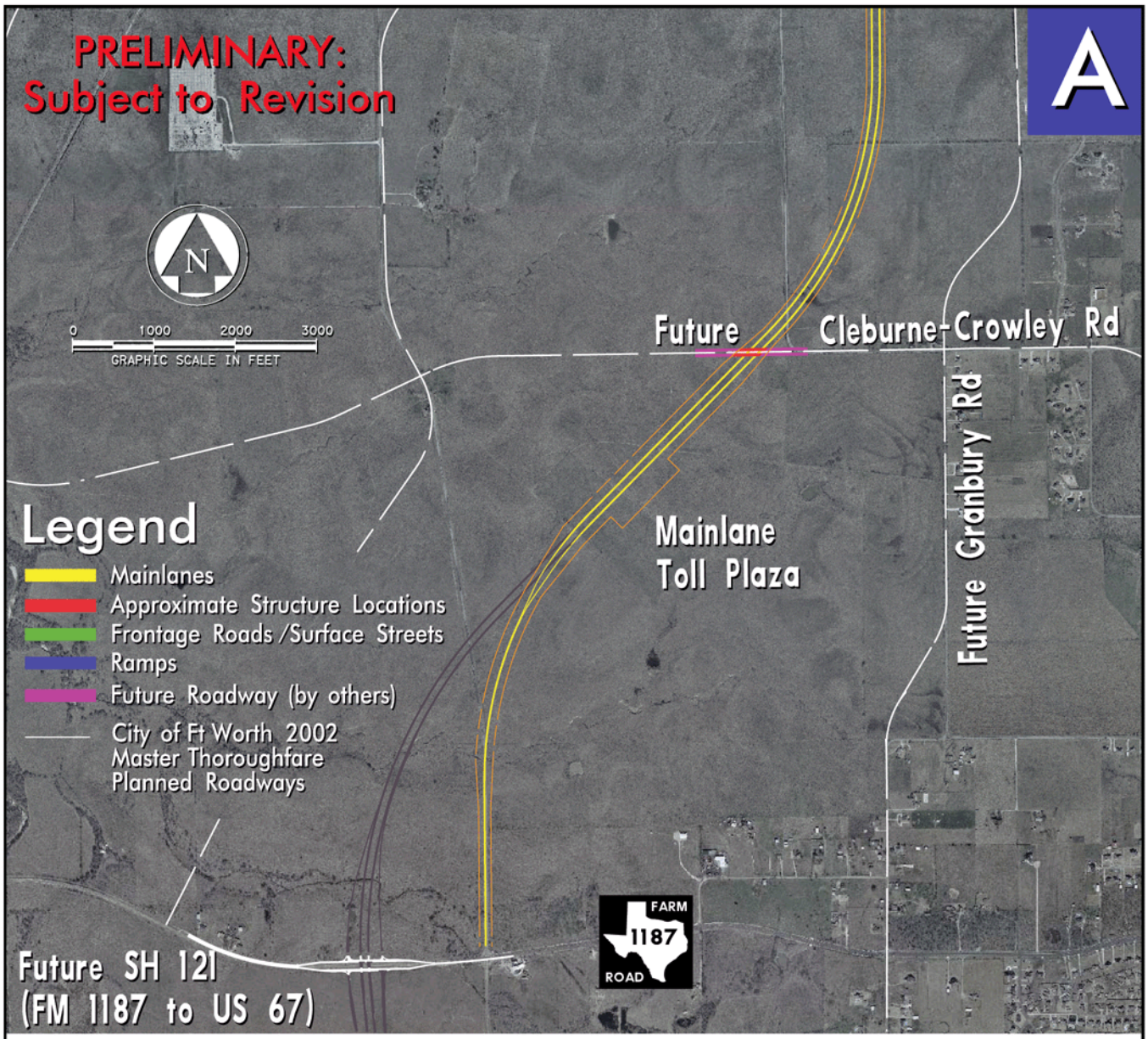
Exhibit 3.2Exhibit 3.2 depicts the typical section for this alignment and Exhibit 3.7 through Exhibit 3.10 depicts the alignment of the alternative through the corridor.

Alternative A would tie to the downtown IH 30 improvements, including IH 30, Summit Avenue and the connections to Macon Street, Cherry Street and Lancaster Avenue. This Alternative, developed

A
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
Camp Bowie
Clover
Montgomery
Botanic Gardens
University Dr.
Trinity Park
Clear Fork Trinity River
Lancaster
7th
Summit
INTERSTATE 30
Pennsylvania
8th
Rosedale
Forest Park
FWWR
Fort Worth Zoo
Vickery
Proposed Toll Plaza
UPRR
Hulen St
Clear Fork Trinity River
Vickery
UPRR
TXU
Stonegate
Hulen St
TCU
University Dr.
Berry
Bellaire Dr
Riverpark
Bryant Irvin Rd
Vickery
PRELIMINARY:
Subject to Revision
0 1000 2000 3000
GRAPHIC SCALE IN FEET
N
ALTERNATIVE A (1 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 3.7


A
Bryant Irvin Rd
Bellaire Dr
Hulen St
TEXAS
183
FWCDS
Bellaire
Int'l Plaza
INTERSTATE
20
INTERSTATE
20
Hulen Mall
Overton Ridge
South Hulen St
PRELIMINARY:
Subject to Revision
N
0 1000 2000 3000
GRAPHIC SCALE IN FEET
Future
Oakbend
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
Bryant Irvin Rd
Oakmont Blvd
Dutch Branch
FWWR
ALTERNATIVE A (2 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 3.8


PRELIMINARY:
Subject to Revision
A
Dirks Rd
Altamesa
South Hulen St
Future Granbury Rd
Future Bryant
Irvin Rd
Trail Lake
Sycamore
School Rd
Columbus Trail
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
City of Ft Worth 2002
Master Thoroughfare
Planned Roadways
Old Granbury Road
Future Arterial
Future Risinger
Future McPherson
Future Stuart-Feltz
Future Granbury Rd
N
0
1000
2000
3000
GRAPHIC SCALE IN FEET
ALTERNATIVE A (3 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 3.9



ALTERNATIVE A (4 of 4)

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.10

by the PDT, would relocate the existing Forest Park Boulevard to the west in the area north of IH 30 and connects the relocated Forest Park Boulevard with ramps that would traverse under IH 30 adjacent to the FWWRR. In addition, a weave section on the IH 30 westbound frontage road would be provided to allow westbound traffic from Summit Avenue and Macon Street to access southbound SH 121, westbound IH 30 and Forest Park Boulevard. SH 121 would pass under the existing connections between IH 30 and Rosedale Street.

Access to Summit Avenue and Forest Park Boulevard in this alternative would be by a split diamond interchange with the ramps from and to the west at Forest Park Boulevard and ramps to and from the east at Summit Avenue. IH 30 to the east would have direct access to and from SH 121. Access from University Drive to northbound SH 121 and eastbound IH 30 would also be provided.

Proceeding to the southwest adjacent to the UPRR, the tollroad would cross over the Clear Fork of the Trinity River and University Drive and under the Vickery Boulevard connections to Rosedale Street and the extended Montgomery Street. The mainlane toll plaza would be located between Montgomery Street and Hulen Street with the SH 121 alignment between Vickery Boulevard and the UPRR. A split diamond interchange would serve Montgomery Street and University Drive with connections to Rosedale Street. Vickery Boulevard would continue to have access to Rosedale Street. Most of the improvements would be acquired as part of the ROW acquisition process between Summit Avenue and Hulen Street and between Overton Ridge Boulevard and Altamesa/Dirks Road.

At Hulen Street, SH 121 would pass under the Hulen Street bridge and over the UPRR. The Hulen Street bridge would be rebuilt and widened as part of this project at a slightly higher profile. The alignment continues southwest parallel to the electric transmission line and the UPRR for approximately one-half mile before curving to the south. Stonegate Boulevard is currently proposed to be extended to the west by the City. It would cross over SH 121 with a diamond interchange. Stonegate Boulevard would serve as access between Hulen Street and SH 121. The alignment would then cross over the Clear Fork of the Trinity River. This river crossing would span as much of the

river as possible with proper clearances for the existing bike trail and maintenance road. The crossing would also allow for future roads on each side of the river.

Alternative A would cross under the future extension of Bellaire Drive with no interchange with Bellaire Drive. The mainlane grade would be near the existing ground level. The median on SH 121 would be widened in this area and 80-foot buffers outside the clear zone are included on each side of SH 121.

On SH 121, from SH 183 to Overton Ridge Boulevard, a fully directional interchange is planned with IH 20 and frontage roads with no direct connections to SH 183. SH 121 would cross under the westbound SH 183 frontage road and over a lowered SH 183, IH 20, the eastbound IH 20 frontage road and Overton Ridge Boulevard. A diamond interchange would be provided for the SH 183 frontage road and Overton Ridge Boulevard. For this alternative, Overton Ridge Boulevard would be reconstructed eight feet lower than existing.

South of Overton Ridge Boulevard the median would be widened and buffers would be included south to Altamesa/Dirks Road. The buffers would result in impacts to the apartments at Overton Ridge Boulevard, homes on the east side of SH 121 between Oakmont Boulevard and Altamesa/Dirks Road and adjacent developments, including an apartment complex, on the west side of SH 121.

Alternative A then would cross under the future Oakbend Trail and under existing Oakmont Boulevard. The tollroad would pass over Dutch Branch Road, with Dutch Branch Road reconstructed eight feet lower. A diamond interchange is planned for Oakmont Boulevard with a diamond at Altamesa/Dirks Road. Ramp toll plazas would be included at the interchanges south of Hulen Street, with the exception of the IH 20 interchange.

South of Altamesa/Dirks Road, SH 121 would cross over the FWWRR and the future Sycamore School Road with a diamond interchange at Sycamore School Road. From this point, SH 121 would continue south and pass under the future Risinger Road and over future McPherson Road with an

interchange at McPherson Road. It would then cross under future roads at Stewart-Feltz Road and Cleburne-Crowley Road, with a mainlane toll plaza proposed between Cleburne-Crowley Road and FM 1187, if needed in the sequence of construction south of FM 1187.

3.3.3. Alternative B

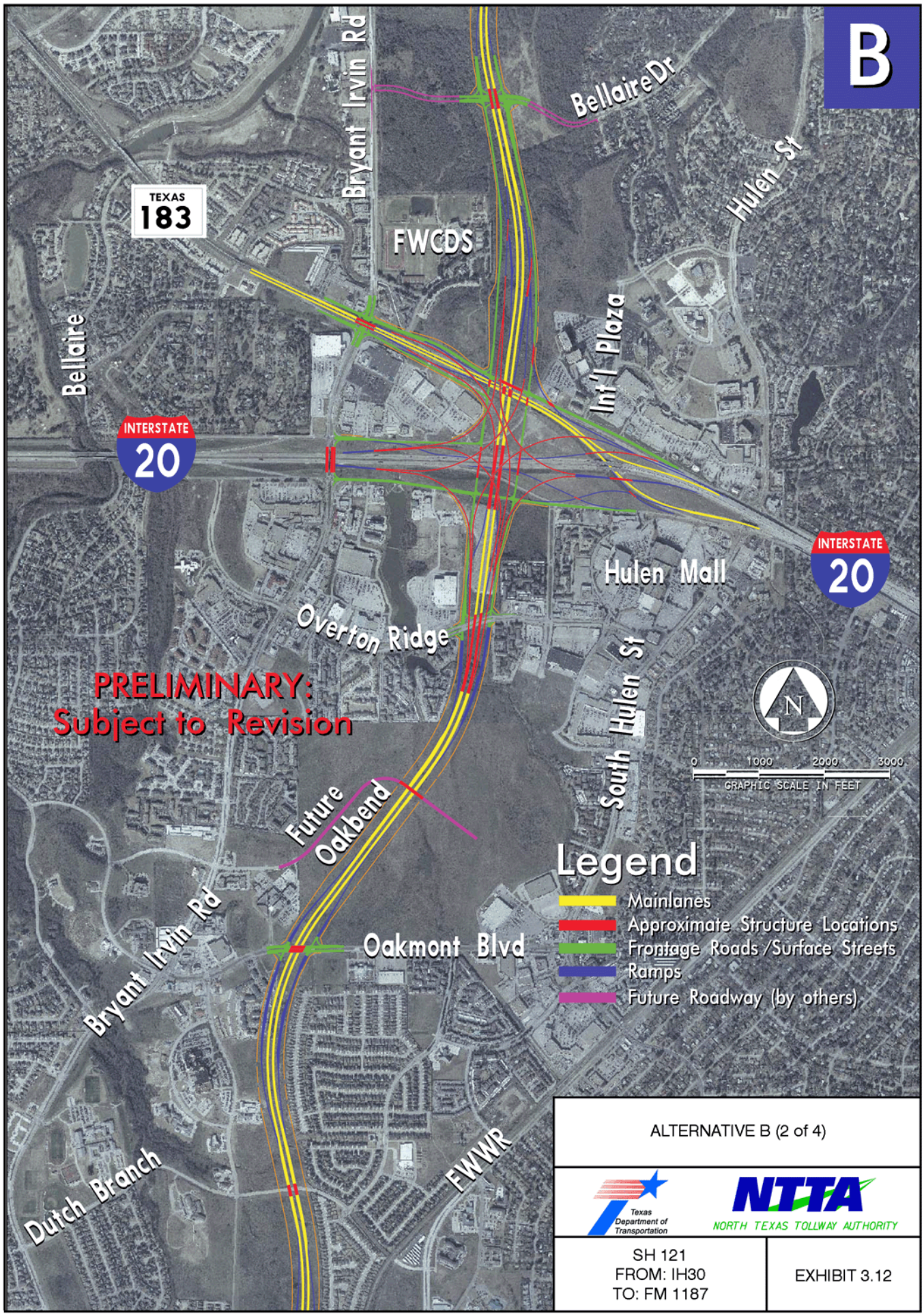
The typical section for Alternative B of SH 121 would consist of two to three travel lanes in each direction divided by a median. The median would vary from 48 to 72 ft in width. The alternative would have ten-foot inside and outside shoulders. The minimum ROW for this alternative would be 220 ft with additional ROW needed at the interchanges.

Exhibit 3.2 depicts the typical section for this alignment and Exhibit 3.11 through Exhibit 3.14 depict the alignment of the alternative through the corridor.

Alternative B would tie to the downtown IH 30 improvements, including IH 30, Summit Avenue and the connections to Macon Street, Cherry Street and Lancaster Avenue. This Alternative, developed in cooperation with the City's CAC, would allow access to Summit Avenue and Forest Park Boulevard by a split diamond interchange with the ramps from and to the west at Forest Park Boulevard and ramps to and from the east at Summit Avenue. IH 30 would have direct access to and from SH 121. The connection between SH 121 and Forest Park Boulevard would consist of one-lane flyover ramps over IH 30 that tie to Forest Park Boulevard near the Lancaster Avenue bridge. For this alternative, Forest Park Boulevard would not be relocated. SH 121 would pass under the existing connections between IH 30 and Rosedale Street. Access from University Drive to northbound SH 121 and eastbound IH 30 would also be provided.

Proceeding to the west or south, adjacent to the UPRR, the tollroad would cross over the Clear Fork of the Trinity River and University Drive and under the Vickery Boulevard connections to Rosedale Street and the extended Montgomery Street. The mainlane toll plaza would be located between

B
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
Camp Bowie
Clover
Montgomery
Botanic Gardens
University Dr.
Trinity Park
Clear Fork Trinity River
Lancaster
7th
Summit
INTERSTATE 30
Pennsylvania
8th
Rosedale
Forest Park
FWWR
Fort Worth Zoo
Vickery
Proposed Toll Plaza
UPRR
Hulen St
Clear Fork Trinity River
Vickery
UPRR
TXU
Stonegate
Hulen St
TCU
University Dr.
Berry
Riverpark
Vickery
Bellaire Dr
PRELIMINARY:
Subject to Revision
GRAPHIC SCALE IN FEET
0 1000 2000 3000
N
ALTERNATIVE B (1 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 3.11



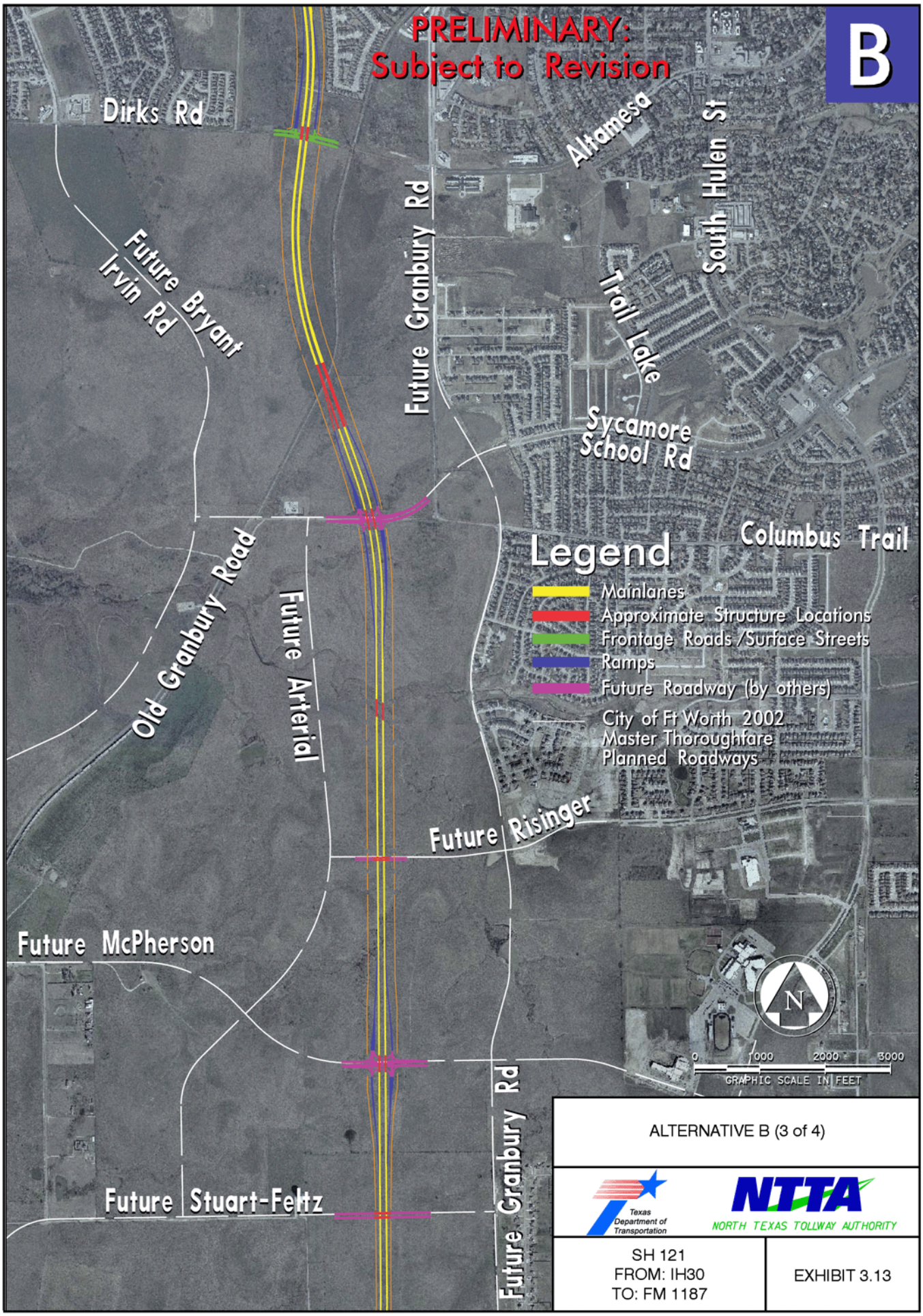
ALTERNATIVE B (2 of 4)

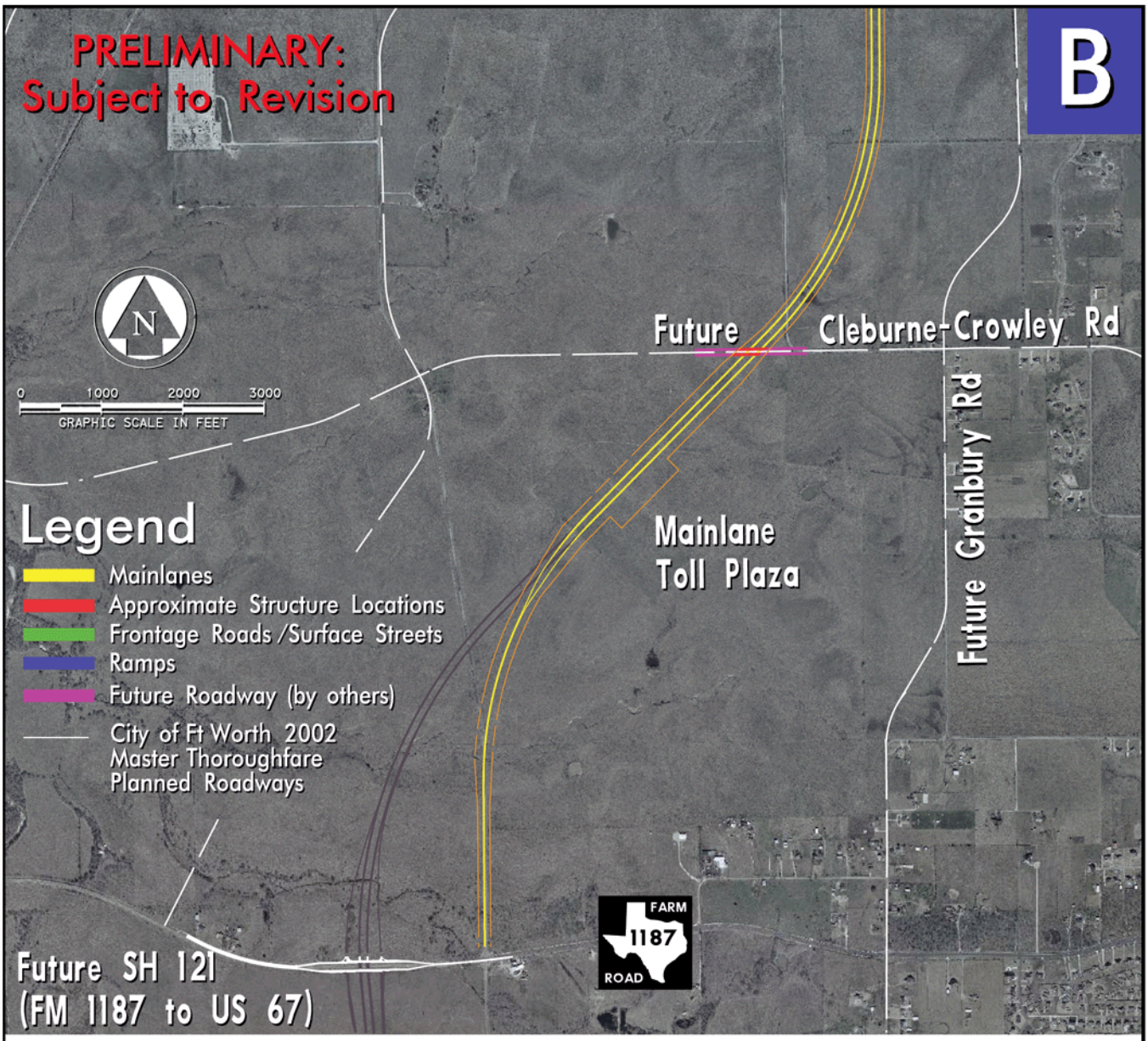
Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.12


PRELIMINARY:
Subject to Revision
B
Dirks Rd
Altamesa
South Hulen St
Future Granbury Rd
Future Bryant Irvin Rd
Trail Lake
Sycamore School Rd
Columbus Trail
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
City of Ft Worth 2002 Master Thoroughfare Planned Roadways
Old Granbury Road
Future Arterial
Future Risinger
Future McPherson
Future Stuart-Feltz
Future Granbury Rd
N
0
1000
2000
3000
GRAPHIC SCALE IN FEET
ALTERNATIVE B (3 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 3.13



ALTERNATIVE B (4 of 4)

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.14

Montgomery Street and Hulen Street with the SH 121 alignment between Vickery Boulevard and the UPRR. A diamond interchange would serve Montgomery Street and University Drive with access to Rosedale Street. Vickery Boulevard would continue to have access to Rosedale Street. Most of the improvements that would be acquired as part of the ROW acquisition process would occur between Summit Avenue and Hulen Street. At Hulen Street, SH 121 would pass under the Hulen Street bridge and over the UPRR. The Hulen Street bridge would be rebuilt and widened as part of this project at a slightly higher profile. Stonegate Boulevard would be extended to the west at-grade, with SH 121 over. The diamond interchange at the Stonegate Boulevard extension would serve as access to and from Hulen Street and SH 121.

The alignment would curve to the south at this point, crossing over the Clear Fork of the Trinity River. This river crossing is planned to span as much of the river as possible with proper clearances for the existing bike trail and maintenance road. It also would allow for future roads on each side of the river. SH 121 then would cross over the future extension of Bellaire Drive with a diamond interchange and with frontage roads from Bellaire Drive to SH 183.

Alternative B would cross under the westbound SH 183 frontage road and over SH 183, IH 20, the eastbound IH 20 frontage road and Overton Ridge Boulevard. At IH 20, direct connectors would be included for all the movements of IH 20 as well as direct connectors between the south and the west on SH 183. A diamond interchange would be included at Overton Ridge Boulevard. For this alternative, Overton Ridge Boulevard would not be lowered or reconstructed.

Alternative B then would cross under the future Oakbend Trail and under existing Oakmont Boulevard. The tollroad would pass over Dutch Branch Road and Altamesa/Dirks Road. A diamond interchange is planned for Oakmont Boulevard with a diamond at Altamesa/Dirks Road. Ramp toll plazas would be included at the interchanges south of Hulen Street, with the exception of the IH 20 interchange. At Dutch Branch Road, the existing roadway would not be lowered or reconstructed.

3.3.4. Alternative C

The typical section for Alternative C would consist of two to three travel lanes in each direction divided by a median. The median would vary from 48 to 100 ft in width. The alternative would have ten-foot inside and outside shoulders. The minimum ROW for this alternative would be 220 ft with additional ROW needed at the interchanges and for widened medians and buffers.

Exhibit 3.2 depicts the typical section for this alignment and Exhibit 3.15 through Exhibit 3.18 depict the alignment of the alternative through the corridor.

At IH 30, Alternative C would tie to the downtown IH 30 improvements, including IH 30 and the connections to Macon Street, Cherry Street and Lancaster Avenue. This Alternative, developed with the purpose to maintain the PDT efforts reflected in Alternative A with reduced ROW impacts, would connect ramps from SH 121 with Forest Park Boulevard at a signalized intersection south of IH 30 and north of the UPRR. For this alternative, Forest Park Boulevard would not be relocated. SH 121 would pass under the existing connections between IH 30 and Rosedale Street.

Access to Summit Avenue and Forest Park Boulevard in this alternative would be a split diamond with the ramps from and to the west at Forest Park Boulevard and ramps to and from the east at Summit Avenue, in addition to a ramp from westbound IH 30 to Forest Park Boulevard. IH 30 to the east would have direct access to and from SH 121.

Access from University Drive to northbound SH 121 and eastbound IH 30 would be provided. Traffic from Summit Avenue would be able to access westbound IH 30 and southbound SH 121 via stacked ramps near the St. Paul Lutheran Church. The stacked ramps would eliminate the weave section on the westbound frontage road. A ramp would be provided from the IH 30-to-SH 121 direct connection to University Drive, utilizing the existing Vickery Boulevard bridge, which would no longer be needed for eastbound traffic. A portion of this bridge is proposed to accommodate two-way pedestrian/bicycle traffic from each side of the river.

C
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
INTERSTATE 30
INTERSTATE 30
7th
Lancaster
Summit
Trinity Park
Clear Fork Trinity River
University Dr.
Pennsylvania
Botanic Gardens
Clover
Montgomery
8th
Rosedale
Forest Park
FWWR
Vickery
Hulen St
Proposed Toll Plaza
UPRR
Fort Worth Zoo
Clear Fork Trinity River
Vickery
UPRR
Hulen St
University Dr.
TCU
TXU
Stonegate
Riverpark
Bryant Irvin Rd
Vickery
Berry
Bellaire Dr
PRELIMINARY:
Subject to Revision
0 1000 2000 3000
GRAPHIC SCALE IN FEET
N
ALTERNATIVE C (1 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 3.15

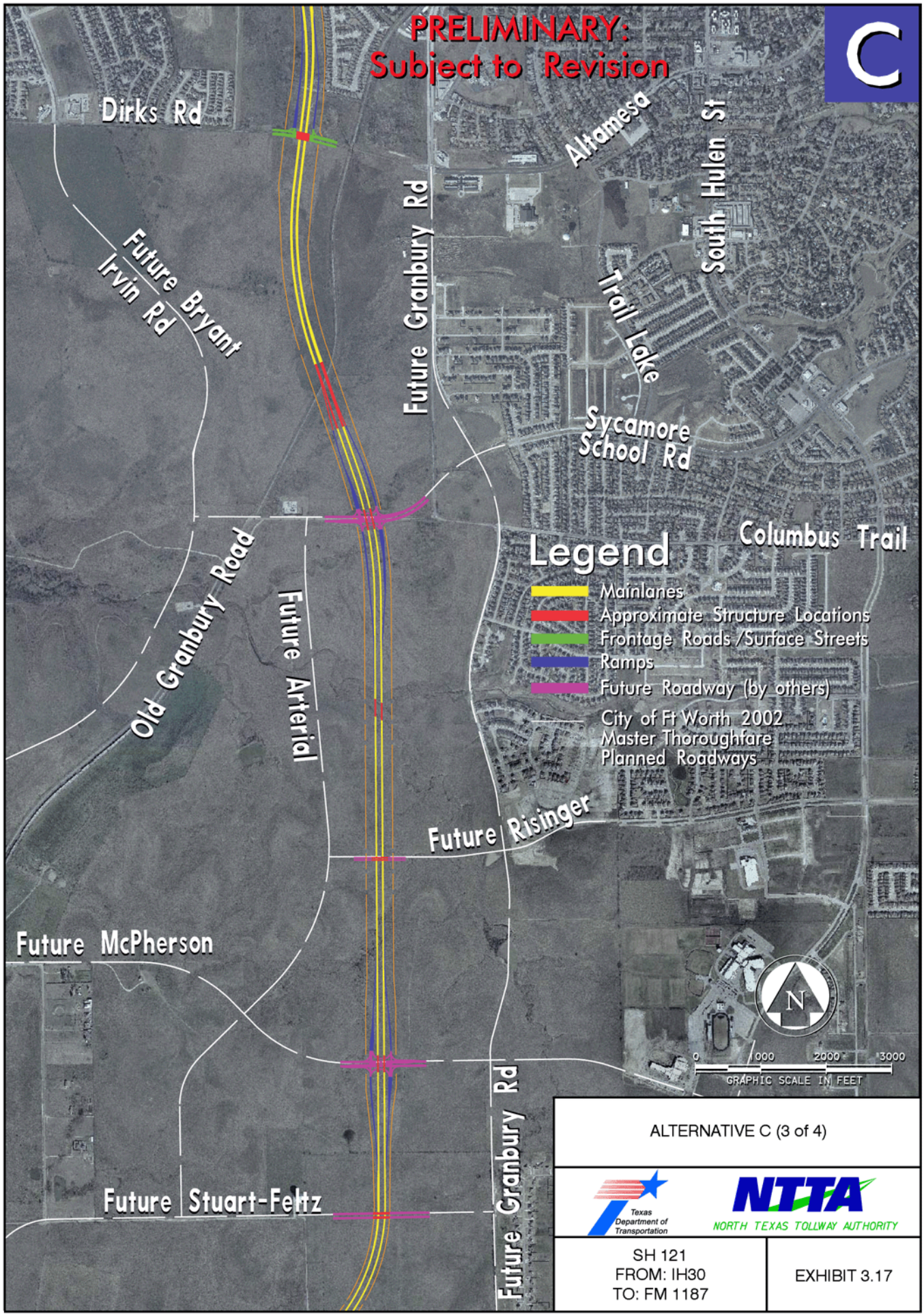
ALTERNATIVE C (2 of 4)

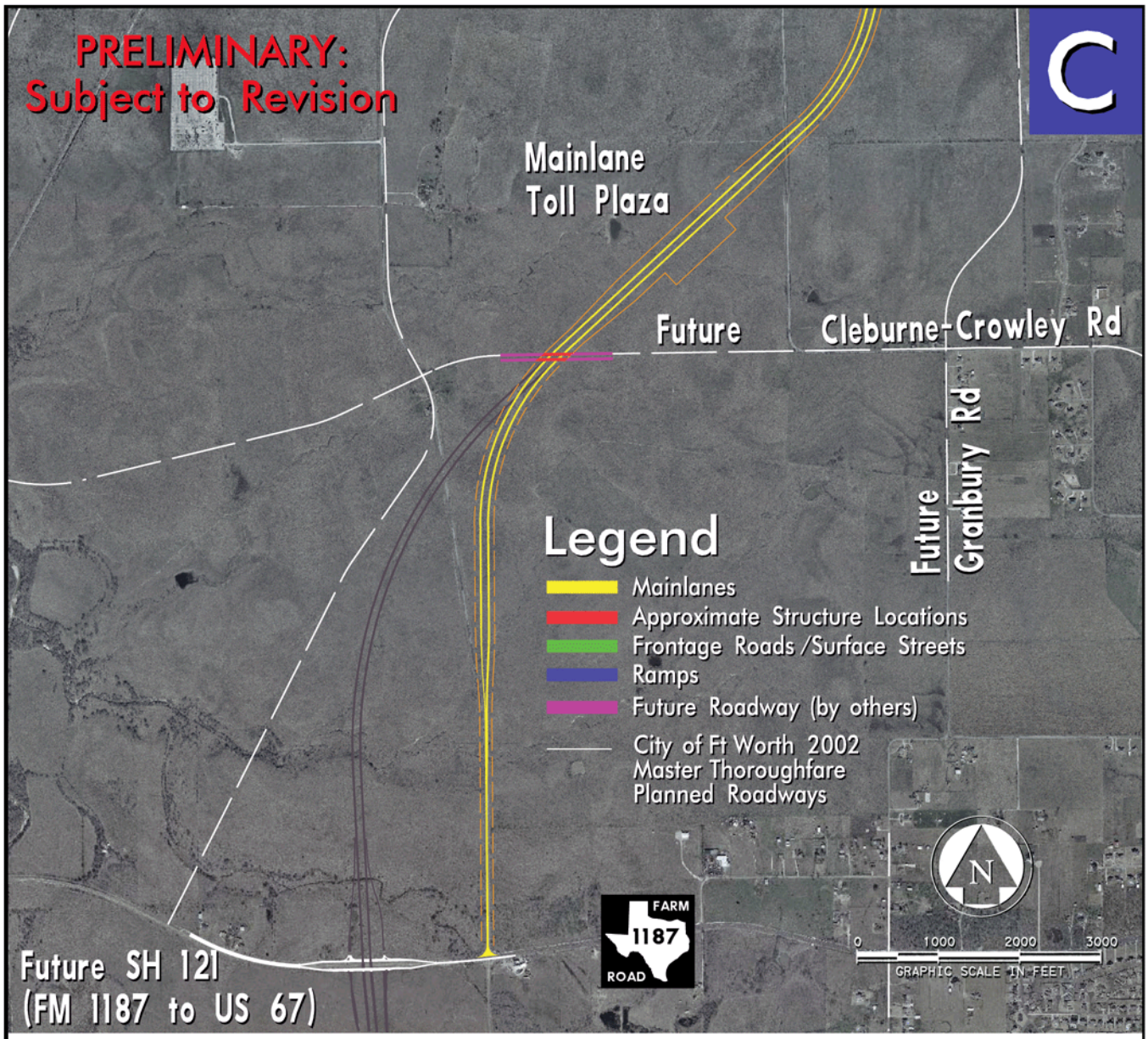
Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.16


PRELIMINARY:
Subject to Revision
C
Dirks Rd
Altamesa
South Hulen St
Future Granbury Rd
Future Bryant Irvin Rd
Trail Lake
Sycamore School Rd
Columbus Trail
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
City of Ft Worth 2002 Master Thoroughfare Planned Roadways
Old Granbury Road
Future Arterial
Future Risinger
Future McPherson
Future Stuart-Feltz
Future Granbury Rd
N
0 1000 2000 3000
GRAPHIC SCALE IN FEET
ALTERNATIVE C (3 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 3.17



ALTERNATIVE C (4 of 4)

Texas Department of Transportation

NTTA
NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.18

Proceeding to the southwest adjacent to the UPRR, the tollroad would cross over the Clear Fork of the Trinity River and University Drive and under the Vickery Boulevard connections to Rosedale Street and the extended Montgomery Street. The mainlane toll plaza would be located between Montgomery Street and Hulen Street with the SH 121 alignment between Vickery Boulevard and the UPRR. A diamond would serve Montgomery Street and University Drive with access to Rosedale Street. Vickery Boulevard would continue to have access to Rosedale Street. Most of the improvements that would be acquired as part of the ROW acquisition process would occur between Summit Avenue and Hulen Street.

At Hulen Street, SH 121 would pass under the Hulen Street bridge and over the UPRR. The Hulen Street bridge would be rebuilt and widened as part of this project at a slightly higher profile. Stonegate Boulevard is proposed to be extended to the west and would cross over SH 121 with a diamond interchange. Stonegate Boulevard would serve as access to and from Hulen Street.

The alignment would curve to the south at this location and would cross over the Clear Fork of the Trinity River. This river crossing would span as much of the river as possible with proper clearances for the existing bike trail and maintenance road. It also would allow for future roads on each side of the river.

Alternative C then would cross under the future extension of Bellaire Drive with no interchange with Bellaire Drive. The median on SH 121 would be widened in this area and 80 ft buffers outside the clear zone are included on each side of SH 121.

At the interchange with IH 20 and frontage roads on SH 121 from SH 183 to Overton Ridge Boulevard, a fully directional interchange is planned for IH 20, including direct connections to SH 183. SH 121 would cross under the westbound SH 183 frontage road and over SH 183, IH 20, the eastbound IH 20 frontage road and Overton Ridge Boulevard. A full diamond interchange would be included at Overton Ridge Boulevard. Overton Ridge Boulevard would not be lowered or reconstructed.

South of Overton Ridge Boulevard the median would be widened where feasible. Where possible, the landscape buffers would be included except where they would displace current development, such as apartments and homes. At Dutch Branch Road, the existing roadway would not be lowered or reconstructed.

SH 121 would cross under the future Oakbend Trail and existing Oakmont Boulevard as well as under a future reconstructed Altamesa/Dirks Road. The tollroad would pass over the existing Dutch Branch Road. A diamond interchange is planned for Oakmont Boulevard with a half diamond interchange at Altamesa/Dirks Road. Ramp toll plazas would be included at the interchanges south of Hulen Street, with the exception of the IH 20 interchange.

South of Altamesa/Dirks Road, SH 121 would cross over the FWWRR and the future Sycamore School Road with a diamond interchange at Sycamore School Road. From this point, SH 121 would continue south and pass under the future Risinger Road and over future McPherson Road with an interchange at McPherson Road.

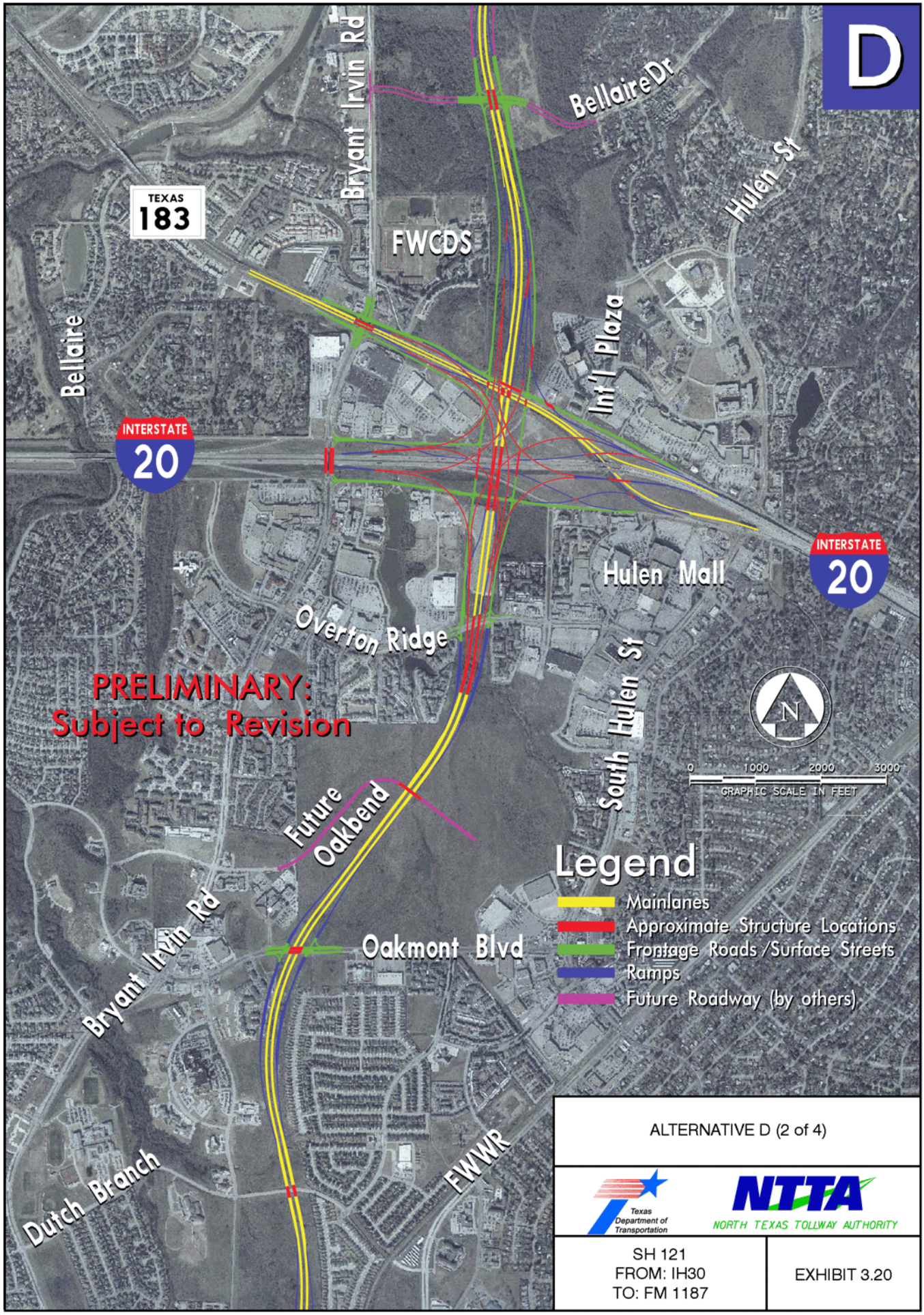
It then would cross under future roads at Stewart-Feltz Road and Cleburne-Crowley Road, with a mainlane toll plaza between Cleburne-Crowley Road and FM 1187. After crossing Stewart-Feltz Road, SH 121 would curve to the southwest in accordance with the *2002 Fort Worth Master Thoroughfare Plan*. This alignment would differ from Alternatives A, B and D.

3.3.5. Alternative D

The typical section for Alternative D of SH 121 would consist of two to three lanes in each direction divided by a median. The median would vary from 48 to 72 ft in width. The alternative would have ten-foot inside and outside shoulders. The minimum ROW for this alternative would be 220 ft with additional ROW needed at the interchanges.

Exhibit 3.2 depicts the typical section for this alignment and Exhibit 3.19 through Exhibit 3.22 depict the alignment of the alternative through the corridor.

D
Legend
Mainlanes
Approximate Structure Locations
Frontage Roads /Surface Streets
Ramps
Future Roadway (by others)
Camp Bowie
Clover
Montgomery
Botanic Gardens
University Dr.
Trinity Park
Clear Fork Trinity River
Lancaster
7th
Summit
INTERSTATE 30
Pennsylvania
8th
Rosedale
Forest Park
FWWR
Vickery
Hulen St
Proposed Toll Plaza
UPRR
Fort Worth Zoo
GRAPHIC SCALE IN FEET
0 1000 2000 3000
N
Stonegate
TXU
TCU
Berry
Bellaire Dr
Riverpark
Bryant Irvin Rd
PRELIMINARY:
Subject to Revision
ALTERNATIVE D (1 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 3.19



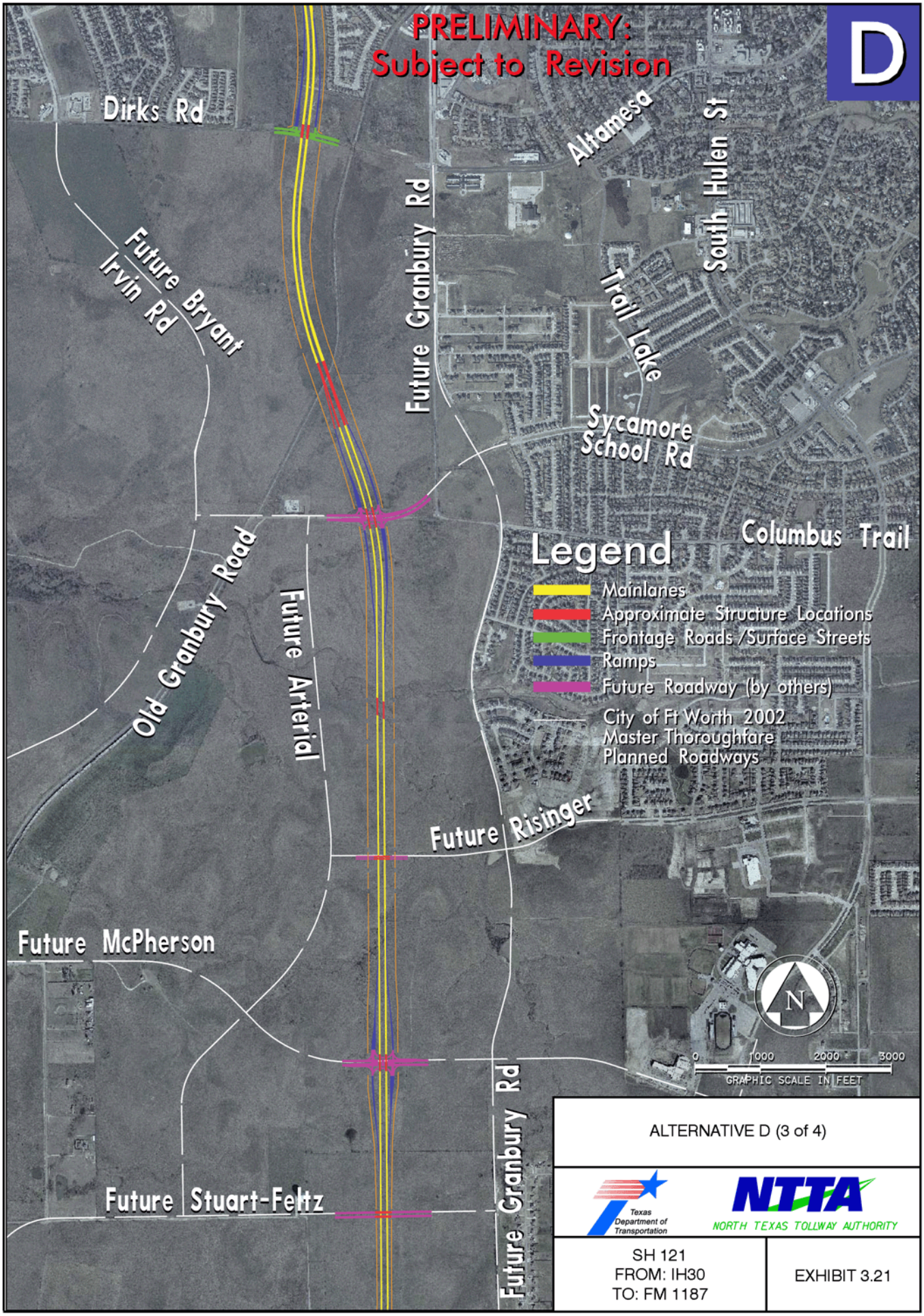
ALTERNATIVE D (2 of 4)

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.20



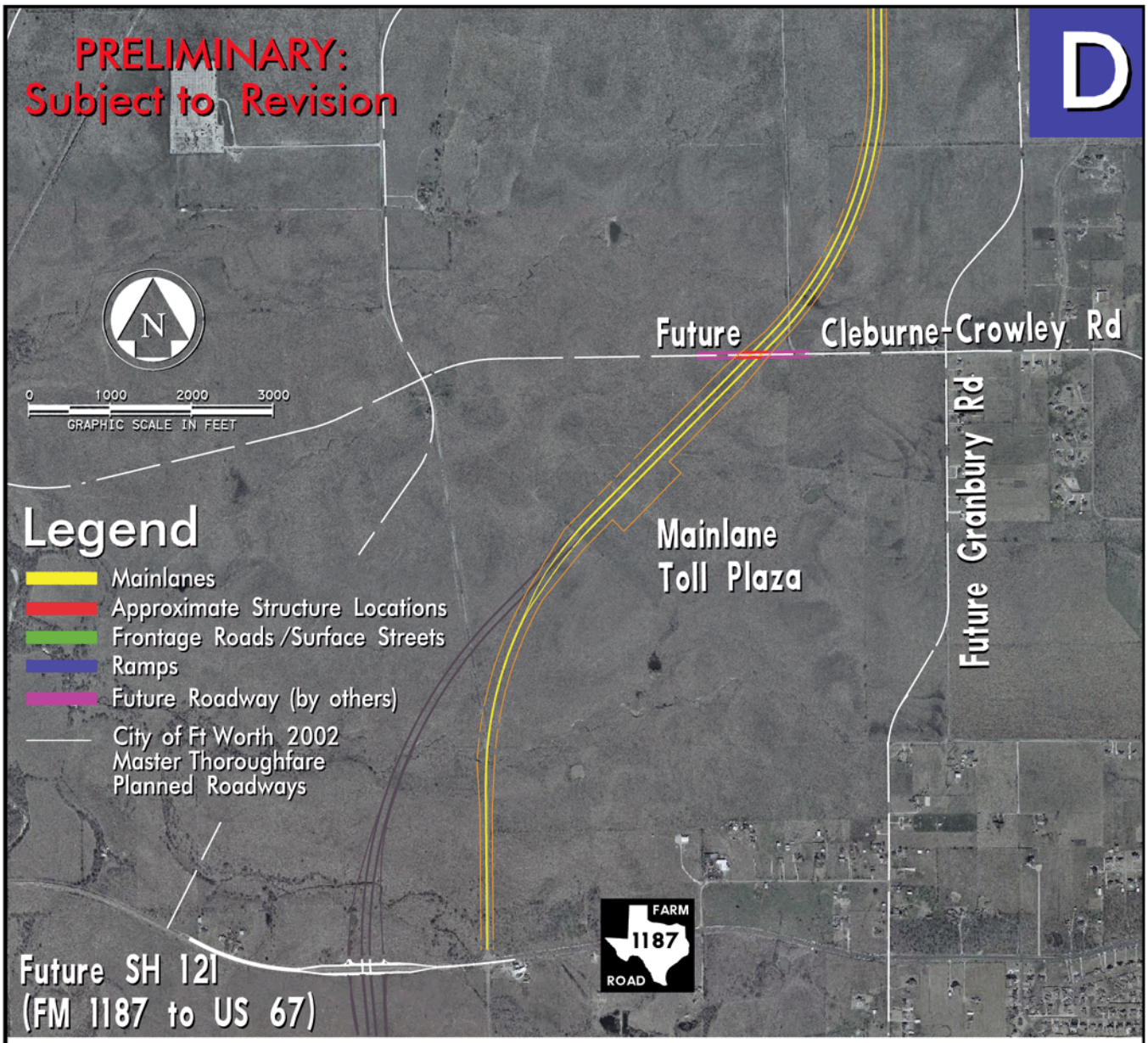
ALTERNATIVE D (3 of 4)

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.21



ALTERNATIVE D (4 of 4)

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 3.22

Alternative D, displayed at the June 1998 Public Meeting, would tie to the downtown IH 30 improvements, including IH 30, Summit Avenue and the connections to Macon Street, Cherry Street and Lancaster Avenue. This alternative would allow access to Summit Avenue and Forest Park Boulevard by a split diamond with the ramps from and to the west at Forest Park Boulevard and ramps to and from the east at Summit Avenue, in addition to a ramp from westbound IH 30 to Forest Park Boulevard. For this alternative, Forest Park Boulevard would not be relocated. SH 121 would pass under the existing connections between IH 30 and Rosedale Street.

IH 30 to the east would have direct access to and from SH 121. The connection to Forest Park Boulevard would consist of two lane flyover ramps that tie to Forest Park Boulevard near the Lancaster bridge, direct connections from Forest Park Boulevard north to IH 30 west and braided ramps adjacent to the St. Paul Lutheran Church.

Proceeding to the southwest adjacent to the UPRR, the tollroad would cross over the Clear Fork of the Trinity River and University Drive and under the Vickery Boulevard connections to Rosedale Street and the extended Montgomery Street. The mainlane toll plaza would be located between Montgomery Street and Hulen Street with the SH 121 alignment between Vickery Boulevard and the UPRR. A split diamond would serve Montgomery Street and University Drive with access to Rosedale Street. Vickery Boulevard would continue to have access to Rosedale Street. Most of the improvements that would be acquired as part of the ROW acquisition process would occur between Summit Avenue and Hulen Street.

Alternative D would go over the Hulen Street bridge, a future development road and Stonegate Boulevard, which would be located closer to the river than in the other alternatives. A diamond interchange is planned at Stonegate Boulevard with frontage roads along SH 121 on each side of the river between Stonegate Boulevard and Bellaire Drive. At Bellaire Drive, SH 121 would cross over Bellaire Drive and a diamond interchange is planned for this location with frontage roads extended on SH 121 to Overton Ridge Boulevard.

At IH 20, direct connectors would be included for all the movements of IH 20 as well as direct connectors between the south and the west on SH183. A full diamond interchange would be included at Overton Ridge Boulevard. Overton Ridge Boulevard would not be lowered or reconstructed.

SH 121 then would cross under the future Oakbend Trail and existing Oakmont Boulevard. The tollroad would pass over Dutch Branch Road and Altamesa/Dirks Road. A diamond interchange is planned for Oakmont Boulevard with a half diamond at Altamesa/Dirks Road. Ramp toll plazas would be included at the interchanges south of Hulen Street, with the exception of the IH 20 interchange. At Dutch Branch Road, the existing roadway would not be lowered or reconstructed.

South of Altamesa/Dirks Road, SH 121 would cross over the FWWRR and the future Sycamore School Road with a diamond interchange at Sycamore School Road. From this point, SH 121 would continue south and pass under the future Risinger Road and over future McPherson Road with an interchange at McPherson Road. It then would cross under future roads at Stewart-Feltz Road and Cleburne-Crowley Road, with a mainlane toll plaza between Cleburne-Crowley Road and FM 1187.

3.3.6. Summary of Build Alternatives

Alternatives A, B, C, C/A and D are plan alternatives within the same basic horizontal alignment. As such, plan elements and aesthetic components could be combined. As demonstrated in the preceding sections, the identification of a recommended route alignment from among the build alternatives proposed is the result of an interactive process. A thorough evaluation of each alternative was performed at each level of study. Further evaluation of the Build/No-Build alternatives is presented in Chapter 5.0, Environmental Consequences. The environmental, socioeconomic, as well as transportation performance factors are included as part of the list of selection criteria as contained in Table 3-1. The ability of each of the alternatives to meet these criteria has been instrumental in the recommendation process for the recommended alternative.

Table 3-1 – SH 121 Evaluation Matrix

Evaluation Criteria	Units	No-Build	Alternative A	Alternative B	Alternative C	Alternative C/A	Alternative D
Transportation Performance							
Improve Mobility of Existing Facilities	Yes/No	No	Yes	Yes	Yes	Yes	Yes
Improved Route for Truck Traffic	Yes/No	No	Yes	Yes	Yes	Yes	Yes
Improved Community and Local Access (circulation)	Yes/No	No	Yes	Yes	Yes	Yes	Yes
Human Environment							
Single-family Displacements	Number	0	48	5	3	3	10
*Multi-family Displacements	Number	0	3	0	0	0	0
Commercial Displacements	Number	0	82	77	82	82	70
Industrial Displacements	Number	0	0	0	0	0	2
Park Displacements	Number	0	0	0	0	0	0
School Displacements	Number	0	0	0	0	0	0
Church Displacements	Number	0	0	0	0	0	1
Cemetery Displacements	Number	0	0	0	0	0	0
Other Public Facilities	Number	0	0	1	0	0	1
Utility and Pipeline Crossings	Yes/No	No	Yes	Yes	Yes	Yes	Yes
Public Service Facility Access	Worse/Similar/Improved	Similar	Improved	Improved	Improved	Improved	Improved
Public Safety Impacts	Worse/Similar/Improved	Worse	Improved	Improved	Improved	Improved	Improved
Community Cohesion	Worse/Similar	Worse	Similar	Similar	Similar	Similar	Worse
Environmental Justice	Worse/Similar	Similar	Similar	Similar	Similar	Similar	Similar
Economic Impact	Worse/Similar/Improved	Worse	Improved	Improved	Improved	Improved	Improved
Potential Noise Impacts	Yes/No	No	Yes	Yes	Yes	Yes	Yes
Air Quality	Worse/Similar/Improved	Similar	Improved	Improved	Improved	Improved	Improved
Potential Hazmat Sites (Recorded)							
RCRA	Number	0	4	4	4	4	8
VCP	Number	0	2	1	1	1	2
PST	Number	0	10	11	10	10	18
LPST	Number	0	6	7	6	6	10
Other	Number	0	3	3	3	3	3
Historic Resources							
Historic Properties Existing	Existing	0	0	1	0	0	1
Archeological Sites							
Existing Sites (Recorded)	Existing	0	2	2	2	2	2
Potential Sites	Low/Medium/High	Low	Low	Low	Low	Low	Low
Natural Environment							
100-Year Floodplains	Yes/No	No	Yes	Yes	Yes	Yes	Yes
Stream/Floodplain Crossings	Number	0	9	10	10	10	10
Wetlands (Potential) Impact	Acre	0	9.24	8.95	8.10	8.10	8.95
Threatened/Endangered Species	Low/Medium/High	None	Low	Low	Low	Low	Low
Trees, Vegetation, and Wildlife Habitat Impact	Low/Medium/High	None	Low	Low	Low	Low	Low
Prime/Unique Farmland Soils	Yes/No	No	No	No	No	No	No

* *Applies to actual number of apartment complexes potentially affected for which at least one apartment building unit is displaced.*

3.4. Description of the No-Build Alternative

The No-Build Alternative assumes no major investments beyond those already programmed for funding. Improvements assumed under the No-Build Alternative are included in the approved MTP by the NCTCOG (*Mobility 2025 – 2004 Update*) and the *2004-2006 State Transportation Improvement Plan* (STIP). Under the No-Build alternative, improvement along the SH 121 study corridor would primarily consist of maintenance activities or spot improvements that provide near-term service level improvements. Since this is a new location alignment, only existing facilities would be maintained and improved. Generally, the existing transportation network in the southwest portion of Fort Worth would be lacking major improvements in mobility.

3.5. Comparative Analysis – Build and No-Build Alternatives

The following is a comparative analysis of the Build (toll facility) and the No-Build alternatives. The benefits and costs of each were screened in terms of their effect on overall mobility, environmental impacts, cost of ROW and construction as well as time required for implementation. Summary results are depicted in Table 3-1.

3.5.1. Length, Cost and Right-of-way Acreage

Preliminary ROW and cost estimates for the proposed toll facility were prepared in conjunction with the schematic plan for the project. The total project length from IH 30 to FM 1187 is approximately 15 mi. Total ROW acreage required for this facility is estimated to be 635 ac. The total 2001 estimated construction cost for the ultimate facility (six lanes from IH 30 to south of Altamesa/Dirks Road, four lanes from south of Altamesa/Dirks Road to FM 1187), is approximately $342 million. The length, cost and ROW acreage varies slightly for each of the alternatives.

Costs associated with the No-Build alternative would include routine maintenance and reconstruction activities on existing facilities, in addition to various CMS actions identified by NCTCOG. Table 3-2 illustrates the projected effect on various performance measures on the local transportation network based on the demographic data recorded in Table 3-3.

Table 3-2 – SH 121 – 2025 Tollroad Performance Summary

Study Subarea						
Performance Measures	**No-Build**	**Alternative A**	**Alternative B**	**Alternative C**	**Alternative C/A**	**Alternative D**
Vehicle Hours of Delay (VHD) Traffic Control	45,419	43,976	44,036	43,928	43,551	44,036
VHD Congestion	235,771	198,624	198,312	199,012	196,331	198,312
Total VHD	281,190	242,600	242,348	242,940	239,882	242,348
Annual Cost of Congestion Delay*	$957,819,688	$806,910,000	$805,642,500	$808,486,250	$797,594,688	$805,642,500
Vehicle Hours of Travel	569,336	545,511	545,397	545,932	542,174	545,397
VMT	14,053,147	15,286,841	15,283,061	15,284,106	15,277,028	15,283,061
Percent Lane Miles at LOS D, E, or F	68.4%	61.1%	61.6%	61.7%	61.0%	61.6%
DFW Region						
VHD Traffic Control	285,952	282,195	283,479	282,241	281,860	283,479
VHD Congestion	4,057,639	4,003,206	3,997,059	4,002,793	4,000,370	3,997,059
Total VHD	4,343,591	4,285,401	4,280,538	4,285,034	4,282,230	4,280,538
Annual Cost of Congestion Delay*	$16,484,158,438	$16,263,024,375	$16,238,052,188	$16,261,346,563	$16,251,503,125	$16,238,052,188
Vehicle Hours of Travel	7,956,785	7,897,294	7,894,633	7,898,028	7,894,849	7,894,633
VMT	203,231,440	203,688,480	203,734,672	203,743,216	203,740,848	203,734,672
Percent Lane Miles at LOS D, E, or F	70.4%	69.3%	69.3%	69.3%	69.4%	69.3%

* *Calculated using 1.25 average auto occupancy, $12.50 average value of time and 260 commuting days.*

Table 3-3 – Base Year and 2025 Demographic Summary

Demographics	**Population**		**Employment**	
	2000	**2025**	**2000**	**2025**
Study Subarea	373,352	613,533	197,383	346,360
DFW Region	4,536,000	7,952,070	2,690,900	4,943,002

Source: NCTCOG, DFW Regional Travel Model, 2003.

3.5.2. Effect on Existing Network

The impact on the existing network of freeways, arterials and collectors in the PSC can be measured in terms of the percentage of lane miles in that particular Performance District operating at a certain LOS. The LOS rating scale is a simple, widely accepted method for describing traffic conditions. The scale ranges from LOS "A" (free flowing traffic) to LOS "F" (highly congested conditions). In comparing percent lane miles from Table 3-2 at LOS D, E or F for the Subarea between the No-Build and the ultimate build-out scenarios, the following was found:

- Under the No-Build alternative, 68.4 percent of the network in the Subarea would operate at LOS D, E or F.
- The difference between the No-Build and Build alternatives would show a positive change in LOS ranging from: Alternative A, 7.3 percent; Alternative B, 6.8 percent, Alternative C, 6.7 percent; Alternative C/A, 7.4 percent and Alternative D, 6.8 percent for the Subarea, indicating an improvement in LOS for the PSC.

The reduction in the TSM percent lane miles at LOS D, E or F provides an improvement in the annual cost of congestion delay. In comparing the annual cost of congestion for the Subarea from Table 3-2 between the No-Build and Build alternatives, the following was found:

- Annual cost of congestion for the Subarea with the No-Build alternative would be approximately $985 million dollars.
- The difference between the No-Build and the Build alternatives would be an improvement ranging from approximately: Alternative A, $151 million; Alternative B, $152 million; Alternative C, $149 million; Alternative C/A, $160 million and Alternative D, $152 million.

The statistics cited in Table 3-2 for alternatives A, B, C and D were derived using the previously approved *Mobility 2025 Plan* in the released DEIS. Alternative C/A was developed after release of the DEIS based upon Public Involvement. It can be inferred that Alternative C/A would have a similar effect on the existing traffic network as the other Build alternatives due to their similarities.

Based upon the numbers for annual cost of congestion, it was found that the annual cost would decrease between the No-Build and the Build alternatives.

Comparing the total vehicle hours of delay (VHD) from Table 3-2 for the Subarea between the No-Build and the Build scenarios, the following was found:

- The No-Build alternative would cause 281,190 more VHD in the Subarea.
- The difference between the No-Build and the Build alternatives would be a reduction in total VHD ranging from: Alternative A, 38,590 hours; Alternative B, 38,842 hours, Alternative C, 38,250 hours; Alternative C/A, 41,308 hours and Alternative D, 38,842 hours.

It was concluded that the total VHD would decrease between the No-Build and the Build alternatives.

3.5.3. Travel Time-Distance Comparisons

As part of the *1997 Traffic and Revenue Study* (Wilbur Smith Associates), an analysis of estimated travel time and distance comparisons for various typical movements was completed. The *Traffic and Revenue Study* analysis was based upon a proposed facility that begins at the interchange of IH 30 near Forest Park and terminates at Altamesa/Dirks Road.

Table 3-4 represents the comparison of four different routes throughout the PSC of time and distance. The table indicates that although SH 121 would not offer the shortest route in each case, it would allow for higher travel speeds; therefore, the shortest time duration between various points of origin and destination. Each comparison uses a logical route between trip termini that first includes the SH 121 project route and then takes a logical existing highway route that does not use the SH 121 project. Given these comparisons, it was determined that the proposed SH 121, if constructed, would provide the typical user of the SH 121 facility an average travel time savings of 4.7 to 7.5 minutes. Project routes that use SH 121 to the greatest extent possible (minimizing travel on the local arterial routes) would provide the greatest degree of travel distance and time-savings for typical users.

Additionally, Table 3-5 shows traffic forecasts for selected sites in southwest Fort Worth under each alternative scenario.

Table 3-4 – Time-Distance Comparisons During Peak-Period

Typical Destinations	Facility Used	Distance (mi)	Time (minutes)	Ave. Speed (mph)
Fort Worth CBD (IH 30 and IH 35W) To/From Southwest Fort Worth (Granbury Rd. and Columbus Trail)	Proposed SH 121	12.7	13.2	58
	Existing Route using IH 35 W, Frontage Roads, Sycamore School Road and Columbus Trail	13.6	20.7	39
Fort Worth CBD (IH 30 and IH 35W) To/From Benbrook (US 377 and Lakeside Drive)	Proposed SH 121	12.7	13.8	55
	Existing Route using IH 30 and US 377	12.0	18.5	39
Fort Worth CBD (IH 30 and IH 35W) To/From Southwest Fort Worth (Bryant Irvin Road and Oakmont Boulevard)	Proposed SH 121	10.5	10.4	61
	Existing Route using IH 35W, IH 20 and Bryant Irvin Road	13.2	15.8	50
Fort Worth CBD (IH 30 and IH 35W) To/From Southwest Fort Worth (Bryant Irvin Road and Oakmont Boulevard)	Proposed SH 121	10.5	10.4	61
	Existing Route using IH 30 and Bryant Irvin Road	11.4	15.2	45

Source: *Traffic and Revenue Study* - Proposed Southwest Parkway (1997)

Table 3-5 – 2025 Daily Traffic Forecasts by Alternative

Location	No-Build	Alternative A		Alternative B		Alternative C		Alternative D		Alternative C/A	
	2025 ADT	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build
IH 35W S of Allen Ave	198,329	195,316	-1.5%	195,875	-1.2%	196,150	-1.1%	195,875	-1.2%	196,288	-1.0%
IH 30 E of Summit Ave	154,198	188,718	22.4%	186,462	20.9%	186,931	21.2%	186,462	20.9%	191,750	24.4%
IH 30 W of Summit Ave	154,198	149,109	-3.3%	149,929	-2.8%	146,850	-4.8%	149,929	-2.8%	164,690	6.8%
IH 30 Ftg Rd W of Summit Ave	29,362	32,387	10.3%	12,945	-55.9%	13,849	-52.8%	12,945	-55.9%	30,126	2.6%
IH 30 W of Forest Park Blvd	211,813	198,385	-6.3%	198,751	-6.2%	189,639	-10.5%	198,751	-22.7%	193,290	-8.7%
Summit N of IH 30	17,386	15,025	-13.6%	14,883	-14.4%	18,406	5.9%	14,883	-14.4%	16,604	-4.5%
Summit bridge over IH 30	35,129	31,629	-10.0%	22,511	-35.9%	30,354	-13.6%	22,511	-35.9%	32,590	-7.2%
8th Ave S of IH 30	18,133	23,285	28.4%	21,718	19.8%	18,451	1.8%	21,718	-76.1%	16,772	-7.5%
Forest Park N of IH 30	24,823	28,866	16.3%	20,224	-18.5%	29,382	18.4%	20,224	-28.6%	28,778	15.9%
Forest Park S of Rosedale St	22,536	14,885	-34.0%	17,812	-21.0%	13,993	-37.9%	17,812	-21.0%	13,997	-37.9%
W Rosedale W of Forest Park Blvd	7,730	18,448	138.7%	16,983	119.7%	17,541	126.9%	16,983	119.7%	14,512	87.7%
University S of Rosedale St	27,920	31,419	12.5%	25,510	-8.6%	32,717	17.2%	25,510	-8.6%	33,005	18.2%
Hulen S of W Vickery Blvd	38,532	36,300	-5.8%	36,195	-6.1%	35,447	-8.0%	36,195	-6.1%	34,961	-9.3%
Bryant Irvin N of Stonegate Boulevard	30,544	29,487	-3.5%	28,238	-7.5%	28,632	-6.3%	28,238	-7.5%	28,196	-7.7%
Bryant Irvin S of Stonegate Boulevard	28,622	23,412	-18.2%	23,218	-18.9%	23,500	-17.9%	23,218	-18.9%	24,559	-14.2%
Hulen St S of Bellaire Dr	40,048	38,011	-5.1%	36,341	-9.3%	37,856	-5.5%	36,341	-9.3%	37,501	-6.4%
Overton Park S of Bellaire Dr	2,015	1,406	-30.2%	916	-54.5%	1,308	-35.1%	916	-54.5%	1,238	-38.6%
Bryant Irvin N of SH 183	32,392	24,523	-24.3%	23,356	-27.9%	24,298	-25.0%	23,356	-27.9%	24,581	-24.1%
Hulen Street S of IH 20	51,260	49,390	-3.6%	48,047	-6.3%	49,185	-4.0%	48,047	-6.3%	48,115	-6.1%
Bryant Irvin S of IH 20	45,743	44,518	-2.7%	43,188	-5.6%	44,580	-2.5%	43,188	-5.6%	40,481	-11.5%

Source: NCTCOG, 2003 based on *Mobility 2025-2004 Update*

Table 3-5 (continued) - 2025 Daily Traffic Forecasts by Alternative

Location	No-Build	Alternative A		Alternative B		Alternative C		Alternative D		Alternative C/A	
	2025 ADT	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build	2025 ADT	Change from No-Build
Hulen St N of Granbury Rd	49,830	45,681	-8.3%	44,270	-11.2%	44,602	-10.5%	44,270	-11.2%	42,680	-14.3%
Bryant Irvin Rd S of Oakmont	43,344	35,375	-18.4%	34,438	-20.5%	34,317	-20.8%	34,438	-20.5%	32,889	-24.1%
Hulen N of Altamesa Blvd	31,192	31,259	0.2%	30,723	-1.5%	30,725	-1.5%	30,723	-1.5%	30,100	-3.5%
McCart S of Altamesa Blvd	40,674	38,190	-6.1%	38,132	-6.2%	38,355	-5.7%	38,132	-6.2%	37,823	-7.0%
McCart N of Risinger Rd	27,883	27,011	-3.1%	27,193	-2.5%	27,336	-2.0%	27,193	-2.5%	27,065	-2.9%
Westcreek Dr W of McCart	10,917	10,212	-6.5%	10,011	-8.3%	10,379	-4.9%	10,011	-8.3%	9,938	-9.0%
Lovell E of Montgomery St	8,498	7,240	-14.8%	8,659	1.9%	8,755	3.0%	8,659	1.9%	15,510	82.5%
W Vickery E of Clover Lane	26,586	25,007	-5.9%	25,457	-4.2%	25,442	-4.3%	25,457	-4.2%	26,793	0.8%
W Vickery W of Clover Lane	29,801	24,902	-16.4%	25,384	-14.8%	25,684	-13.8%	25,384	-14.8%	27,109	-9.0%
W Vickery W of Westridge Ave	31,109	27,302	-12.2%	28,976	-6.9%	29,419	-5.4%	28,976	-6.9%	30,331	-2.5%
Hartwood Dr E of Hulen St	11,908	8,104	-31.9%	7,944	-33.3%	8,388	-29.6%	7,944	-33.3%	8,752	-26.5%
Oakmont Blvd	23,014	33,064	43.7%	32,399	40.8%	31,179	35.5%	32,399	40.8%	33,477	45.5%
Altamesa/Dirks Road W of Granbury Rd	9,141	7,617	-16.7%	7,421	-18.8%	7,567	-17.2%	7,421	-18.8%	7,252	-20.7%
Altamesa/Dirks Rd E of Bryant Irvin Rd	10,559	13,477	27.6%	13,519	28.0%	13,716	29.9%	13,519	28.0%	14,409	36.5%
Woodway Dr	13,323	10,950	-17.8%	10,421	-21.8%	10,259	-23.0%	10,421	-21.8%	10,232	-23.2%
Granbury Rd S of Hulen St	33,975	23,153	-31.9%	22,601	-33.5%	22,683	-33.2%	22,601	-33.5%	20,994	-38.2%
Briarhaven S of Bellaire Dr	2,013	662	-67.1%	1,435	-28.7%	714	-64.5%	1,435	-28.7%	-	-
Overton Park S of Ranch View Dr	3,148	2,771	-12.0%	2,025	-35.7%	2,630	-16.5%	2,025	-35.7%	2,480	-21.2%

Source: NCTCOG, 2003 based on *Mobility 2025-2004 Update*

3.6. Congestion Management Strategies in Conjunction with Proposed Alternatives

Regardless of the build alternative selected, the NCTCOG's *Mobility 2025 – 2004 Update* addresses several CMS strategies found to be effective transportation measures for southwest Fort Worth. However, most of these were recommended in conjunction with a freeway/tollroad facility serving the same corridor. In addition to these CMS recommendations, a discussion on rail/transit-oriented strategies to reduce congestion on area freeways and to serve future demand in the areas of southwest Fort Worth is presented in the following.

As discussed in *Mobility 2025 - 2004 Update* and in the sections that follow, the option to provide commuter rail service in the study corridor was found to be a legitimate component of the overall transportation system proposed for southwest Fort Worth. As such, each of the following strategies are considered components of, rather than alternatives to, the overall project objectives. They are not carried further into the alternative evaluation discussions of this document, but are considered part of the Build or No-Build alternative as components of the committed improvements for the region.

3.6.1. Rail/Transit-Oriented Strategies

The transit component of the *Mobility 2025 – 2004 Update* includes local bus, express bus, commuter rail, light rail and rail technologies to be determined. The discussion of this alternative is based solely on *Mobility 2025 – 2004 Update*'s analysis of current conditions, discussion of the various alternatives that were identified for evaluation and the results of this evaluation.

To provide a baseline, with which all of the *Mobility 2025 –2004 Update* alternatives could be compared, a future year committed network was developed. The components of this system include the TRE Commuter Rail Line from Dallas to Fort Worth with a peak headway of 10 minutes and an off peak headway of 50 minutes during hours of operation. A network of local and express buses designed to serve the two transit authority service areas and the rail system was also included. Freeway, arterial and HOV lane assumptions were held constant for all of the transit forecasts.

All transit forecasts developed for *Mobility 2025 – 2004 Update* used the same baseline fare assumptions, based on current fare structures for both DART and FWTA. A fare structure for the TRE was based on the anticipated travel distance. Forecasts were then simulated using the year 2025 demographic scenario. Possible rail alternatives for the Metroplex were identified based on previous system planning work, completed major investment studies and information obtained from the *Regional Commuter Rail Feasibility Study*.

The transit system focus was mainly on the evaluation of rail alternatives with the bus system serving as a background feeder system. The bus service would feed the rail through the following services:

- Mobility Impaired Transportation Service (MITS) gives rides to people with disabilities. MITS trips are by reservation and riders must register for the service.
- FWTA offers regular fixed route service seven days a week, with bus stops at the same places, at the same times, every weekday. Local fixed routes have shorter schedules on weekends.
- Most fixed routes connect with at least one of the six transfer stations where routes meet.
- The Rider Request brings the bus to your home or workplace by reservation.
- The TRE has nine transfer stations between Dallas and Fort Worth to help the rider link up to bus service with FWTA and DART.

FWTA reported ridership in the second quarter of 2004 in Table 3-6.

Table 3-6 – Fort Worth Transit Authority Ridership Report

Service	Ridership
MITS	40,702
Commuter Rail	188,377
Transit Service	1,178,712
Total Ridership	1,407,791

Source: FWTA Report, 2004 Quarter 2 (Dec-Feb)

A series of 10 different rail forecasts were developed to use in the evaluation and identifications of recommendations for *Mobility 2025 – 2004 Update*.

Exhibit 2.7 shows the full range of corridors that were identified as alternative rail options for analysis. In cases where the rail corridors had no interaction with one another, such as the extension

of rail into southwest Fort Worth, the rail options were simulated in the same alternative. The FWWRR component in Fort Worth, that would serve the SH 121 PSC, is analyzed as a commuter rail system in the forecasts.

The evaluation of various rail forecasts to determine those sections of the rail alternatives that might be warranted was based on a set of rail system warrants. The rail capital cost per mile was compared with the per mile cost of reconstructing a freeway and the per lane person carrying capacity of a roadway, to result in the daily rail passenger warrants. Due to the realization that the *Mobility 2020* warrants were high in comparison with the actual ridership that was observed on the existing DART rail system, a set of "rail equity warrants" were developed to account for this discrepancy. The rail equity warrants previously established during the development of *Mobility 2020* were used during review of the *Mobility 2025* and *Mobility 2025 Update* forecasts.

Projected ridership for segmented links of the rail systems in each of the 16 forecast simulations was obtained for the year 2020. Based on these forecasts, recommendations were made that included the recommendation to form a "Tarrant Rail Evaluation Task Force" to evaluate the engineering feasibility and environmental implications of commuter rail service along the Cottonbelt corridor, from DFW International Airport through the Fort Worth CBD to the FWWRR line in southwest Fort Worth.

3.6.2. Transportation Systems Strategies

Transportation systems strategies utilize the existing transportation system and incorporate features to maximize or increase its efficiency. The project limits include urbanized (Fort Worth) and rural areas. A regional CMS plan, that incorporates various TSM/TDM strategies, was prepared by NCTCOG and has been operational since October 1, 1997. The CMS 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 traffic to levels that accommodate State and local needs. The regional CMS includes commitments for TDM, TSM,

Advanced Transportation Management (ATM), Bicycle/Pedestrian facilities and arterials widening (Please see Exhibit 2.4 for programmed projects near the PSC).

TDM

The Regional ETR Program was one strategy that is being implemented as a transportation control measure. The program involves continued annual operation of the existing program as a public/private cooperative effort between NCTCOG, DART and the FWTA. This voluntary program targets the region's large employers, focusing both inside and outside of transit service areas. The effectiveness of this strategy is contingent on by the program's success in reducing single occupant vehicle travel.

Ridesharing programs are key elements of any region's TDM effort. The vanpool program is a strategy aimed at increasing average vehicle occupancy during peak travel periods. It is implemented through public agencies, public/private Transportation Management Associations (TMA) and/or individual private sector employers. The program targets long work commute trips. Public subsidy, directed to vanpool riders, targets one-to two-year start-up costs.

Park-and-Ride facilities serve as collection areas for persons transferring to higher occupancy vehicles. Strategies for the PSC include: i) continued operation of existing Park-and-Ride facilities; ii) consideration of candidate future sites; and iii) location and design of facilities that are conducive to bus transit, vanpools and carpools.

Transportation System Management

The various TSM strategies in the PSC are aimed at identifying improvements to new and existing facilities of an operational nature. These include intersection improvements, such as the installation of traffic control devices, traffic channelization, grade separations and addition of turning lanes. Several such projects are currently programmed and included in the TIP. Another strategy that falls under the TSM category is signalization improvements. Programmed projects are included in the TIP, with future projects to include signal optimization, signal upgrades and system interconnection.

Special Events Management

Special events management strategies, such as pre-trip and en-route information dissemination plans, TDM and transportation system management, may be used to minimize traffic disruption and enhance mobility before, during and after special events. Examples of these special events in the general project area include the Southwestern Expo and Livestock Show at the Will Rogers Memorial Coliseum and the Fort Worth Cowtown Marathon and Pioneer Days in the Fort Worth Stockyard District and Texas Motor Speedway races and other events.

Advance Transportation Management

The ATM program is aimed at reducing delay on the freeway system due to traffic incidents such as crashes or stalled vehicles. An Advanced Traveler Information System (ATIS) is recommended as part of this program to provide real-time information on traffic conditions and travel opportunities throughout the region.

A Tarrant County steering committee has completed the Fort Worth Regional ITS Plan. The traffic monitoring and incident detection/response system currently operates on IH 35W south of IH 30, IH 20 (South loop of IH 820), SH 360: IH 20 to SH 183 and SH 183 east of SH 360. A Traffic Management Center currently manages this system. Mobility Assistance Patrols service most of the Tarrant County freeway system.

Another recommendation is the Advanced Traffic Management Systems (ATMS). This system promotes the integration of freeways and tollroads, HOV lanes and strategic arterials across jurisdictional lines. Recommendations included in the ATMS include: operation of changeable message signs to divert traffic around traffic incidents; closed circuit television for traffic monitoring; incident verification and clearance; lane control signals for incident management; and automated ramp metering systems to regulate freeway system access during peak travel periods. Many of these services can be and have been, integrated with the ATIS under the collective title, ITS. ITS projects would strive for consistency with National ITS Architecture and Structures recommendations (FHWA 1998).

An Advanced Public Transportation System (APTS) is recommended. The aim of this system is to use available technology to enhance transit service, increase the safety of riders and to support greater levels of service to transit riders.

Bicycle and Pedestrian Facilities

In an effort to increase the regional level of bicycle and pedestrian trips, various strategies are recommended for immediate and future implementation. Bicycle and pedestrian facilities are generally developed to serve commuter trips of less than five miles in length, especially in high-density areas and along congested travel corridors.

In order to facilitate off-street bike commuter travel and pedestrian access, the veloweb Project, a proposed interconnected system of paved routes with signing and grade separated crossings to facilitate bicycle commuter travel was presented in *Mobility 2025 - 2004 Update*. The veloweb is essentially a series of small roads designated for use by fast-moving bicyclists. Primary considerations of the veloweb include:

- Markings and travel speeds to meet minimum safety standards (proposed design speed of 25 mph).
- Long-lasting impervious pavement surface.
- Grade-separated crossings of roadways with substantial traffic and traffic circle intersections with minor roadways.
- Limited signalized or stop sign intersections.
- Easy access from roadways and to common trip destinations.

In addition to the veloweb there are other recommendations to create a safer environment for bicycle commuting. There is an on-street bicycle and pedestrian access program that involves the widening of outside lanes on arterial streets. Also proposed, was a system of improvements intended to promote bicycle commuting as a more viable mode of travel. Examples of such improvements might include signed on-and-off street routes, bicycle parking in front of retail and business centers, bicycle storage facilities and various other amenities for commuters. Central Fort Worth is a candidate area for future implementation and development assistance for bicycle commuting. A greater emphasis on the planning of pedestrian facilities across the region serving major activity and transit centers is

also proposed, particularly in combination with additional or proposed light rail, commuter rail and HOV lanes.

CHAPTER 4

AFFECTED ENVIRONMENT

4.0 AFFECTED ENVIRONMENT

This chapter describes the existing social, economic and natural environmental conditions in the study area without the influence of the recommended project. The discussion provides a description of the environment in which the project would take place and describes the relevant resources in the study area.

4.1. Description of Project Area

4.1.1. Social and Economic Environment

Population

According to the April 2003 NCTCOG's *2030 Demographic Forecast*, the year 2000 total population for North Central Texas was 5,067,400 and was projected to grow approximately 56 percent to 9,107,900 by the year 2030. According to this report from NCTCOG, the Metroplex was one of the fastest growing areas in the United States and this trend is expected to continue through the year 2030.

According to the April 2003 NCTCOG's *2030 Demographic Forecast*, North Central Texas is projected to have a 2030 population of 9.1 million persons in 3.4 million households and non-construction employment of 5.4 million jobs. The rate of growth projected through three decades represented in this forecast is at a magnitude never before experienced in the North Central Texas region.

According to the NCTCOG Research and Information Services, the year 2004 total population for the Metroplex is 5,856,350. From January 2003 to January 2004, the region added 146,400 new persons, which marks the eighth consecutive year to add over 100,000 persons to the region.

Population Growth by County

As the Metroplex continues to attract new industry and businesses, the associated increases in population and employment begin to inflict a measurable strain on the existing transportation

systems. In 2000, the four NCTCOG core counties, Collin, Dallas, Denton and Tarrant, captured 90 percent of all the household growth in the region. Tarrant County led all counties in the region by adding 39,950 persons from January 2003 to January 2004, pushing the total population of Tarrant County to 1,589,200 residents. Tarrant County is projected to lead all the NCTCOG counties in absolute growth by capturing 21 percent of all the projected household growth during the 30-year forecast period. Additionally, Johnson County is expected to triple its 2000 household total by the year 2030.

The DFW Consolidated Metropolitan Statistical Area (CMSA), in which the PSC is located, has grown dramatically since 1990. According to the United States Bureau of the Census, the combined population of Tarrant and Dallas Counties grew from 3,022,913 in 1990 to 3,665,118 in the year 2000. NCTCOG 2025 projections for these same counties are 2,012,600 and 2,587,100 respectively, resulting in a total population of 4,599,700. *Mobility 2025 – 2004 Update: The MTP* reports that the metropolitan area's population is growing at an approximate annual rate of 1.76 percent, which is higher than the national average growth.

Population By Race

Census 2000 data shows that the total minority population for the study area is 24 percent; for the City is 53 percent; and, for Tarrant County is 37 percent. (The minority category includes individuals identified as belonging to a racial category other than white. Hispanic refers to individuals of Hispanic origin, which includes all racial categories).

According to the 2000 Census, Whites are the predominant ethnic group in Tarrant County, representing 71 percent of the total population. Blacks represent 13 percent, American Indians one percent, Asians and Hawaiian four percent; nine percent are classified as not belonging to any particular ethnic group and three percent constitute persons who are of more than one race. Persons of Hispanic origin, which can be of any of the previous-mentioned ethnic groups, represent 20 percent of the total County population. The City's demographic profile using 2000 Census data indicates that Whites represent 60 percent, Blacks represent 20 percent, American Indians represent

one percent, Asians/Pacific Islanders represent three percent, others classified as not belonging to any particular racial group represent 14 percent and persons who are more than one race represent three percent. Citywide, Hispanics or Latinos of any race compose 30 percent. The recommended project is located within ten census tracts, mapped and designated by the U.S. Department of Commerce, Census Bureau (Census 2000) as 1019.00, 1028.00, 1053.00, 1054.05, 1109.03, 1055.06, 1055.08, 1055.10, 1110.09, 1110.10. Within the PSC, as a percentage of total population, the 2000 Census indicated that Whites represent 80 percent, Blacks represent eight percent, American Indians represent one percent, Asian/Pacific Islander represent three percent, others represent seven percent and persons who are of two or more races represent two percent. Within the PSC census tracts, Hispanics represent 14 percent of the total population. The ethnic compositions within the PSC per census tract are summarized in Table 4-1.

Table 4-1 – Ethnic Composition by Census Tract

Census Tract	White	Black	American Indian	Asian/ Pacific Islander	Other	Two or More Races	Hispanic (All Races)
1019.00	961	47	2	18	42	14	89
%	*88.7*	*4.3*	*0.2*	*1.7*	*3.9*	*1.3*	*8.2*
1028.00	1,129	74	4	4	38	22	81
%	*88.8*	*5.8*	*0.3*	*0.3*	*3.0*	*1.7*	*6.4*
1053.00	433	27	17	6	354	48	672
%	*48.9*	*3.1*	*1.9*	*0.7*	*40.0*	*5.4*	*75.9*
1054.05	3,384	411	14	102	119	94	329
%	*82.1*	*10.0*	*0.3*	*2.5*	*2.9*	*2.3*	*8.0*
1109.03	1,592	62	3	76	25	13	66
%	*89.9*	*3.5*	*0.2*	*4.3*	*1.4*	*0.7*	*3.7*
1055.06	3,855	547	29	180	282	105	582
%	*77.1*	*10.9*	*0.6*	*3.6*	*5.6*	*2.1*	*11.6*
1055.08	3,721	634	29	209	235	109	502
%	*75.4*	*12.8*	*0.6*	*4.2*	*4.8*	*2.2*	*10.2*
1055.10	2,482	789	25	240	96	90	329
%	*66.7*	*21.2*	*0.7*	*6.5*	*2.6*	*2.4*	*8.8*
1110.09	2,745	130	11	134	32	60	171
%	*88.2*	*4.2*	*0.4*	*4.3*	*1.0*	*1.9*	*5.5*
1110.10	1,309	15	3	3	2	22	51
%	*96.7*	*1.1*	*0.2*	*0.2*	*0.1*	*1.6*	*3.8*

Source: U.S. Census Bureau, Census 2000

Growth of Major Employers

According to the NCTCOG's *June 2004 Major Employers List*, there are 944 major employers in the North Central Texas Region. Major employment establishments are those that have a minimum of 250 full-time and part-time workers. Major employers in the North Central Texas region combine to employ 790,450 person, representing 25 percent of all employment in the region. Tarrant County has 227 major employer sites, most of which are concentrated in the City's CBD and along IH 35W north and south of downtown. Major employment centers that would be served by the proposed facility include the Fort Worth CBD, the West Fort Worth Hospital District and the Southwest Fort Worth market area. In 2004, Lockheed Martin Corporation in Fort Worth led all major employers in the 16-county region with 16,800 workers.

Housing

As a result of the low interest rates in 1994, home building activity began to increase in north Texas. According to NCTCOG *DFW Metropolitan Area Profile*, residential construction permits in Fort Worth increased by four percent as of 1997. In addition, multi-family construction was on the rise. The *Profile of General Demographic Characteristics for the City of Fort Worth, Texas: 2000* reports a total of 211,035 housing units of which 92.4 percent are occupied and 7.6 are vacant. Housing tenure information indicates that of the 195,078 occupied units, 55.9 percent are owner occupied and 44.1 percent are renter occupied. The NCTCOG Research and Information Services' 2001 Housing Estimates reported a total of 575,212 housing units that included single-family, multi-family and other (mobile home, trailer, houseboat, etc.) for Tarrant County. The City's total estimated housing units in 2001 was 213,828.

According to the Real Estate Center at Texas A&M University and the United States Census Data, building permit activity data indicated an increase in single-family housing of 120 percent in 2000 over 1990 in the Fort Worth/Arlington metropolitan area and 108 percent in Tarrant County. Multi-family housing increased by 85 percent in the City and 102 percent in Tarrant County for the same year. The NCTCOG's *Profile of General Demographic Characteristics for Tarrant County, Texas: 2000* reports that from a total of 565,830 housing units, 533,864 were occupied and 31,966 were

vacant. The City alone had a total of 211,165 housing units of which 195,146 (92.4 percent) were occupied and 16,019 (7.6 percent) were vacant.

Income

The median income per household along the PSC was higher than that for the City and slightly lower than that for Tarrant County. According to 1999 income captured in the 2000 census data, the household median income for the PSC was $46,365 compared to $37,074 for the City and $46,179 for Tarrant County. Table 4-2 summarizes the median household income per census tract within the PSC.

Table 4-2 – Median Household Income by Census Tract in 1999

Census Tract	Median Household Income (Dollars)
1019.00	38,869
1028.00	61,750
1053.00	36,538
1054.05	40,710
1055.06	31,030
1055.08	42,815
1055.10	45,882
1109.03	49,698
1110.09	82,785
1110.10	33,571

Source: U.S. Census Bureau, Census 2000

4.1.2. Utilities

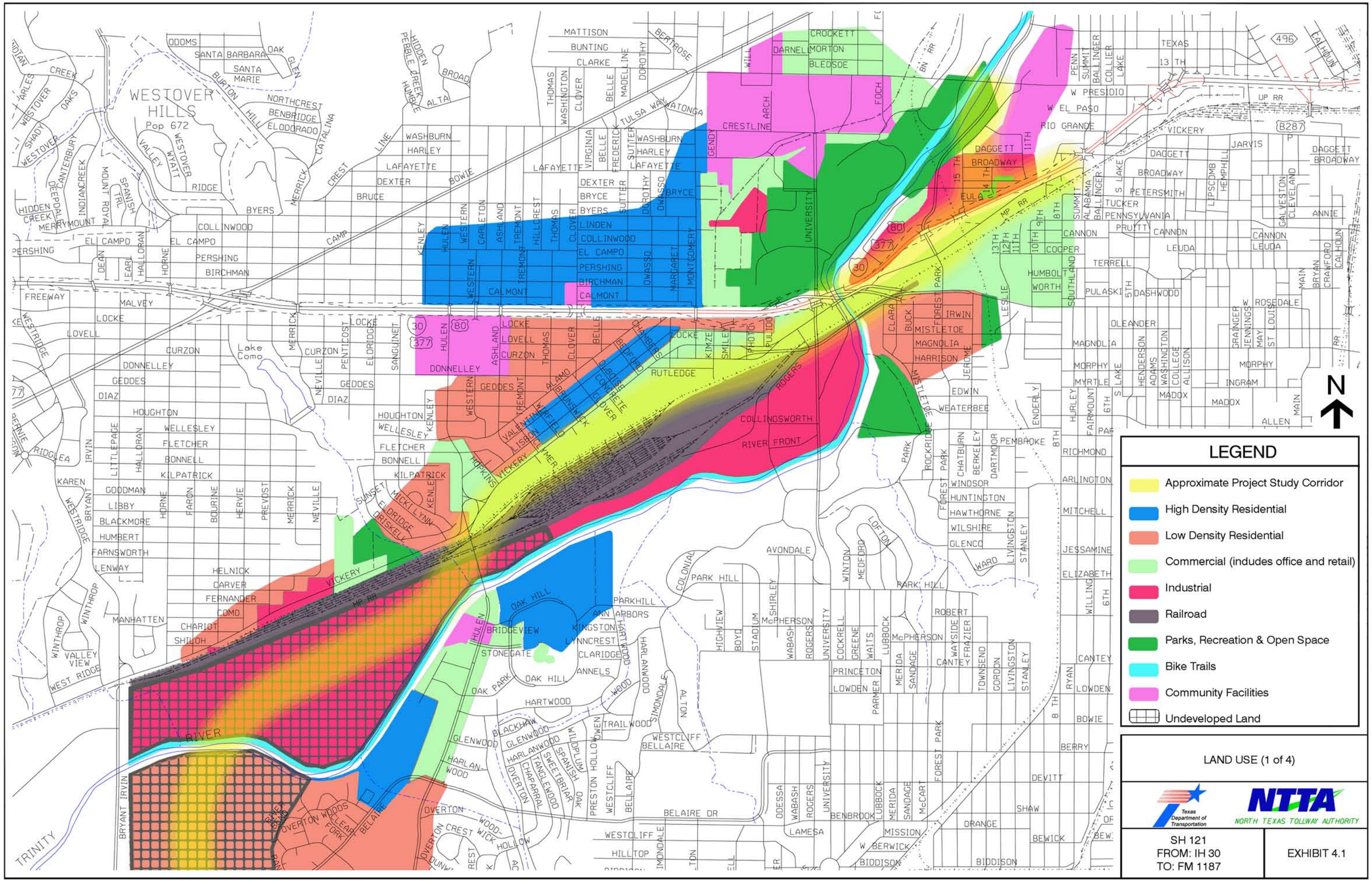
Existing utilities located within the developed areas along the PSC include water and wastewater, gas, telephone and cable television lines. The Holly Water Plant, a principal water treatment plant for the City, is located east of Forest Park near the northern project limit. Located south of Vickery Boulevard and west of Hulen Street is a high-energy electrical transmission line that traverses the PSC parallel to the Centennial Railroad Yards. Another high energy electrical transmission line traverses the PSC between Overton Ridge and Oakmont Boulevard and another crosses the PSC just north of FM 1187. A major raw water line, which distributes water from Cedar Creek Reservoir to

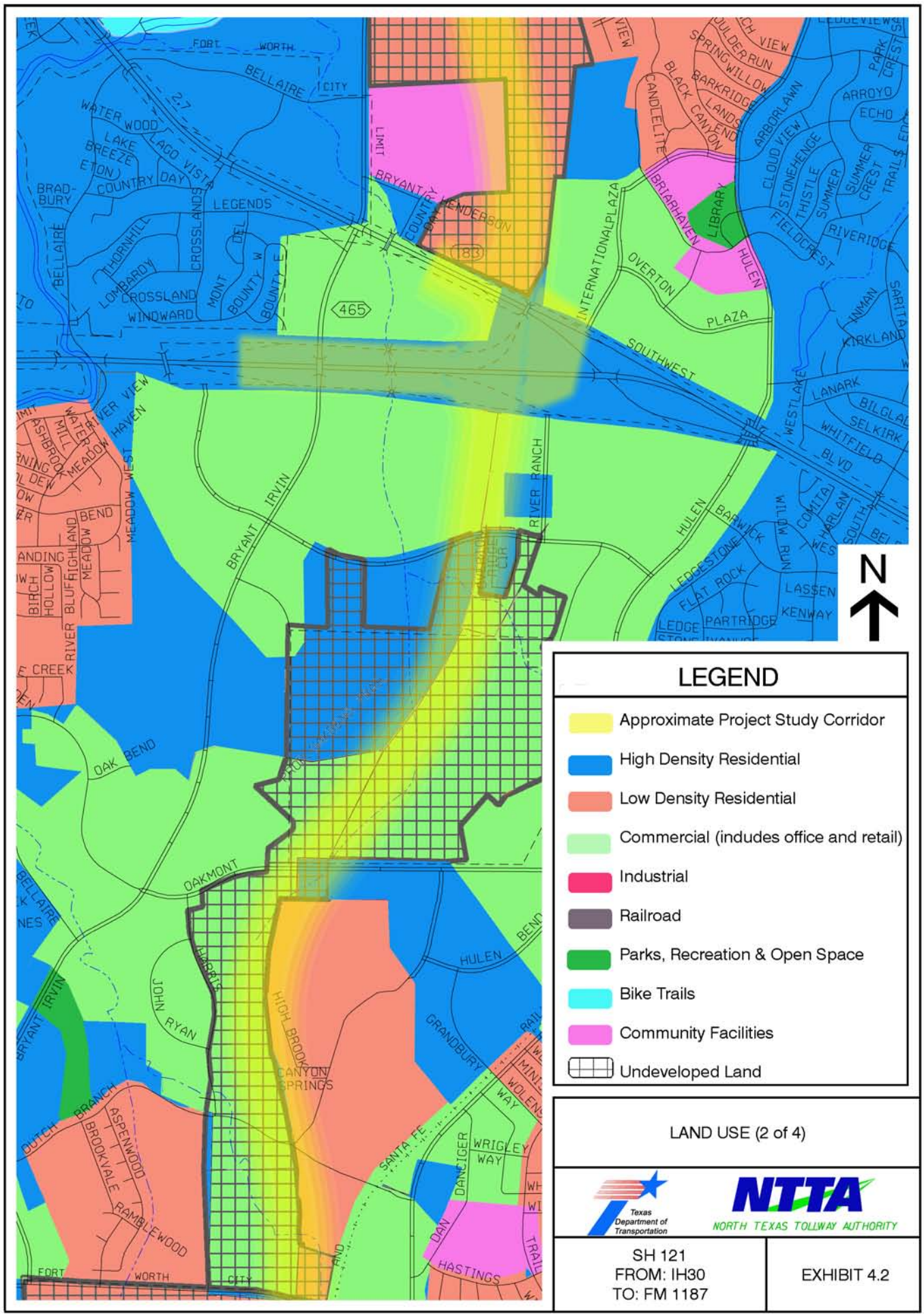
Lake Benbrook, traverses the PSC just south of Sycamore School Road. General utility infrastructure for new development in the southwest quadrant of Fort Worth is ongoing.

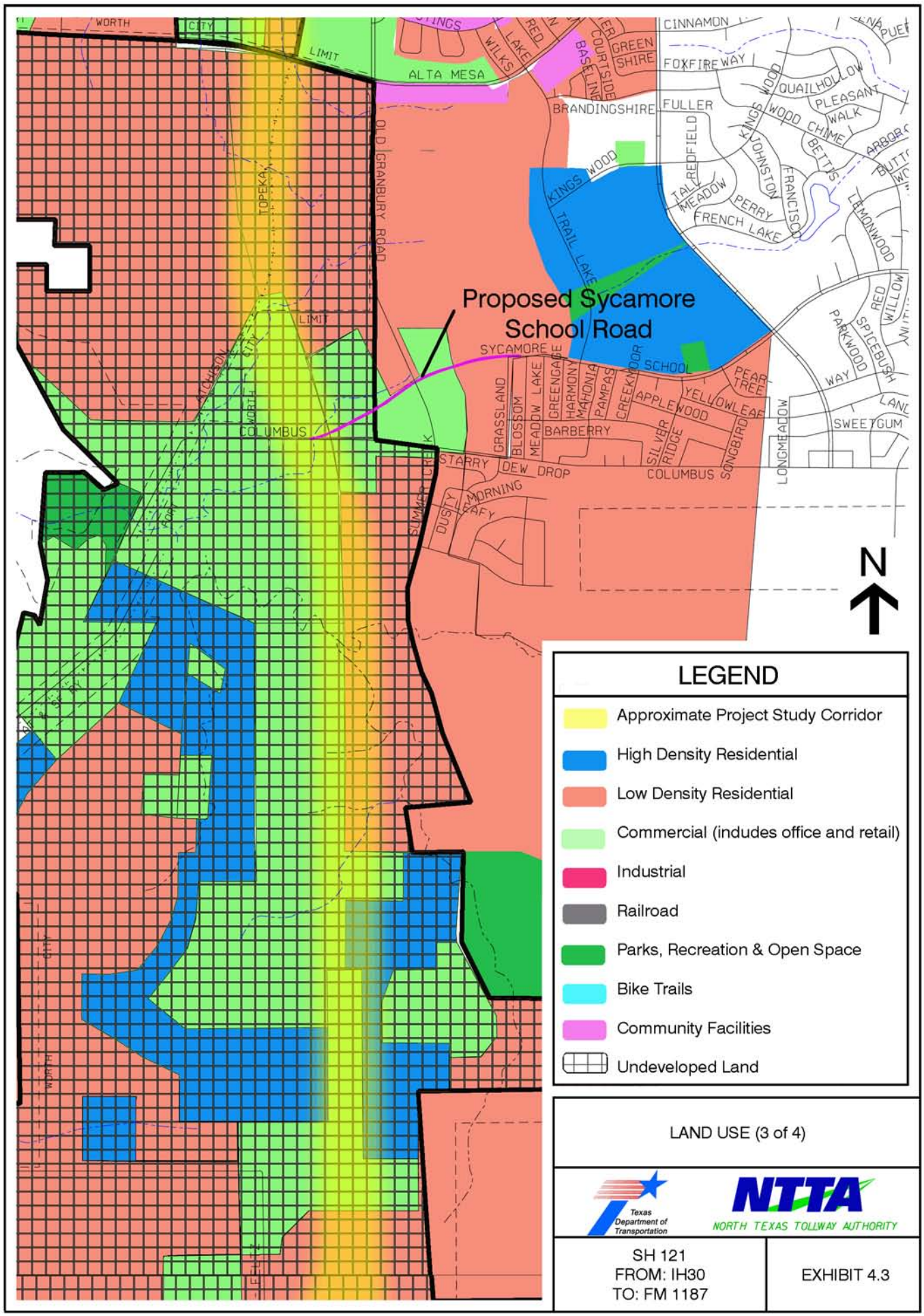
4.1.3. Existing Land Use and Employment within the Project Study Corridor

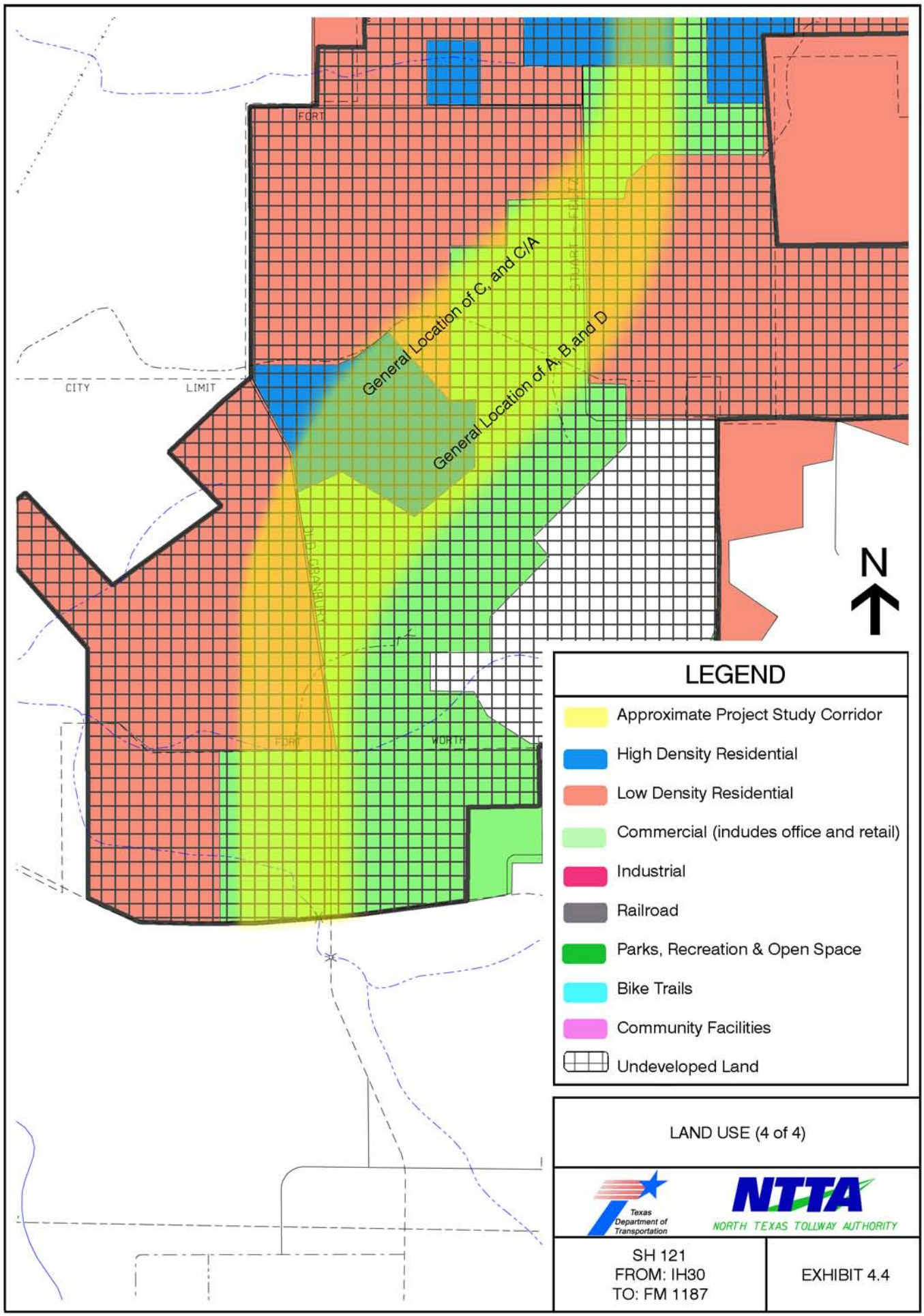
A transportation plan was developed in order to meet future traffic needs due to growth and development in the DFW area. *Mobility 2025 - 2004 Update*, prepared by the NCTCOG and approved by the RTC, was designed to guide the implementation of roadway and transit improvements in the region. *Mobility 2025 Plan Update* reports a rapid future growth in the DFW area through the year 2025 and indicates that the local population would grow 63 percent and employment 70 percent by the year 2025. The population travel needs, such as travel patterns and travel times, alter when changes in land use take place.

The land use along the PSC, from IH 30 to FM 1187, varies from undeveloped land to developed areas of residential, commercial, industrial and farmland purposes (Exhibit 4.1 through Exhibit 4.4). The establishments north of IH 30 and west along Vickery Boulevard include industrial and commercial buildings with interspersed areas of residential units, churches and vacant lots. The area south of the UPRR tracks and west of Hulen Street is currently undeveloped, but zoned for commercial and industrial development. Residential areas and recreational facilities, such as hiking and biking trails are aligned with the Trinity River. The land south of Bellaire Drive to Altamesa/Dirks Road is suburban with retail and commercial sites as well as single and multi-family residential units. From Altamesa/Dirks Road to FM 1187, the majority of the land is undeveloped with the exception of established farmland and scattered residential areas. The main result of these changes is that areas are separated from each other and scattered throughout a particular area. This area is characterized by the lack of central traffic destinations.


LEGEND
Approximate Project Study Corridor
High Density Residential
Low Density Residential
Commercial (indudes office and retail)
Industrial
Railroad
Parks, Recreation & Open Space
Bike Trails
Community Facilities
Undeveloped Land
N
WESTOVER HILLS
Pop 672
Lake Como
RIVER
TRINITY
UP RR
MP RR
BN RR
LAND USE (1 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 4.1


LEGEND
Approximate Project Study Corridor
High Density Residential
Low Density Residential
Commercial (indudes office and retail)
Industrial
Railroad
Parks, Recreation & Open Space
Bike Trails
Community Facilities
Undeveloped Land
N
LAND USE (2 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 4.2
FORT WORTH
BELLAIRE
CITY
WATER WOOD
LAKE BREEZE
LAGO VISTA
ETON
COUNTRY DAY
BRAD-BURY
LEGENDS
THORNHILL
LOMBARDY
CROSSLAND
WINDWARD
CROSSLANDS
MONT DEL
BOUNTY W
BOUNTY E
BRYANT IRVIN
COUNTRY LIMIT
HENDERSON
183
465
INTERNATIONAL PLAZA
OVERTON
PLAZA
SOUTHWEST
BRIARHAVEN
LIBRARY
HULEN
CANDLELITE
BLACK CANYON
SPRING WILLOW
BARKRIDGE
ARBORLAWN
CLOUD VIEW
STONEHENGE
THISTLE
SUMMER
SUMMER CREST
FIELDCREST
RIVERIDGE
ARROYO
ECHO
PARK CREST
INMAN
KIRKLAND
SARITA
LANARK
BILGLAD
SELKIRK
WHITFIELD
BLVD
WESTLAKE
RIVER VIEW
MEADOW HAVEN
MEADOW WEST
WATER MILL
ASHBROOK
BEND
HIGHLAND
MEADOW
BIRCH HOLLOW
BLUFF
RIVER
CREEK
RIVER RANCH
BARWICK
COMITA
HARLAN
LEDGESTONE
FLAT ROCK
LASSEN
KENWAY
PARTRIDGE
OAK BEND
OAKMONT
BELLAIRE
JOHN RYAN
HIGH BROOK
CANYON SPRINGS
GRANDBURY
WRIGLEY WAY
SANTA FE
DANCIGER
DAN
HASTINGS
DUTCH BRANCH
ASPENWOOD
BROOKVALE
RAMBLEWOOD
FORT WORTH CITY


Proposed Sycamore School Road
LEGEND
Approximate Project Study Corridor
High Density Residential
Low Density Residential
Commercial (indudes office and retail)
Industrial
Railroad
Parks, Recreation & Open Space
Bike Trails
Community Facilities
Undeveloped Land
N
LAND USE (3 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 4.3


FORT
CITY
LIMIT
General Location of C, and C/A
General Location of A, B and D
OLD GRANBURY
FORT
WORTH
N
LEGEND
Approximate Project Study Corridor
High Density Residential
Low Density Residential
Commercial (indudes office and retail)
Industrial
Railroad
Parks, Recreation & Open Space
Bike Trails
Community Facilities
Undeveloped Land
LAND USE (4 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 4.4

4.1.4. Transportation Facilities

Roadways

The vast network of existing roadways in Fort Worth is comprised of a variety of roadway types including residential streets and major City streets, plus interstate and other highways (Exhibit 4.5). Major highways such as IH 30, IH 20, SH 199 and US 377 running east-west and IH 35W and Business 287, running north south are located within or in close proximity to the PSC.

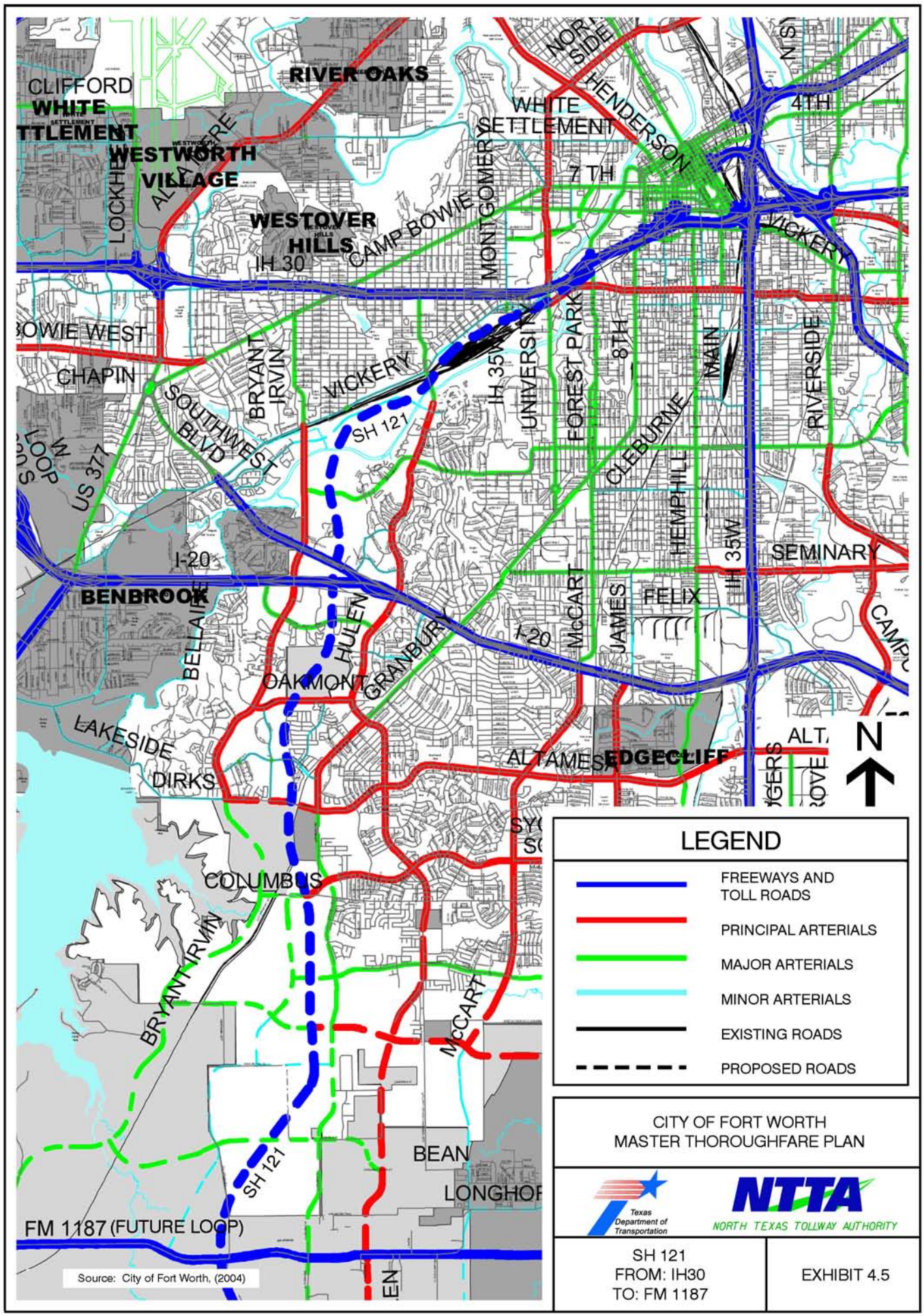
Roadways traversing the PSC or located adjacent to it include: Forest Park Boulevard, IH 30, IH 20, SH 183, Lancaster Avenue, Oakmont Boulevard, Rosedale Street, Vickery Boulevard, Wenneca Avenue, Tucker Street, Bellaire Drive, Altamesa/Dirks Road, , Hulen Street, Bryant Irvin Road, Montgomery Street, University Drive, Columbus Trail, Stuart-Feltz Road and FM 1187.

The existing road network around the PSC is composed of arterials, collectors, local streets, FM, county roads and unpaved roads. These roads typically have adequate to deteriorating pavement, high crowns, narrow or no shoulders, limited sight distances and discontinuous geometry. Also, many of these roads are discontinuous and have more vehicle traffic than they were designed to carry. Without major improvements to the existing road network or construction of a new roadway, such as proposed, the existing system would continue to become more congested. Increased congestion can lead to unsafe driving conditions that could result in higher traffic accidents.

4.1.5. Publicly Oriented Facilities

The Fort Worth Cultural District is located near the PSC and bounded by West 7th Street, Montgomery Street, IH 30 and University Drive. Offering a variety of shops, restaurants, six museums as well as performance art theaters, the area is the third largest Cultural District in the United States.

Public parks and recreation areas are located within the PSC. Currently, there is a bike trail maintained by the City of Fort Worth Parks and Community Services Department along the Clear


CLIFFORD
WHITE SETTLEMENT
WESTWORTH VILLAGE
RIVER OAKS
WESTOVER HILLS
IH 30
CAMP BOWIE
MONTGOMERY
WHITE SETTLEMENT
NORTH SIDE
HENDERSON
7 TH
4TH
VICKERY
BOWIE WEST
CHAPIN
BRYANT IRVIN
SOUTHWEST BLVD
US 377
SH 121
IH 35W
UNIVERSITY
FOREST PARK
8TH
CLEBURNE
HEMPHILL
MAIN
RIVERSIDE
I-20
BENBROOK
BELLAIRE
HULEN
GRANBURY
OAKMONT
McCART
JAMES
FELIX
SEMINARY
LAKESIDE
DIRKS
ALTAMESA
EDGECLIFF
COLUMBUS
BEAN
LONGHORN
FM 1187 (FUTURE LOOP)
Source: City of Fort Worth, (2004)
N
LEGEND
FREEWAYS AND TOLL ROADS
PRINCIPAL ARTERIALS
MAJOR ARTERIALS
MINOR ARTERIALS
EXISTING ROADS
PROPOSED ROADS
CITY OF FORT WORTH
MASTER THOROUGHFARE PLAN
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
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Fork of the Trinity River. This bike trail is also part of the NCTCOG's planned veloweb system. The veloweb is composed of smaller roads with a minimum of stop signs and traffic lights benefiting fast moving bicyclists. Preliminary plats, filed with the City before March 2004, show proposed parks adjacent to the proposed SH 121 ROW. Existing parks are depicted in Exhibit 4.6. Proposed parks are depicted in Exhibit 5.8.

Various facilities, such as schools and hospitals as well as churches, exist in close proximity to the PSC. These locations include the Fort Worth Country Day School, located on Country Day Boulevard, Brooklyn Heights School, located at 3813 Valentine, All Saints Hospital, located north of Oakmont Boulevard and the Harris Methodist South Southwest Hospital, located south of Oakmont Boulevard. The churches include: San Mateo Catholic Church on Lovell Avenue, Greater Friendship Baptist Church on Wenneca Avenue and St. Paul Lutheran Church north of IH 30.

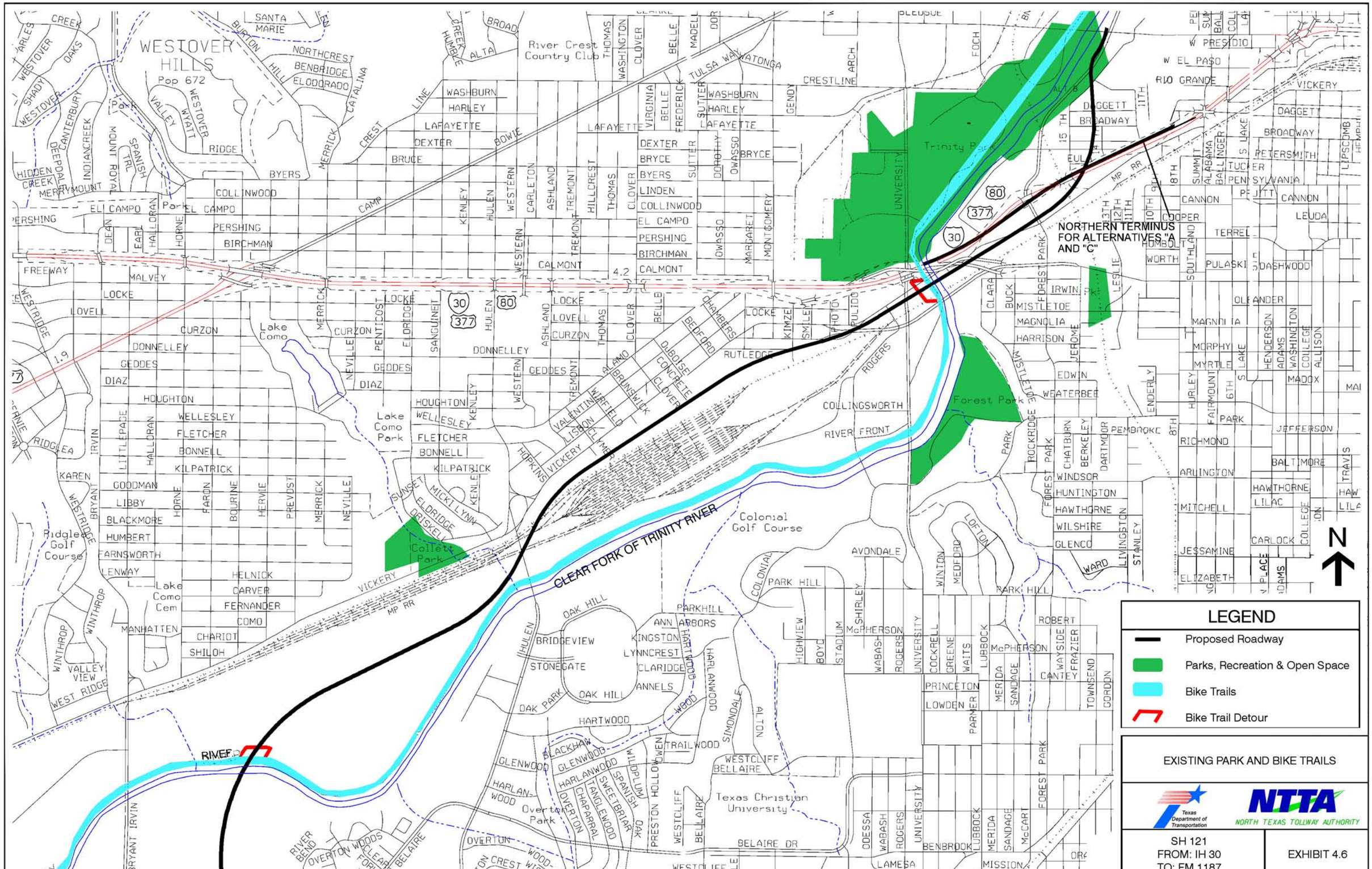
4.2. Environmental Setting

4.2.1. Earth Resources

Soils

The various soil series along the PSC are best described utilizing the general soil map units as developed by the Natural Resource Conservation Service (NRCS), formerly the Soil Conservation Service, in "The Soil Survey of Tarrant County" June, 1981. The general soil map units are typically comprised of one or more major detailed soil map units in combination with minor proportions of other soil types. General soil map units found in the PSC include the Sanger-Purves-Slidell, the Aledo-Bolar-Sanger and the Frio-Trinity units. The Sanger-Purves-Slidell unit consists of nearly level and gently sloping, deep and shallow, clayey soils located mainly on uplands. The soils in this unit are mainly used as cropland, pastureland and rangeland and for urban purposes. The map unit is primarily made up of well-drained soils on slopes of zero to five percent. This unit makes up approximately 21 percent of the County and 37 percent of the PSC.

The Aledo-Bolar-Sanger unit consists of gently sloping to moderately steep, very shallow to deep, loamy and clayey soils located mainly on uplands. The soils in this unit are mainly used as


NORTHERN TERMINUS FOR ALTERNATIVES "A" AND "C"
CLEAR FORK OF TRINITY RIVER
Trinity Park
Forest Park
Colonial Golf Course
Texas Christian University
River Crest Country Club
Lake Como
Lake Como Park
Lake Como Cem
Collett Park
Overton Park
Ridglea Golf Course
WESTOVER HILLS
Pop 672
RIVER
LEGEND
Proposed Roadway
Parks, Recreation & Open Space
Bike Trails
Bike Trail Detour
EXISTING PARK AND BIKE TRAILS
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 4.6

rangeland, pastureland and cropland and for urban purposes. The map unit is primarily made up of well-drained soils on slopes of one to 20 percent. This unit makes up 20 percent of the County and 48 percent of the PSC.

The Frio-Trinity unit consists of nearly level, clayey soils located on floodplains. The soils in this unit are mainly used as pastureland and for urban purposes. The map unit is primarily made up of well-drained soils on zero to one percent slope. This unit makes up seven percent of the County and about 15 percent of the PSC.

Geography

The PSC is within the Trinity River Basin in North Central Texas and the northwestern portion of the West Gulf Coastal Plain of Texas. Structurally, the area lies between the Texas Basin on the east and the Fort Worth Basin on the west. The Balcones fault approaches the eastern edge of the PSC.

Topography in the area consists of rolling hills with elevations ranging from 695 to 1,065 ft above sea level.

Mineral Resources

Sand, gravel, stone, lime and cement represent the greatest contribution to previous mineral production in Tarrant County. No current mineral or petroleum production occurs within the PSC.

Prime and Unique Farmlands

Some soil series within the PSC have been designated as prime farmland. These soils are found along the Clear Fork of the Trinity River between IH 20 and Vickery Boulevard. This section of the PSC is currently undeveloped, though it is designated for commercial uses and has not in the recent past supported farmland activities.

Wetlands

The 1992 National Wetlands Inventory (NWI) maps as prepared by the United States Department of the Interior, U.S. Fish and Wildlife Service (FWS), current aerial photographs and visual inspection of the proposed alignment were utilized to identify and locate affected wetlands. Wetlands are defined in the *1987 USACE Wetlands Delineation Manual* as, "those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support and that under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions." Wetlands generally include swamps, marshes, bogs and similar areas.

Identifiable wetland (potential jurisdictional waters of the United States) areas associated with the SH 121 PSC are of two types, as indicated by the FWS Wetland Classification System. These two types are:

- Riverine - all freshwater habitats contained within a channel, including streams, springs and/or rivers, except those dominated by trees, shrubs, or persistent emergent vegetation; and
- Palustrine - water systems dominated by emergent vegetation, or small (less than 20 ac), shallow (less than six feet in depth) bodies of water without shoreline features dominated by bedrock or wave action.

The potential jurisdictional waters of the United States associated with ponds within the PSC are composed of small man-made surface water impoundments intended for livestock watering. These impoundments are mostly less than one acre in surface area. Pond designations under the FWS include: Palustrine, unconsolidated bottoms, permanently flooded, dike impoundments, PUBHh; Palustrine, unconsolidated bottom, semi-permanently flooded, diked impoundment, PUBFh; and, Riverine, unconsolidated bottom, permanently flooded, excavated, R2UBHx. The impoundments designated PUBHh and PUBFh generally have some emergent vegetation and might contain small forage fish or game fish. However, they are not considered to be of high quality or serve as an important wildlife habitat. Riverine jurisdictional waters of the United States (streams and rivers) demonstrate appreciable flow only after rainfall or in the case of the Clear Fork of the Trinity River, those times when flow is being released from the Benbrook dam or spillway. Vegetation contained within floodplain areas associated with streambed jurisdictional waters of the United States within

the PSC is predominantly deciduous hardwood broad-leaf trees. There are approximately 20 jurisdictional waters of the United States within or in close proximity to proposed SH 121. Most of these areas are palustrine (stock ponds).

Surface Water Resources

The PSC is within the Trinity River Basin. Surface waters within the PSC include the Clear Fork of the Trinity River, stream segment 0829 from the confluence with the West Fork of the Trinity River to Benbrook Dam and several intermittent streams, such as several unnamed tributaries to Rock Creek as well as the Clear Fork of the Trinity River. The Clear Fork of the Trinity River begins in Parker County and drains southwestern Tarrant County. The Clear Fork of the Trinity River is a mature stream with a fairly low, uniform gradient of approximately seven feet per mile.

According to the TCEQ's 1998 Water Quality Inventory, the water quality of the segment is limited due to water quality standards violations; however, the designated water uses do include contact recreation, high aquatic life or public water supply. The Texas Department of Health (TDH) issued an aquatic life closure in 1990 due to elevated levels of chlordane in fish tissues; fish consumption is not supported. Urban runoff appears to be the principal source of contamination. Water flow within the PSC is primarily influenced by rainfall.

Benbrook Lake reservoir was formed by the impoundment of waters of the Clear Fork of the Trinity River and is located approximately one mile southwest and upstream of the PSC. The reservoir is a source of water for the City and Tarrant County. It also serves as a recreational facility in addition to providing flood control. The Fort Worth District of the USACE manages Lake Benbrook. In addition to Benbrook Lake, there are several small impoundments consisting of ponds generally less than one acre in surface area that are used mainly for livestock watering.

Neither the USCG nor the USACE consider the waterway along the PSC as navigable.

The Clear Fork of the Trinity River as well as various intermittent streams, such as Rock Creek and other unnamed tributaries to the Clear Fork of the Trinity River are found within the SH 121 PSC. The Clear Fork of the Trinity River begins in Parker County and flows southwest into Tarrant County. According to the TCEQ 1998 Water Quality Inventory, the Clear Fork of the Trinity River, stream segment 0829: from the confluence with the West Fork Trinity River to Benbrook Lake Dam, has been classified to have a limited water quality because of water quality standard violations. The stream supports a high aquatic life and it is used for contact recreation and for public water supply, but because of the high levels of chlordane in fish tissue, fish consumption is not supported through the lower mile of the segment. The principal source of contamination is urban runoff. Water flow within the PSC is influenced mainly by rainfall events.

Benbrook Lake reservoir is formed by the impoundment of waters of the Clear Fork of the Trinity River and is located approximately one mile southwest and upstream of the PSC. According to TCEQ 1998 Water Quality Inventory, Benbrook Lake, stream segment 0830: from Benbrook Lake Dam to a point 220 yards (yd) downstream of US 377, up to the normal pool elevation of 694 ft, has been classified as having limited water quality or effluent limited because the lake is designated as a public water supply reservoir.

The designation of Benbrook Lake as a public water supply reservoir affords special wastewater treatment requirements. All domestic wastewater dischargers, located within five miles upstream of public water supply reservoirs, are required to achieve advanced waste treatment. The classification of Benbrook Lake as “water quality limited” or “effluent limited” is due only because of the public water supply designation and does not mean that any water quality standards have been exceeded. The lake supports a high aquatic life and its designated uses are contact recreation and as mentioned, public water supply. The reservoir is a major source of water for the City and Tarrant County and also provides recreation and flood control. Data for the current TCEQ evaluation period indicate attainment of criteria for designated uses.

In addition to Benbrook Lake, there are several small impoundments in the PSC consisting of ponds generally less than one acre in surface area. These are used mainly for livestock watering. The

impact to these small water bodies ranges from 28 percent to 90 percent as discussed in Jurisdictional Waters of the United States and Wetlands Impacts, (Chapter 5.0, Environmental Consequences).

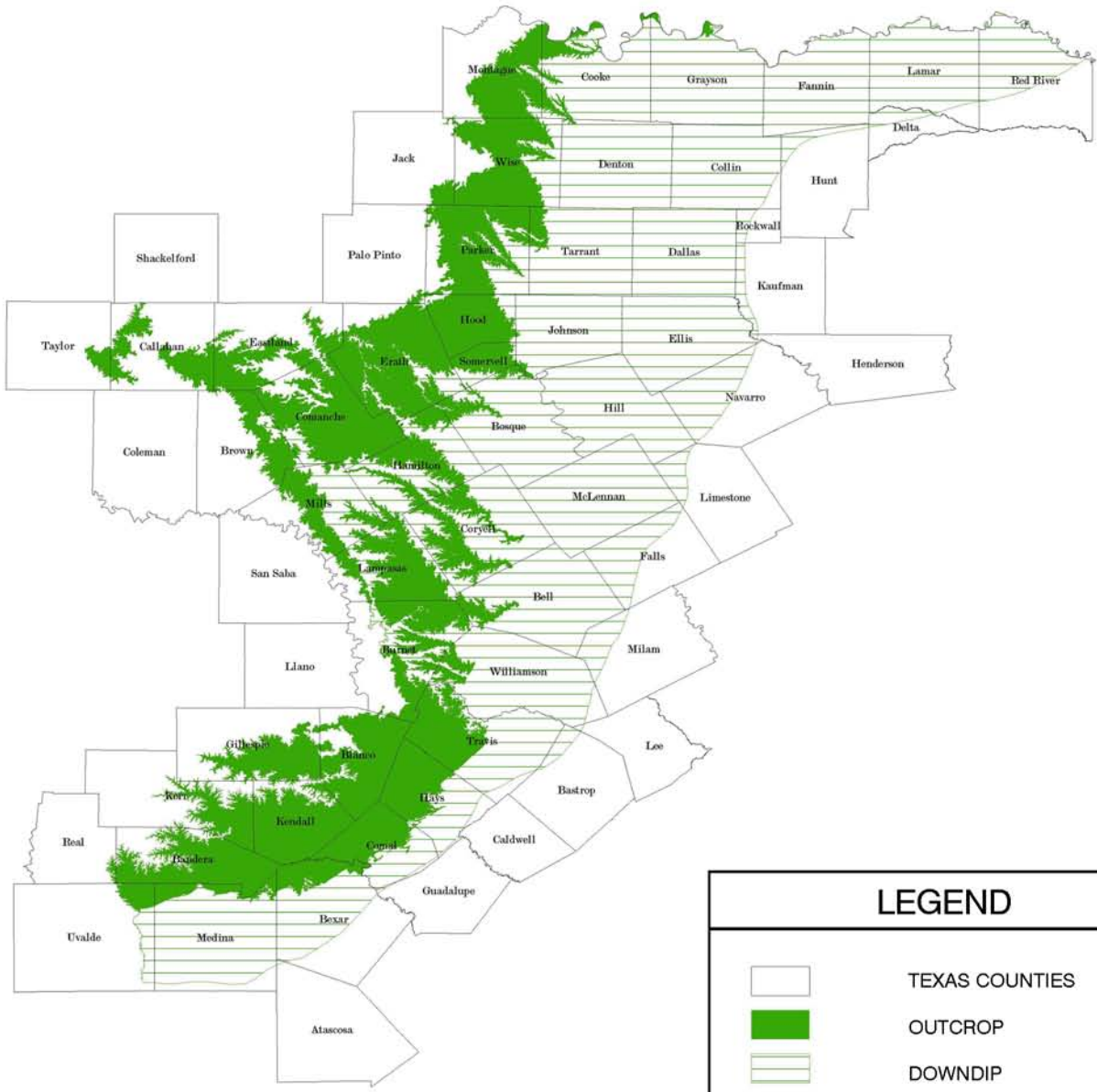
Groundwater Resources

The Trinity Aquifer (Exhibit 4.7) consists of early Cretaceous age formations of the Trinity Group that extends from the Red River in North Texas to the Hill Country of South-Central Texas. Formations comprising the Trinity Group are (from youngest to oldest) the Paluxy Sand, Glen Rose and Twin Mountain-Travis Peak. The Travis Peak formation has historically been the most productive in Tarrant County. Its depth increases toward the east ranging from 550 ft at Eagle Mountain Lake to 1,490 ft at Arlington. It has an approximate thickness of 300 ft where it crosses the PSC. The Paluxy Sand formation crops out in the northwestern part of the county and averages 160 ft in thickness, beginning at a depth of approximately 300 ft. A Quaternary system of detrital alluvial deposits consists of material derived from formations that crop out within the drainage basin of the Trinity River. These floodplain deposits consist of rounded gravel, sand and clay. Floodplain deposits are extensive along the Clear Fork of the Trinity River and range in width from a few feet to more than two miles. The alluvial deposits in Tarrant County furnish small to moderate quantities of ground water, the larger yields coming from lower terraces and floodplains. The quality of water from this formation is generally poor due to surface pollution.

The Trinity Aquifer is a major aquifer underlying the SH 121 PSC. The downdip section of this aquifer underlies approximately 90 percent of Tarrant County. Along the PSC, the water-bearing formations dip below the surface and are covered by other formations. The downdip section of an aquifer is less susceptible to contamination. The outcrop of the Trinity aquifer, or recharge zone, is located west of the PSC. Woodbine, a minor aquifer, also underlies the PSC (Exhibit 4.8). The outcrop, the principal recharge zone, is located east of the PSC.

Climate

The Metroplex is located within north central Texas, approximately 250 mi north of the Gulf of Mexico. It is near the headwaters of the Trinity River that is found within the upper margins of the



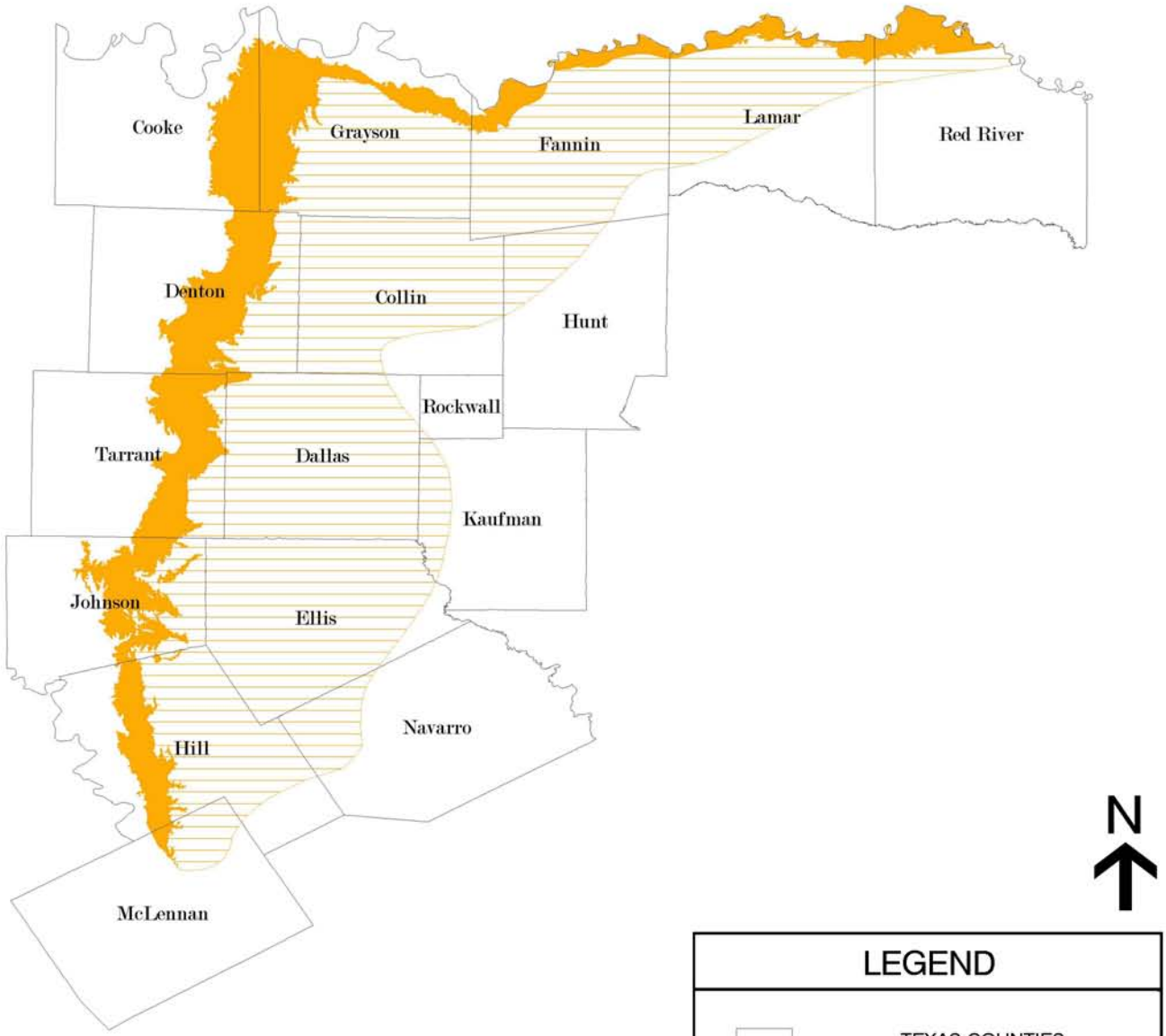
TRINITY AQUIFER

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 4.7



LEGEND

TEXAS COUNTIES

OUTCROP

DOWNDIP

WOODBINE AQUIFER

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 4.8

Coastal Plain. The Metroplex's climate is humid subtropical with hot summers. It is also continental, characterized by a wide annual temperature range. Annual precipitation varies considerably, ranging from less than 16 inches (in) to more than 45 in. Winters are mild, but "blue northers" occur about three times each winter and often are accompanied by sudden drops in temperature. Periods of extreme cold that occasionally occur are short-lived, so that even in January mild weather occurs frequently. The highest temperatures of summer are associated with fair skies, westerly winds and low humidity. Characteristically, hot spells in the summer are broken into three-to-five day periods by thunderstorm activity. Average temperatures range from an average low of 37º F in January to an average high of 98º F in August. Thunderstorms occur throughout the year, but are most frequent in the spring. The average length of the warm season (freeze-free period) is approximately 249 days. The average last occurrence of 32º F or below is normally in mid-March and the average first occurrence is in late November. The mean annual precipitation is 33.7 in and the mean annual snowfall is 3.1 in.

Air Quality

Four areas in Texas: Houston/Galveston, Beaumont-Port Arthur, DFW and El Paso are in non-attainment for O_3 under the 1-hour standard. Under this standard, O_3 concentrations of 125 parts per billion (ppb) should not be met or exceeded more than three times in three consecutive years at the same monitoring site.

The PSC is located within a non-attainment area for 1-hour and 8-hr O_3 standards. Under 8-hour standard, ozone concentrations for the average of the annual fourth highest daily eight-hour maximum over a three-year period cannot be at or above 85ppb. A demonstration of transportation conformity for added capacity projects to the 8-hour O_3 standard is not required until the end of the EPA one-year grace period. The EPA one-year grace period will end June 15, 2005. O_3 concentrations have exceeded the 1-hour standard of 0.125 parts per million (ppm)/125 ppb. The TCM to correct the current air quality status for O_3 is presented in the SIP. Carbon Monoxide (CO) standards have not been exceeded over the last four years; Tarrant County is in attainment for CO standards.

Traffic Noise

Sound from highway traffic is generated primarily from vehicle tires, engine and exhaust. It is commonly measured in decibels (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 sound. This adjustment is called A-weighting and is expressed as dB(A).

Presently the predominant noise generators north of Bellaire Drive in the proposed SH 121 project area are vehicular traffic and the UPRR Yard. Noise from the railroad yard is attributed to the existing train hump station. This station is where railcars are released from the train they are on and sent over a hump to self propel to a new train by a computer operated switch network. The noise from the impact as the railcar connects with a new train can be heard from quite a distance.

Land use from Vickery Boulevard to FM 1187, is predominantly undeveloped with a few exceptions such as a school, a church, two hospitals and residential areas. The church, the hospital and the multi-family residential areas have no frequent human outdoor activity areas between highway and receiver; therefore, they were analyzed as activity category E (interior), with FHWA Noise Abatement Criteria (NAC) of 52 dB(A). Because the school and the single-family areas south of Oakmont Boulevard, Sunset Terrace and Mistletoe Heights have frequent human outdoor activity areas facing the proposed SH 121, they were analyzed as activity NAC category B (exterior), with FHWA NAC of 67 dB(A). More details on traffic noise analysis can be found in Noise Impacts (Chapter 5.0, Environmental Consequences).

Hazardous Materials

Hazardous Materials (hazmat) are used extensively by society for manufacturing, transportation, cleaning and other associated activities. They can be found in virtually every aspect of public and private daily activities, such as household cleaners, automotive fuels, manufacturing chemicals and

water and wastewater disinfectants. Independently owned auto-repair businesses, old filling stations, dry cleaners and manufacturing facilities are located along the northern section of the PSC. Auto-body shops and repair garages typically handle fuels and oils, filling stations store gasoline, dry cleaners use solvents and manufacturing facilities use many different types of chemicals. The presence of these types of materials does not imply that the property is contaminated, but might be an indication of the potential for contamination.

A Phase I Environmental Site Assessment report identified areas of potential environmental concern relating to hazardous waste use on properties within the SH 121 PSC. The report lists sites registered in the TCEQ Voluntary Cleanup Program (VCP), TCEQ Leaking Petroleum Storage Tank (LPST) database, TCEQ registered Underground Storage Tank (UST) database, Environmental Protection Agency (EPA) Resource Conservation and Recovery Act Information System (RCRIS) database utilizing the Facility index system (FINDS) and the Texas Industrial and Hazardous Waste Database (TxIHW). More details on report findings can be found in Section 5.22, Hazardous Waste Sites.

Potential waste sites can be categorized as: hazardous, municipal, solid waste, demolition, or other environmentally sensitive materials that would require special handling prior to and during construction of the project.

For the purposes of this study, a hazardous waste site is a potentially contaminated area, regardless of size, where waste materials, UST's or other environmentally sensitive materials are stored, used, produced or ultimately disposed. The presence of these materials indicate the potential for contamination, thereby justifying further investigation to assess the waste related impacts to the project. The *Resource Conservation Recovery Act* (RCRA) and the Comprehensive Environmental Response, *Compensation and Liability Act* (CERCLA) regulate hazardous waste sites.

Two categories of sites were identified within the PSC: former service/filling stations and commercial/industrial areas. Potential contamination associated with present and former service/filling stations located within the PSC is primarily related to the presence or former presence of UST's. UST's are strictly regulated by the TCEQ and EPA; however, UST's removed or taken

out of service prior to the adoption of regulations might have released pollutants that remain in the ground undetected. For these reasons, all current and former service/filling stations or any site that contains or formerly contained UST's should be considered potentially contaminated.

Commercial/Industrial areas might be contaminated due to the nature of the materials produced, raw materials used for production and/or the by-products of plant processes. There are numerous independently owned auto-repair businesses located along the northern section of the PSC. Auto-body shops and repair garages typically handle fuels, oils, paints and solvents. The presence of these types of materials does not imply that the property is contaminated, but could indicate potential surface or underground contamination.

A Phase I EA (1998) "commercial" investigation was commissioned by the TxDOT Fort Worth District Office to identify areas of potential environmental concern relating to hazardous waste use on properties within the PSC. The report lists:

- TCEQ VCP
- TCEQ LPST
- TCEQ registered Petroleum Storage Tank (PST) sites,
- EPA RCRIS database information from the FINDS and
- TxIHW database system.

A TxDOT hazmat study was subsequently conducted to identify any additional potential hazmats sites located within the potential ROW for Alternatives A, B, C, C/A and D. In addition to the databases mentioned previous, the EPA Envirofacts Database was searched to locate RCRA and Superfund sites within or near the PSC. However, RCRA sites do not include conditionally exempt small quantity generators that might produce enough waste over time to affect the environment. An additional field investigation was conducted on October 4, 2001 to locate sites that might have been excluded from government databases. Three additional sites were located that might pose a potential hazmat contamination. These sites are described as "potential" in each of the hazardous waste site tables that are presented for the different Build alternatives. Further investigation of the sites identified in the study might be necessary prior to ROW acquisition and/or during construction.

Results from the 1998 Phase I "Commercial" investigation and the 2001 TxDOT research revealed that the majority of the hazardous waste sites within the PSC are located in two areas. One of the areas is just north of IH 30 between Forest Park and Eleventh Avenue. The second area is along Vickery Boulevard between Concrete Street and Forest Park. Information can be found in Section 5.22, Hazardous Waste Sites (Chapter 5.0, Environmental Consequences).

4.3. Ecological Resources

4.3.1. Ecological Setting

The PSC is located within the Texan Biotic Province. All proposed alternatives lie in a transition area of the Blackland Prairies and East Cross Timbers. Non-urbanized areas of the PSC are most consistent with silver bluestem-Texas wintergrass grasslands vegetation type as outlined in "Vegetation Types of Texas" (Texas Parks and Wildlife Department [TPWD], 1984). Other areas of the project would be described as cleared pastureland and areas under cultivation.

The flora and fauna found within the PSC are typical of that found in the southeastern part of the Country. Benbrook Lake, in the vicinity of the PSC, supports diverse fish species. It is an important feeding and staging habitat for migratory birds. The Clear Fork of the Trinity River, located within the PSC represents a valuable ecological environment. A Colonial Waterbird Rookery (CWR) has been documented to occur within 1.5 mi of the project, but would not be affected by this project. Efforts by the TPWD and the City to stock the river with channel catfish, largemouth bass and rainbow trout are currently under way. Over 40 species of indigenous mammals have been inventoried in Tarrant County and potentially could be found within much of the PSC. Over 500 species of birds are known to occur within Tarrant county on a resident or transient basis and their potential presence in the PSC is only diminished by the existing urban activity.

The vegetation in the rural area located along the southern alignment consists of big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indian grass (*Sorghastrum nutans*), switchgrass (*Panicum virgatum*), gramas (*Bouteloua sp.*) and buffalo grass (*Buchloe dactyloides*). In the past, substantial amounts of prairie forbs such as western ragweed (*Ambrosia*

psilostachya), sedges (*Cyperaceae sp.*), asters (*Aster sp.*) and sageworts (*Artemisia ludoviciana var. mexicana*) covered the area. Land mismanagement and cultivation have caused the uplands to be covered mostly by scrub oak (*Quercus sinuate var. breviloba*), mesquite (*Prosopis glandulosa*) and juniper (*Juniperus ashei*) with mid and shortgrass understories. The bottomland trees include hardwoods such as pecan (*Carya illinionensis*), oak (*Quercus sp.*) and elm (*Ulmus americana and Ulmus crassifolia*). Mesquite trees have heavily invaded these bottomland areas. Characteristic understory shrubs and vines include skunkbush (*Rhus trilobata*), saw greenbriar (*Smilax bona-nox*), bumelia (*Sideroxylon lanuginosum var. oblongifolium*) and poison ivy (*Toxicodendron radicans*).

Many of the native biotic communities have been displaced as a result of urban development as well as industrial and commercial activities. The vegetation in the urban areas along the northern part of the PSC is predominately ornamental. Trees such as crape-myrtle (*Langerstroemia indica*) sweetgum (*Liguidambar styraciflua*), live oak (*Quercus virginiana*), holly (*Ilex deciduas*) and mimosa (*Albizia julibrissin*) are currently located along roads, medians and property lines.

4.3.2. Environmentally Sensitive Areas

Environmentally sensitive areas are areas such as wildlife refuges, wild and scenic rivers or other specially designated areas. There are no known Environmentally Sensitive Areas located within the PSC.

4.4. Cultural Resources

An assessment of the potential for cultural resources within the PSC of the SH 121 from Forest Park Boulevard in Fort Worth to FM 1187 has been conducted. Research centered upon the identification of previously conducted archeological surveys, recorded archeological sites, properties listed on the National Register of Historic Places (NRHP), State Archeological Landmarks (SALs), Texas Historical Landmarks (THL) and Texas Historical Markers (THM) was conducted at the Texas Archeological Research Laboratory (TARL) and the Texas Historical Commission (THC). Background summaries and the historical context for the PSC, the historic background, requirements

for NRHP Eligible buildings/structures and the historic architectural context are found in the Historic Buildings Report on file at the TxDOT Fort Worth District Headquarters.

4.4.1. Archeological Surveys

A TxDOT survey was performed along the PSC in 1994. The survey resulted in the recording of one prehistoric archeological site: 41TR137. This site is located west of Old Granbury Road and south of Columbus Trail. Two other previous TxDOT surveys have been performed within the vicinity of the PSC, one on IH 20 in the City of Benbrook and the other on a section of FM 1187. In addition, a survey for the Department of Housing and Urban Development (HUD) included a tract of 22 ac east of Benbrook. No prehistoric archeological sites were identified as a result of these surveys.

An archeological survey of the northern sections of the PSC was conducted in March of 1999. It included nearly all of the northern sections of the PSC that were not surveyed in 1994. Certain areas in the northern section of the project were not surveyed, because they are currently the locations of active businesses in urban settings. Survey of these latter areas would be relegated to the construction phase of the project. The survey conducted in 1999 covered a very large tract of private land that crosses a section of the Clear Fork of the Trinity River. Two archeological sites were discovered within the proposed ROW on the Alternatives A, B, C, C/A and D, consisting of one prehistoric site (41TR170) and one historic site (41TR171).

Five additional prehistoric archeological sites have been recorded in the general area of the project (Section 4.4.2, Archeological Sites), but none of these are located within the proposed ROW of Alternatives A, B, C, C/A and D.

4.4.2. Archeological Sites

Prehistoric site 41TR170 was discovered buried within floodplain deposits on the south side of the Clear Fork of the Trinity River. Survey of the 41TR170 area revealed a buried, multi-component prehistoric site. The site is extensive and covers a large portion of the ROW in the general area where the project area intersects the southern edge of the Clear Fork of the Trinity River. Two

distinct lenses of prehistoric cultural materials were detected, one buried approximately three feet below surface and one buried approximately 4.25 ft below the surface. This suggests the presence of at least two different prehistoric occupations during the late Holocene.

Site 41TR170 contains intact, rock lined hearth features, exhibits good organic preservation (animal bone and charcoal) and is buried at variable depths in the floodplain. Thus, site 41TR170 appears to be undisturbed and exhibits several of the positive qualities by which the NRHP significance of archeological sites is measured. Geomorphic evaluation of the floodplain in this area suggests the presence of deep Holocene soils and that the cultural materials might have been deposited relatively late in the Central Texas archeological sequence (Late or Post-Archaic, over the last 1000-2000 years).

Historic archeological site 41TR171 consists of a collection of historic to modern buildings and building remains located along an abandoned road north of the Clear Fork of the Trinity River. This site consists primarily of a pile of rough cut stone and fence remnants at the southern end of the site, barbed wire fencing and a dilapidated shed and cattle loader in the center, an old foundation remnant likely dating to the turn of the century further north and a dilapidated shed at its northern end. Also included in the site are a number of collections of trash and other refuse. About 50 percent of this site is located within the proposed SH 121 ROW. Site 41TR171 is disturbed and contains a mix of historic and modern-age deposits and therefore appears ineligible for the NRHP or as a SAL.

Five additional prehistoric archeological sites have been recorded in the general area of the project (41TR65, 66, 119, 137, 147). Of these, only site 41TR137 is located close to the ROW. Archeological site 41TR137, recorded in the TxDOT survey of 1994 is located near Lake Benbrook. At the time of recording, the site area was pastureland. Recorders observed a biface, chert flakes, flakes of other materials and fire-cracked rock. No features were observed and no shovel tests were performed in the site. Twenty-two shovel tests were performed west of the site in the projected ROW of the road. These produced negative results suggesting that the site would not be impacted by construction of the planned tollroad.

4.4.3. Historic Resources

NRHP Properties and SALs

Although one recorded Texas Historic Landmark is located within 0.25 mi from the location of the proposed SH 121, no NRHP properties or SALs have yet been designated within the PSC.

Historical Markers

Two cemeteries with historical markers are located in the area. Burke Cemetery is located 0.50 mi south of the project at the Clear Fork of the Trinity River and the Willburn Cemetery is in a residential development on the north side of Mary's Creek near its confluence with the Clear Fork of the Trinity River. Neither cemetery would be impacted by the recommended project.

Cemeteries

Four cemeteries are found within the general project area, but would not be affected by construction of the project. Two of the cemeteries were noted previous and have historical markers associated with them. The other two are known as Muhlinghause and Crilleland Cemeteries situated along Rock Creek. Both sites are about a mile west of the project.

4.4.4. Historic Buildings and Structures

Historic Buildings and Structures — Field Survey Results

The following historic resource information identifies architectural sites (buildings, structures, objects and districts, etc.) within the Area of Potential Effect (APE) for the proposed SH 121 project. The APE, as designated by the THC for this proposed undertaking is one-quarter of a mile on either side of the proposed SH 121. Archival research and a reconnaissance survey were conducted to identify historic-age sites (pre-1952) within the project's APE.

The archival research consisted of reviewing the NRHP, the State Archeological Landmark (SAL) listings and the Historic Fort Worth Library and property files. The results indicate that no National Register Markers, three Official State Historical Markers and one City Marker commemorating

important historical figures were identified within the APE for the proposed route. The reconnaissance surveys consisted of identifying, examining and photographing potential sites of interest and on occasion were supplemented with informal interviews with interested property owners. Based on the Secretary of Interior's Standards and Guidelines for the Evaluation of Historic Properties the historical significance and architectural integrity the buildings were evaluated for their potential eligibility to the NRHP.

The project area stretches from IH 30 to FM 1187. There were no architectural sites more than 50 years of age or older identified in the southern portion of the project area from IH 20 to FM 1187. However, a large concentration of historic-age resources located between IH 30 to IH 20 in the northern portion of the project area was identified. As a result, the focus of the field survey was between Eighth Avenue and Hulen Street with which 257 residential, commercial and industrial properties, bridges, railroad structures and a botanic garden (site Nos. 1 through 257) were identified and evaluated for National Register eligibility based on the information about each structure provided below. In addition, specific information pertaining to historic buildings including mapped location, photo documentation and the potential impact of each alternative is included in a Historic Buildings Report submitted under separate cover. This report is on file at the TxDOT Fort Worth District Headquarters.

NRHP Listed and Potentially Eligible Sites

The field survey identified 13 potentially NRHP eligible sites in the APE of the proposed new location tollroad. Residential dwellings, railroad structures, a botanic garden, a historic district, an industrial property and a bridge are the building types identified and of which summaries of each are included in the following site summaries.

Factory Place Neighborhood:
Site No: 36 Deats Duplex House

Location:	3930-32 Lisbon Street
Construction Date:	1929
Property type:	Domestic/Multi-family
Residential Status:	Potentially eligible for National Register listing.

The single-story, clapboard sided, rectangular-plan duplex is surmounted by a front-gabled roof with exposed rafters. It is accessed through two single door entries sheltered by two symmetrical front-gabled porches with brick pier supports. The original owner of the house was George W. Deats, master mechanic for the Texas & Pacific Railroad. He purchased the property the year the Lancaster Railroad Yards moved to this area and built the house the following year. It has served as rental property and an owner-occupied residence for workers in the Texas and Pacific Lancaster Railroad Yards. It is eligible for National Register listing under Criterion A: Event and its association with community planning and development west of Fort Worth.

Brooklyn Heights Neighborhood:

Site No: 37 Graham-Merchant House

Location:	3504 Lovell Avenue
Construction Date:	1901
Property type:	Domestic/Single-family Residential
Residential Status:	Potentially eligible for State of THM program: eligible for National Register listing.

The single-story, L-plan, clapboard sided house is surmounted by a cross-gabled roof. Single door entries on the east elevation and south facade are accessed through a shed and half-hipped roof porch supported by square wood columns. The windows are single or pairs of one/one double-hung wood sash. They are flanked by wood shutters and sheltered by shed awnings. Two separate shed roof additions extend from the north elevation.

Howard B. Graham built the house and lived in it until 1913 when he sold it to Calvin C. Merchant, a laborer, who lived there until his death in 1924. His wife occupied the house until 1939. The Graham-Merchant house is eligible for the official THM Program and for listing in the NRHP under Criterion C: Design/Construction and under Criterion B: association with a relevant person.

Site No. 77 Centennial Yards, Texas and Pacific Lancaster Railyards

Location:	South of 3900 Block of Vickery Boulevard
Construction Date:	1928
Property type:	Railroad
Residential Status:	Potentially eligible for National Register listing under the Railroad Structures Multiple Property Group.

Historically, the railyards consisted of two office and machine shops and one repair facility. In 1928, John Lancaster, president of the Texas and Pacific Railroad, unveiled plans to improve the downtown rail system. The improvement involved relocating the roundhouse, train yards, repair facilities and shops from the depot to a spot three miles southwest of the CBD of Fort Worth. This new location of facilities spawned a new community of industries and railroad workers who lived near by. Originally, the main structure featured multi-paned casement windows, a projecting cornice and a parapet along the front elevations. The railyards are eligible for National Register listing under the proposed Railroad Structures Multiple Property Group.

Site No. 78 Municipal Rose Garden/Fort Worth Botanic Garden

Location:	2200 Botanic Garden Drive
Construction Date:	1933-1934
Property type:	Botanic Garden
Residential Status:	Potentially eligible for National Register listing

Historically, the oldest botanic gardens in Texas, it consists of the main building and the Rose Garden. Built with Depression Relief funds, the City borrowed $340,000 from the Reconstruction Finance Corporation to construct a new city park. The Civil Works Administration, who employed stonemasons, carpenters and unskilled workers completed the work. The design, by Hare and Hare of Kansas City, Missouri, was based on a Renaissance axial plan, incorporating a formal garden in the center with smaller gardens radiating out on terraces below. The walkways and shelters are made of Palo Pinto County sandstone. The entire site is eligible for National Register listing under Criterion C: Design/Construction and Criterion A: for its association with the Depression Era.

Site No. 79 Texas and Pacific Railroad bridge

Location:	2000 Block of Vickery Boulevard
Construction Date:	1927
Property type:	Railroad
Residential Status:	Potentially eligible for National Register listing under the Railroad Structures Multiple Property Group.

The Texas and Pacific Railroad bridge is a steel through truss system supported by reinforced concrete piers and approaches. It crosses the Clear Fork of the Trinity River and is eligible for National Register listing under the Railroad Structures Multiple Property Group.

Mistletoe Heights Neighborhood:

Site No. 80 Mistletoe Heights Neighborhood Historic District

Location:	Southside of Fort Worth
Construction Date:	Ca 1909-1922
Property type:	Residential District
Residential Status:	Potentially eligible for National Register listing as a historic district.

Although it was platted in 1890, Mistletoe Heights was not immediately annexed to the city. Annexation was achieved in two phases, in 1909 and 1922. It was only after World War I that the area was developed as a residential district; during this period, city government became more structured and apportionment of services more organized. By the late 1920s, the area was densely settled, with an area of large homes as well as smaller enclaves of more modest bungalows. Today, Mistletoe Heights is a local conservation area, one of nine subdivisions comprising the Forest Park Conservation District. It is eligible National Register listing as historic district significance in community planning and development.

Site No: 85 Agee-Renfro-Vandervoort House

Location:	1200 Mistletoe Drive
Construction Date:	Ca 1915
Property type:	Domestic/Single-family Residential
Residential Status:	Contributing member of the Forest Park Conservation District; eligible for National Register listing following restoration and/or documentation.

The two-story, brick, Mediterranean-influenced dwelling is surmounted by a hipped tile roof with boxed eaves, a plain frieze and a hipped dormer. A single door entry with sidelights is accessed through a one-story, hip-roofed, partial-width porch with paired round columns on a solid brick railing. The windows are single and triple one/one double-hung wood sash; windows north and south of the porch have an arched transom. A hipped porte-cochere with brick piers is at the north elevation.

Howard L. Agee, president and general manager of the Agee Screen Company is the earliest recorded owner of the house. The Renfro family, owners of a drug store chain, owned the house in the 1920s and 1930s. In 1940, they traded the house to the Vandervoort family, owners of the Vandervoort Dairy, in exchange for the provision of ice cream to the Renfro Drug Store. The

Vandervoort family sold the house in 1954. The house is a contributing member of the Forest Park Conservation District and eligible for National Register listing under Criterion C: Design/Construction.

Site No: 117 Boyd House

Location:	1138 Clara Street
Construction Date:	Ca 1919
Property type:	Domestic/Single-family Residential
Residential Status:	Contributor to the Forest Park Conservation District; eligible for National Register listing following restoration and/or documentation.

A hipped roof with wide overhanging eaves surmounts the two-story, stuccoed, Prairie-influenced dwelling. A double door entry is accessed through a one-story hipped corner porch supported by stucco piers and a solid railing with concrete coping. The windows are single and bands of narrow 1/1 double-hung wood sash. In the 1920s, the first owner, Ellis H. Boyd, part owner of a motor company and oil well manufacturing company, built it. Currently, it is a contributing member of the Forest Park Conservation District and eligible for listing in the National Register under Criterion C: Design/Construction.

Site No: 144 Klar House

Location:	2400 Mistletoe Boulevard
Construction Date:	Ca 1927
Property type:	Domestic/Single-family Residential
Residential Status:	Contributing member of the Forest Park Conservation District; eligible for National Register listing following restoration and/or documentation.

A hipped tile roof with wide overhanging eaves surmounts the single-story, brick, Prairie-influenced dwelling. It is accessed through a hip-roofed, partial-width porch supported by brick piers with decorative column capitals and a solid brick railing topped by concrete coping. Windows are single, paired and triple one/one double-hung wood-sash with decorative muntins in the upper sash. Three brick chimneys rise above the north, south and west elevations. The house was built by Stein & Carb for Jacob Klar, a partner in the jewelry firm of Wolf & Klar. It is a contributing member of the Forest Park Conservation District and eligible for listing in the National Register under Criterion C: Design/Construction as an excellent example of an embellished bungalow.

Quality Hill:

Site No. 239 Cobb-Burney House

Location:	1598 Sunset Terrace
Construction Date:	1903
Property type:	Domestic/Single-family Residential
Residential Status:	Currently a State of THM; eligible for National Register listing.

The two-story, rectangular-plan, yellow brick, Prairie-influenced house is surmounted by a side-gabled roof with large overhanging eaves. A single door entry accesses the southwest facade sheltered by a flat roof porch supported by rectangular brick columns that partially spans the facade. A single four/one double-hung wood sash window to the northwest and southeast flanks the entrance door. Pairs of casement windows with decorative wood muntins are featured on the second level. Other windows include shorter single or ribbon casement with decorative wood muntins. A decorative brick pattern defines the soffit line around the house and is featured between each window on the second level. A brick chimney rises above the southwest slope of the roof.

The house was built for Lyman D. Cobb, a mortgage company president and his wife Emma. In 1919 Emma Cobb sold the home to Judge Ivy Burney, a lawyer whose special field was the cattle industry. Currently the house bears a State of THM and is eligible for National Register listing under Criterion C: Design/Construction and for its influences of the Chicago Prairie School style of architecture.

Site No. 255 Saint Louis and San Francisco Railroad Bridge

Location:	2200 Block of West 7th Street
Construction Date:	1931
Property type:	Railroad
Residential Status:	Potentially eligible for National Register listing under the Railroad Structures Multiple Property Group.

The Saint Louis and San Francisco Railroad bridge is a steel through truss system supported by reinforced concrete piers. It features a long timber trestle that extends west across Trinity Park. The bridge was built after the Saint Louis and San Francisco Railroad bought the ROW crossing the

Clear Fork of the Trinity River. It is eligible for National Register listing under the Railroad Structures Multiple Property Group.

Site No. 256 City of Fort Worth Water Works/North Holly Water Treatment Plant

Location:	1500 11th Avenue
Construction Date:	1891-1892 to 1954
Property type:	Industrial
Residential Status:	Potentially eligible for listing in the NRHP

The City of Fort Worth Water Works/North Holly Water Treatment Plant is divided into two separate pieces of property, North Holly and South Holly. North Holly is a historic property built prior to 1952 and includes the earliest building, the pump building, dating from 1891-1892. The plant was built in response to the city's unprecedented growth related to the coming of the railroads and associated industries. Additionally, the rectangular-plan, block form buildings incorporate elements of Romanesque Revival and Mission Revival influences which are a prime example of municipal design from the early twentieth century. For this reason it is eligible for listing in the NRHP under Criterion A: Event and its association with the historic growth and development of Fort Worth and Criterion C: Design/Construction.

The property on which South Holly is located was developed separately from North Holly. The City acquired Land in 1956 for construction of South Holly, which opened for operation in 1958. Prior to the City's acquisition of the property, the land was undeveloped and not used for water filtration or treatment; however, the buildings were sensitively designed to emulate the simple rectangular forms and the Romanesque Revival style of North Holly. After coordination with TxDOT, Environmental Affairs Division (ENV), the buildings were determined ineligible for the National Register because they do not meet the 50-year age requirement established by the construction date of the proposed SH 121 project.

Site No. 257 West Lancaster Bridge

Location:	2800 Block of West 7th Street
Construction Date:	1938
Property type:	Roadway Underpass-Overpass/Bridges
Residential Status:	Potentially eligible for listing in the NRHP

Crossing over the West Fork of the Trinity River and Trinity Park, the bridge was built to reduce traffic congestion on West 7th Street. The underpass over Foch Street incorporates a retaining wall and a pedestrian stairway to the bridge level and was built to provide access to Farington Field Stadium. According to the Tarrant County Historic Resource Survey, the bridge is eligible listing in the NRHP as part of the Roadway Underpass-Overpass Multiple Property Group. The survey stated "The significance of the group lies in its scale – unusually large for a Texas city – and in its portrayal of the city's commitment to accommodate rail facilities during a period of intense growth."

Non-eligible Sites

A total of 242 properties were identified in the project area that are not eligible for National Register listing, but are more than 50 years in age. Additionally, two buildings, site Nos. 82 and 148, are included in the survey and are less than 50 years in age. They are modern houses located in the Mistletoe Heights neighborhood. Constructed within the last two decades, they detract from the overall historic integrity of the neighborhood, but are included in the survey to demonstrate the current context of the area. More specific information pertaining to each historic-age and modern building, including photographic documentation and its relation to the proposed SH 121, is included in the Historic Buildings Report, under separate cover and on file at the TxDOT Fort Worth District Office.

4.5. Endangered/Threatened Species

Available information on threatened and endangered species from governmental agencies was obtained in order to assess the impact of the proposed SH 121. The FWS branch office in Arlington, Texas provided the list of endangered, threatened, candidate species and species of concern for Tarrant County. The TPWD Biological and Conservation Data System provided the Federal and State list for Tarrant County (Rev. 11/12/03) and these two lists were combined as shown in Table 4-3. The area around Benbrook Lake supports the feeding and staging cycles of a wide variety of migratory birds. Over 40 species of mammals and over 500 species of birds, both resident and transient are known to occur within Tarrant County and would have access to the PSC. The presence of any of these species within the PSC would be limited by their compatibility with urban activity.

Table 4-3 – Tarrant County Listed Endangered/Threatened Species SH 121 Corridor

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present
Birds				
Arctic Peregrine Falcon *(Falco peregrinus tundrius)*	DL	T	Nests in tundra regions; migrates through Texas; winter inhabitant of coastlines and mountains from Florida to South America. Open areas, usually near water.	No
Bald Eagle *(Haliaeetus leucocephalus)*	LT-PDL	T	Nests and winters near rivers, lakes and along coasts; nests in tall trees or on cliffs near large bodies of water.	No
Henslow's Sparrow *(Ammodramus)henslowii*	—	—	Grasslands, weedy fields or cut-over areas; dense groundcover with lots of bunch grasses, vines and brambles; bare ground for running/walking.	No
Interior Least Tern *(Sterna anitllarum athalassos)*	LE	E	Nests along sand and gravel bars within braided streams and rivers; also known to nest on man-made structures.	No
Migrant Loggerhead Shrike (*Lanius ludovicanus migrans)*	—	—	Open and semi-open grassy areas, farmland with scattered trees and brush.	Yes
Western Burrowing Owl (*Anthene cunicularia hypugaea)*	—	—	Prairies, pastures, farmland areas, savannas, open areas, vacant lots near human habitation.	Yes
White-faced Ibis *(Plegadis chihi)*	—	T	Prefers freshwater marshes, sloughs and irrigated rice fields, but will use brackish and saltwater habitat; nests in marshes, in low trees, on ground in bulrushes, reeds, or floating mats.	No
Whooping Crane *(Grus Americana)*	LE	E	Estuaries, prairie marshes savannah, grasslands, croplands pastures-winter resident at Aransas NWR, Aransas and Matagorda.	No
Mammals				
Black-tailed Prairie Dog (*Cynomys ludovicianus)*	C	—	Shortgrass prairies, pastures and farmland areas. Form colonies.	Yes
Plains Spotted Skunk *(Spliogale putorius interrupta)*	—	—	Open fields, prairies, croplands, fence rows, farmyards, forest edges and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Yes
Reptiles				
Texas Garter Snake *(Thamnophis sirtalis annectens)*	—	—	Wet or moist microhabitats near streams, rivers, ditches, canals, marshes and ponds.	Yes
Texas Horned Lizard *(Phrynosoma cornutum)*	—	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; sandy to rocky soil.	No
Timber/Canebrake Rattlesnake *(Crotalus horridus)*	—	T	Swamps, floodplains, upland woodlands, riparian zones, abandoned farmland; prefers dense ground cover, i.e., grapevines or palmetto.	Yes
Vascular Plants				
Auriculate false foxglove *(Tomanthera auriculata)*	—	—	Found in degraded prairies floodplains, fallow fields and borders of upland sterile woods; Extirpated in Texas; known from late 1800s specimen labeled "Benbrook."	No
Glen Rose Yucca *(Yucca necopina)*	—	—	Grasslands on sandy soils; also found in limestone bedrock, clayey soil on top of limestone and gravelly limestone alluvium. Flowering April-June.	No

LE, LT - Federally Listed Endangered/Threatened
PT, C - Federally Proposed Threatened, or Candidate Species
DL, PDL - Federally Delisted/Proposed Delisted
E, T - State Endangered/Threatened
" — " - Species of Concern, but with no regulatory listing status

Source: U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department and survey of project area (Update 11/12/03).

4.6. Publicly Owned Facilities and Community Services

Coordination was initiated with the TPWD and no existing or planned facilities are located within the PSC. A copy of the *Texas Outdoor Recreation Plan* (TORP), 1995, was reviewed. There are no plans being developed within the PSC for future publicly owned facilities or community services. The City of Fort Worth Parks and Community Services Department currently maintains a bike trail along the Clear Fork of the Trinity River (Please see Exhibit 4.6). This bike trail is also part of a NCTCOG planned veloweb system and would remain unaffected as a result of this project. Preliminary plats, filed with the City before March 2004, show proposed parks adjacent to the proposed SH 121 ROW. Proposed parks are depicted in Exhibit 5.8. There are no wild or scenic rivers as designated by the National Park Service within the PSC or vicinity.

CHAPTER 5

ENVIRONMENTAL CONSEQUENCES

5.0 ENVIRONMENTAL CONSEQUENCES

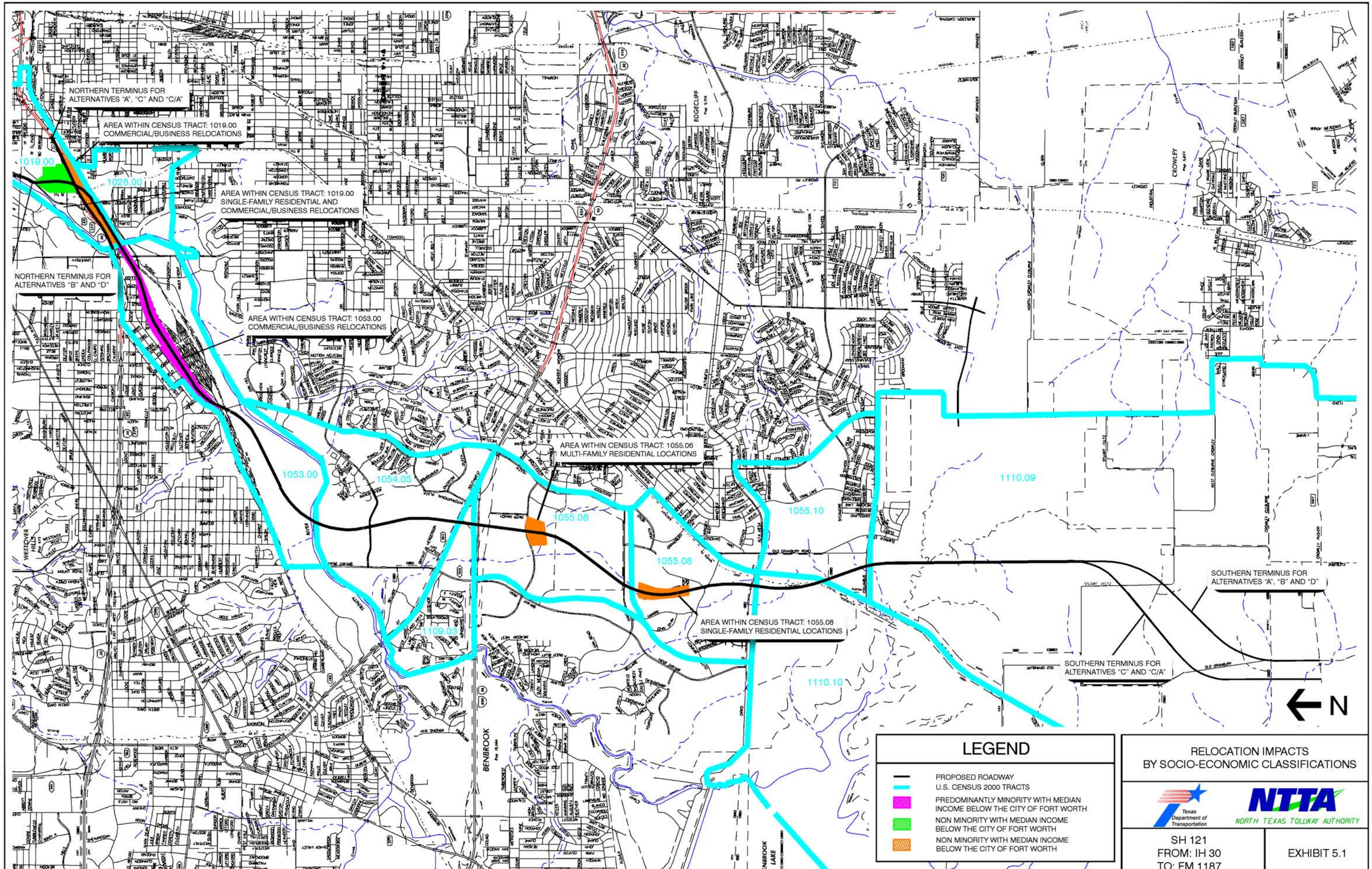
This section includes the potential beneficial and adverse social, economic and environmental effects of the five "Build" Alternatives A, B, C, C/A and D as well as the No-Build Alternative. Because all Build alternatives share a similar horizontal alignment, many of the environmental consequence categories/types are similarly impacted by all five of the Build alternatives (Please see Table 3-1). In the case of the C and C/A Alternatives, the environmental consequences are essentially identical.

5.1. Land Use Impacts

The DFW area is highly suburbanized and the outlying area to central city commute from the southwest area of Fort Worth does not provide for a direct route to the CBD, other than arterials such as Hulen Street, Bryant Irvin Road and Old Granbury Road. The growth in population and employment previously mentioned would increase the continuous development trend of suburban areas in southwest Fort Worth. Travel times, trip frequencies and trip lengths are expected to increase by the year 2025. Without improvements to the existing transportation system, such as the proposed SH 121 project, the existing traffic congestion is expected to increase.

The *2000 Fort Worth Comprehensive Plan*, adopted by the Fort Worth City Council on February 24, 2004, describes the City's proposed land use along the project. Although, according to *Texas Local Government Code* Section, 219.005, "a comprehensive plan should not constitute zoning regulations or establish zoning district boundaries", future land use is based on the Plan's land use policies and land use maps. Often, transportation access influences land use. The purpose of the City's Plan is to guide future land use in order to encourage economic development, promote housing developments, preserve cultural resources and to accommodate transportation routes and publicly owned facilities that would improve and provide the residents quality of life. The Plan includes the proposed SH 121 within the following sectors, as on Exhibit 5.1:

- Sector 1, Arlington Heights: area bounded on the north by the West Fork Trinity River, on the south east by the Clear Fork of the Trinity River and on the west by Bryant Irvin Road.
- Sector 2, Downtown: area bounded on the east by Forest Park Boulevard, on the south by the UP railroad tracks/IH 30 and on the east by railroad tracks west of IH 35W.


NORTHERN TERMINUS FOR ALTERNATIVES "A", "C" AND "C/A"
AREA WITHIN CENSUS TRACT: 1019.00 COMMERCIAL/BUSINESS RELOCATIONS
1019.00
1028.00
AREA WITHIN CENSUS TRACT: 1019.00 SINGLE-FAMILY RESIDENTIAL AND COMMERCIAL/BUSINESS RELOCATIONS
NORTHERN TERMINUS FOR ALTERNATIVES "B" AND "D"
AREA WITHIN CENSUS TRACT: 1053.00 COMMERCIAL/BUSINESS RELOCATIONS
1053.00
1054.05
AREA WITHIN CENSUS TRACT: 1055.06 MULTI-FAMILY RESIDENTIAL LOCATIONS
1055.06
1055.08
1055.10
1110.09
1109.03
AREA WITHIN CENSUS TRACT: 1055.08 SINGLE-FAMILY RESIDENTIAL LOCATIONS
1110.10
SOUTHERN TERMINUS FOR ALTERNATIVES "A", "B" AND "D"
SOUTHERN TERMINUS FOR ALTERNATIVES "C" AND "C/A"
N
EDGECLIFF
CROWLEY
WESTOVER HILLS
BENBROOK
BENBROOK LAKE
LEGEND
PROPOSED ROADWAY
U.S. CENSUS 2000 TRACTS
PREDOMINANTLY MINORITY WITH MEDIAN INCOME BELOW THE CITY OF FORT WORTH
NON MINORITY WITH MEDIAN INCOME BELOW THE CITY OF FORT WORTH
NON MINORITY WITH MEDIAN INCOME BELOW THE CITY OF FORT WORTH
RELOCATION IMPACTS BY SOCIO-ECONOMIC CLASSIFICATIONS
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 5.1

- Sector 7, Far Southwest Planning Sector: bounded by single-family residential, agricultural and light industrial to FM 1187, on the south of FM 1187 by single-family residential subdivisions under construction in areas planned for such growth; and the remainder of the sector is open space.
- Sector 14, Texas Christian University (TCU)/Westcliff: bounded on the west by the Clear Fork of the Trinity River and Bryant Irvin Rd, on the east by 8th Avenue, Granbury Road and McCart Avenue; and on the south by IH 20/SH 183.
- Sector 15, Wedgewood: bounded on the north by IH 20/SH183, on the west by the Clear Fork of the Trinity River, on the south by Risinger Road and on the east by the BNSF railroad tracks.

Development strategies recommended by the Plan in relation to the project, include mixed-use growth development, as defined by the City is a highly urbanized area similar to a downtown area. This consists of high employment concentration, housing units, schools, publicly owned facilities, public transportation and pedestrian activity. A similar area is envisioned for north of IH 30 and along the south side of the corridor, west of Hulen Street to the Trinity River. The Plan also recommends light industrial use as a transition between the railyards and the proposed SH 121, from Montgomery Street, to Bryant Irvin Road. It encourages residential development along Hulen Street to the area north of Bellaire Drive and south of Briarhaven Road and compatible development along the proposed corridor, between the Trinity River and Arborlawn Drive. In addition, it encourages major employers, businesses, apartment complexes and single-family residential housing to locate at proposed entryways and exits of the proposed SH 121 facility.

5.1.1. Alternatives A, B, C, C/A and D

As mentioned in Chapter 1.0, Project History, SH 121 has been under study since before 1970. Based on previous studies, the City has planned for a new roadway in southwest Tarrant County and has made zoning decisions to accommodate the new roadway. Therefore, the construction of SH 121 would have minimal effects on land use south of the UPRR yard.

The *2000 Fort Worth Comprehensive Plan*, that includes the project, contains land use policies and strategies upon which zoning, plats, annexations, special exceptions, variances and other land use decisions along the project would be made. SH 121 would potentially help the City achieve its land

use goals of developing multiple growth centers, to promote compact urban land use within designated areas and lower intensities of land use elsewhere in the City.

Improved access to properties in the area would potentially cause an associated value increase of these properties. The expected industrial, commercial and residential developments of the area should encourage new employment and improve the overall economy in the area.

5.1.2. No-Build Alternative

The No-Build alternative would most likely have no effect on the trend of urbanization in the south area. With the projected growth in the area and no alternative route, congestion, travel time and travel miles on existing facilities are expected to increase in future years. Future land use decisions might be influenced by the lack of access that the proposed SH 121 would have provided. The No-Build alternative would not be consistent with the *Mobility 2025 – 2004 Update* for the Metroplex, or the *2000 Fort Worth Comprehensive Plan*.

5.2. Prime and Unique Farmlands

Pursuant to Section 1541(a) of the *Farmland Protection Policy Act* (FPPA), enacted December 22, 1981, USC. 4202 and as required by 1541(b) of FPPA, Federal agencies are: (1) to use the criteria to identify and take into account the impacts of their programs on the preservation of farmland, (2) to consider alternative actions, as appropriate, that could lessen any impacts and (3) to ensure that their program, to the extent practicable, is compatible with State, local government and private programs and policies to protect farmland.

Completion of Form AD-1006, Farmland Conversion Impact Rating, Part VI, for land south of IH 20 resulted in a total site assessment score of 32. If the assessment score is less than 60, no further evaluation is required. There was no prime and unique farmlands found from IH 20 north to the Hulen Street bridge. There is prime farmland that borders the Clear Fork of the Trinity River for approximately 1.7 mi within the PSC, but the designated area has not been under cultivation for some

time and the area containing the soil is zoned for commercial use. The form is on file at the TxDOT Fort Worth District Headquarters.

5.2.1. Alternatives A, B, C, C/A, D and No-Build

The "Build" alternatives, as well as the No-Build alternative, would not result in any impacts on prime and unique farmlands.

5.3. Environmental Justice Impacts

This section analyzes potential Environmental Justice (EJ) concerns of the proposed alternatives to determine if there are low-income or minority populations who would incur disproportionately high and adverse impacts.

5.3.1. Overview

Executive Order (EO) 12898, "Federal Actions to Address EJ in Minority Populations and Low-Income Populations" was signed in February 1994. It requires Federal agencies to ensure that disproportionately high and adverse human health or environmental effects of proposed Federal projects on minority and low-income communities are identified and addressed. The general principles required under EO 12898 are as follows:

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

In addition to complying with the EO, 12898, the DOT is committed to Title VI of the *Civil Rights Act of 1964* and the *Civil Rights Restoration Act of 1987*, which provides nondiscrimination programs require that Federal-aid recipients, subrecipients and contractors prevent discrimination and ensure nondiscrimination in all or their programs and activities, whether those programs and

activities are Federally funded or not. The factors prohibited from serving as a basis for action or inaction, which discriminates, include race, color, national origin, sex, age and handicap/disability. The efforts to prevent discrimination must address, but not be limited to a program's impacts, access, benefits, participation, treatment, services, contracting opportunities, training opportunities, investigations of complaints, allocation of funds, prioritization of projects and the functions of ROW, research, planning and design.

5.3.2. Public Participation

Throughout the study process, NTTA and TxDOT have made every effort to notify affected residents, business owners and stakeholders in the project corridor. All public involvement activities were conducted in accordance with 43 TAC 11.80-11.90, CFR Title 23, Part 771 and *TxDOT Highway Design Operations and Procedures Manual*, Part II-B.

As described in Chapter 6.0, Public Involvement, of this document, approximately 52 meetings were held with members of the community concerning this project. Forty-five of these meetings were general public meetings held within the study corridor. Advertisements for these meetings included a statement that persons interested in attending the meetings who have special communication or accommodation needs are encouraged to contact the Fort Worth District Office at least 72 hours before the meeting and that every reasonable effort would be made to accommodate those needs. Information presented at these meetings included project purpose and need, alternative alignments, highway geometric design criteria and traffic projections within the PSC. Many of the meetings were structured to encourage comment through the use of breakout groups lead by facilitators.

Seven of the meetings held were meetings of the CAC created by Fort Worth City Council Resolution No. 2482 (Appendix F). The CAC members were appointed by the City Council to review proposed and preliminary alternative designs of the proposed project and consisted of 17 community and business leaders. Two of the members were minorities or represented minority groups. Additional meetings and briefings were also held and are documented in Chapter 6.0, Public Involvement.

Several outreach methods were used to notify the public of the aforementioned meetings, including advertisements in *The Fort Worth Star Telegram*, *The Cleburne Times Review* and *The Burleson Star* and notification of property owners by certified mail. All meeting notices included procedures for requesting Spanish translation services at the advertised meeting.

In addition to public involvement efforts completed by NTTA and TxDOT, the Fort Worth Chamber of Commerce hosted two meetings that focused on impacts to the business community. Invitations to the meetings were sent to all owners and business managers including minority and low-income populations. Those in attendance voiced concerns regarding the timing of the proposed project's implementation and the extent of relocation assistance offered by TxDOT. A mailing list was compiled after the meeting of all those interested in receiving brochures on procedures for ROW acquisition and relocation assistance. In general, comments received at public meetings were in support of the project.

5.3.3. Impact Assessment Methodology

The EJ analysis in this document follows guidance provided by the Office of Federal Activities, "Final Guidance for Incorporating EJ Concerns in EPA's NEPA Compliance Analyses" dated April 1998, as well as guidance provided by other FHWA, EPA and CEQ publications. The analysis identifies minority and low-income populations within the project study area and the potential adverse impacts to these populations if the proposed project were implemented. The study area for this analysis included all census tracts/census block groups that are adjacent to the proposed project.

For this evaluation, definitions of minority and low-income areas were established based on guidance provided by the Office of Federal Activities publication. The guidance states that, "…a minority population may be present if the minority population percentage of the affected area is 'meaningfully greater' than the minority population percentage in the general population or other 'appropriate unit of geographic analysis'. A minority population is also present if the numeric measure is over 50 percent of the affected area.

The Department of Health and Human Services (DHHS) for 2004, reflect the low-income threshold median for a family of four to be $18,850.00. For low-income populations, the guidance states that, "…low-income populations in an affected area… should be identified with the annual statistical poverty thresholds from the Bureau of Census." The reports state that the use of national decennial census data in depicting the low-income/poverty and minority statistics is one of the most prevalent methods used to define affected communities. For this analysis, all census tracts within the project corridor were evaluated and assessed.

The EJ analysis in this document utilizes U.S. 2000 Census data to identify high minority and/or low-income/poverty populations located within the project area. The project assessed potential impacts to census tracts 1019.00, 1028.00, 1053.00, 1054.05, 1109.03, 1055.06, 1055.08, 1055.10, 1110.09 and 1110.10, as shown in Exhibit 5.1.

A Geographic Information Systems (GIS) analysis was used to determine populations residing within the study area. Potential adverse impacts of the proposed project were assessed and a GIS analysis was used to determine where these impacts affect minority and low-income populations. Alternatives and mitigation measures to avoid adverse environmental impacts on affected populations were studied and assessed for feasibility. Potential benefits of the proposed project on the affected populations were also evaluated.

5.3.4. Impact Assessment

Census 2000 data shows that the total minority population for the study area is 24 percent; for the City is 53 percent; and, for Tarrant County is 37 percent. (The minority category includes individuals identified as belonging to a racial category other than white. Hispanic refers to individuals of Hispanic origin, which includes all racial categories.)

<u>Areas with High Minority, Hispanic and Low-Income Populations</u>

Table 5-1 shows demographic data for Tarrant County, the project area and the census tracts within the study area.

Table 5-1 – Evaluation of Census Tract in Project Corridor

	Total Population	Percent Minority	Percent of Population Below Poverty Level
Project Area	27,287	24%	8%
Project Area by Census Tract			
1019.00	1120	11%	10%
1028.00	1287	12%	6%
1053.00*	921	88%	14%
1054.05	4124	20%	7%
1055.06	4998	27%	14%
1055.08	4937	28%	7%
1055.10	3722	35%	5%
1109.03	1798	12%	6%
1110.09	3112	14%	4%
1110.10	1268	5%	7%

Source: U.S. Census, 2000
* *Represent tract with high concentrations of minority, Hispanic or low-income populations.*

For this analysis, in adherence to the guidelines, high minority areas include those tracts where over 50 percent of the tract was minority. Census Tract 1053.00 is the only census tract within the SH 121 Corridor that has a predominately minority population. It is within this census tract that EJ concerns were investigated.

According to an analysis of the project area using 2000 Census data and compared to the DHHS poverty guidelines, no low-income populations were identified within the study area.

Impacts to High Minority and Low-Income Areas

All census tracts within the proposed project area were analyzed for impacts related to the alternatives considered. In order to analyze the impacts from an EJ perspective, four impact categories were assessed in census tract 1053.00: acquisitions and displacements; community cohesion; land use and economics; and traffic and circulation. EJ impacts were identified where an environmental impact in that tract was adverse compared to the impacts in the other census tracts and the project area as a whole. Possible adverse impacts are discussed in the following.

Census Tract 1053.00 is bounded by Vickery Boulevard, Valentine Street and IH 30 on the north; the Clear Fork of the Trinity River on the south; and, Bryant-Irvin Road on the western edge, as shown in Exhibit 5.1. The 1,170 ac in this tract contain a mixture of different types of business establishments, residential properties, institutional and public facilities. The following categories were considered in determining potential adverse impacts to the high minority population within this tract.

Acquisition and Displacements

Within Census Tract 1053.00 approximately 40 buildings, representing as many as 80 businesses would be potentially displaced. This number represents as much as 70 percent of the total business displacements throughout the PSC. Some impacts may not represent actual displacements, just easements for ROW. The number of acquisitions and displacements would be refined as a result of detailed information developed during final design.

The number of displacements within this Census Tract represents an adverse impact from a community impact perspective relative to the entire project but not an EJ impact. During field reconnaissance a survey of potentially impacted businesses was undertaken to determine the extent of minority ownership, employment and patronage within the census tract. Based on this survey, only four businesses were positively identified as being minority owned (five percent). Representative businesses surveyed identified that approximately 33 percent of the employees of the potentially displaced businesses were minority. This percentage is consistent with the minority population of Tarrant County (37 percent) and substantially lower than the minority population within Census Tract 1053.00 (88 percent). Based on observation, the diverse mix of businesses located within the census tract serve a wide range of clientele from all socioeconomic levels. While the number of business displacements may be disproportionate, the impacts to the minority community do not appear adversely disproportionate. Table 5-2 enumerates the estimated number of displaced businesses, employees and minority employees by business sector type.

Table 5-2 – Impacted Employees by Business Sector

Business Sector	Total Employees	Minority Employees*	Percent of Minority Employees
Commercial	339	149	44%
Hotel	21	5	24%
Industrial	52	17	33%
Office	23	8	35%
Office Complex	320	50	16%
Public Facilities	2	0	0%
Retail	32	18	56%
Service	100	47	47%
Service/Retail	10	0	0%
Warehouse	0	0	0%
Totals	**906**	**300**	**33%**

Source: LOPEZGARCIA GROUP, 2004
* *Estimates were based on field and telephone surveys*

The impact of the loss of these businesses to the residents of the adjacent neighborhood would be minimal because there are similar businesses located north of Vickery Boulevard, which would not be impacted by the proposed project. To date, those businesses that have participated in the planning process support the proposed project and understand the need to relocate. NTTA and TxDOT would make effort to relocate persons and businesses in the immediate area to minimize disruption.

Community Cohesion

According to 2000 Census data, there are a total of 270 households within Census Tract 1053.00. These households, consisting of single-family residences, located north of Vickery Boulevard would not be displaced. The construction of SH 121 would not split the residential neighborhood in Census Tract 1053.00. The proposed ROW lies between the UPRR yard to the south and Vickery Boulevard to the north. This would impact businesses along Vickery Boulevard, but would not separate residents from community facilities, churches or recreation areas.

Community cohesion would not be adversely affected by the construction of SH 121. Three related church properties on Lovell Avenue and Pulido Street are adjacent to the proposed ROW. However, access to these properties by the surrounding community would not be adversely impacted.

The construction of SH 121 would not negatively impact school districts, recreation areas, churches, police and fire protection nor would the project disproportionately adversely impact any social groups such as the elderly or handicapped.

Land Use and Economics

The area directly impacted by the proposed project consists of a predominately commercial and light industrial land use mix. The area contains a diverse mix of commercial and office business, much of which has been converted from warehousing and housing stock. Additionally, the businesses located on the south side of Vickery Boulevard are adjacent to an active UPRR freight railyard. The proposed project is compatible with the existing rail facility.

There are numerous areas in Census Tract 1053.00 and within the vicinity, where displaced businesses could relocate. Additionally, the west end of the census tract and areas east of Montgomery Street and north Vickery Boulevard are transitioning to higher density land use including several office complexes. Many buildings including hotels and highway related services, would be better served by the proposed roadway,

The recommended alignment of SH 121 has been selected based on the availability of undeveloped land throughout the corridor and has been established to reduce the possible impacts of relocation, community cohesion and special populations.

Traffic and Circulation

The dominant mode of travel through and within the community is automobile using local and arterial streets. According to census data, only 12 households in Census Tract 1053.00 have no

access to a vehicle. Vickery Boulevard is the primary east-west arterial through this area and Montgomery Avenue is the primary north south arterial. Both of these streets are heavily traveled. The majority of businesses are located on or adjacent Vickery Boulevard and Montgomery Avenue. The proposed project would provide increased access to services and areas of employment outside of the community.

There are few sidewalks along Vickery Boulevard and Montgomery Street. In addition, the types of business found here generally would not be frequented by pedestrians or bicyclists l. Although there are sidewalks in front of some of the businesses, these tend to be disjointed and only provide access between the front door of the business and a side parking area. Pedestrian circulation would not be adversely impacted by the construction of the proposed project.

There is minimal transit service available within the PSC. The FWTA provides limited local bus service east of Montgomery Street along Vickery and Lovell. The majority of the area in Census Tract 1053.00 is not directly served by public transit. The construction of SH 121 would enable the FWTA to provide express bus service from the suburbs in the southern portion of the PSC to the CBD.

5.3.5. Alternatives A, B, C, C/A and D

Public input related to the proposed project's benefits and impacts has been solicited throughout the proposed project development which has attracted low-income and minority community members at a number of public meetings as discussed in Chapter 6.0, Public Involvement. Adverse impacts identified would be mitigated using measures described in this EIS. In view of this and the benefits and local support for implementing the proposed project, the adverse impacts would not be disproportionate to the positive benefits that the proposed project would offer minority populations within the PSC - including increased accessibility to much needed services and employment opportunities.

There would be overall benefits to EJ populations from the proposed project as a whole. Some of these benefits include increased access to education, medical and governmental services - all of which are located within the PSC. The project would also strengthen economic conditions within the PSC.

EO 13166, entitled "Improving Access to Services for Persons with Limited English Proficiency (LEP)," mandates that Federal agencies examine the services it provides and develop and implement a system by which LEP persons can meaningfully access those services consistent with and without unduly burdening, the fundamental mission of the agency. Each agency shall also work to ensure that recipients of Federal financial assistance (recipients) provide meaningful access to their LEP applicants and beneficiaries (65 Federal Register 50123, August 16, 2000). TxDOT complies with EO 13166 by offering to meet the needs of persons requiring special communication accommodations in all public involvement activities and notices.

5.3.6. No-Build Alternative

The No-Build alternative would maintain the existing transportation network. Existing businesses and residents would not be displaced or impacted and redevelopment of the area along Vickery Boulevard would continue at its current pace.

5.4. Social Impacts

5.4.1. Community Cohesion Impacts

Community cohesion impacts can occur if the proposed action splits neighborhoods, isolates a portion of a neighborhood or ethnic group, generates new development, changes property values, or causes the separation of residences from community facilities and services.

Alternative A

From the northern terminus (Summit Avenue along IH 30 to Hulen Street) Alternative A would follow along the property line of the existing UPRR Yard and would require the relocation of two residences located in a commercially zoned area north of IH 30, east of Forest Park Boulevard. Located just south of the Holly Water Treatment Plant, this neighborhood represents an area in which previously residential buildings have been replaced by commercial and industrial use structures. Within this neighborhood, there is one church, eleven houses, over thirty commercial vacant lots, office space and warehouses. There are no grocery stores, convenient stores, laundry mats, or gas stations. The small community is served by one church and it would not be displaced by this alternative. The predominant land use of this area is commercial and industrial.

The neighborhoods' quality of community life was identified through field observation and interviews with the City of Fort Worth Planning Department. The community is presently located north of a major highway, with limited access and surrounded by City utility facilities and railroad tracks. The alternative would not split the neighborhood by isolating any of the residences or disrupting community cohesion.

Alternative A would traverse, for the most part, undeveloped parcels of land from the Hulen Street bridge up to the IH 20 interchange. South of the IH 20, the proposed ROW would take portions of housing units at the Hunters Ridge, Marina Club and Hunters Green multi-family residential developments located near Overton Ridge Boulevard. Although the apartment building units along the east and west boundaries of the proposed SH 121 would be impacted, the apartment community would not be split or divided. The remaining apartment units would continue to experience the multi-family community atmosphere they currently do because of the improved accessibility to major highways and other facilities and services.

From Overton Ridge to just south of Oakmont Boulevard, the project would cross-undeveloped land until approximately 530 ft south of Oakmont Boulevard. The eastern ROW line would take an 80 ft strip from the Hulen Bend Addition, approximately 2,390 ft long parcel. Thirty-five existing single-

family residences would be relocated along Stockton Drive. South of Dutch Branch Road and west of Lomo Alto Drive, ROW relocations would cause the loss of approximately seven single-family residences located on the outskirts of a large single-family development. These properties are adjacent to the alignment and their displacement would not impact the integrity of the remaining houses or the overall neighborhood. From here, south to FM 1187, the project would traverse undeveloped properties, eliminating any negative impacts associated with community cohesion in this area.

Although Alternative A involves the impact to apartment units and single-family units, no particular neighborhood or social group would be affected by the relocation of these properties. The alignment would not isolate a portion of a neighborhood, ethnic group or cause the separation of residences from community facilities and services. Alternative A would not have a negative impact on the cohesiveness of neighborhoods.

Alternative B

From the northern terminus (Forest Park Boulevard) to IH 30, Alternative B would require the relocation of five single-family residences. The only church serving the area would not be displaced. As mentioned previous, this community already lacks strong community cohesion due to its location within a commercial zone, proximity to IH 30, limited access and lack of recreational areas, schools, grocery stores and service stations. From IH 30 to Hulen Street, Alternative B would follow along the property line of the existing UPRR Yard, traversing some commercial properties and would not have an impact on any communities along this section. Alternative B would traverse, for the most part, undeveloped parcels of land from the Hulen Street bridge to FM 1187 eliminating any negative impacts associated with community cohesion in this area. No particular neighborhood or social group would be affected by relocation of the properties. The alternative would not split the neighborhood by isolating any of the residences. For these reasons Alternative B would not negatively impact the cohesiveness of neighborhoods.

Alternative C and C/A

From the northern terminus, west of Summit Avenue along IH 30 to Hulen Street, Alternative C and C/A would follow along the property line of the existing UPRR Yard and would require relocation of two residences located in a commercially zoned area north of IH 30. This neighborhood lacks recreational areas, schools, grocery stores and gas service stations. Located north of a major highway, with limited access and surrounded by City utility facilities and railroad tracks, the small residential community would not experience a further degradation of community cohesion because of the project. Alternative C and C/A would also traverse commercial property located along IH 30. None of the communities along this section would be impacted. Alternative C and C/A would then traverse, for the most part, undeveloped parcels of land from the Hulen Street bridge south to the IH 20 interchange. From IH 30 to Hulen Street, Alternative C and C/A would follow along the property line of the existing UPRR Yard, traversing some commercial properties and would not have an impact on any communities along this section. These alternatives would not split the neighborhood and therefore not isolate any of the residences.

Alternative C and C/A would traverse, for the most part, undeveloped parcels of land from Hulen Street to FM 1187 and would eliminate any negative impacts associated with community cohesion in this area. No particular neighborhood or social group would be affected by relocation of properties. For these reasons, Alternative C and C/A would not negatively impact the cohesiveness of neighborhoods, reducing ROW width that would displace residential units as discussed in Alternative A.

Alternative D

From the northern terminus (Forest Park Boulevard) to IH 30, Alternative D would require the relocation of nine single-family residences and the Greater Friendship Baptist Church in a commercially zoned area. The neighborhood is located south of the Holly Water Treatment Plant and is one in which formerly residential buildings have been replaced by buildings for commercial and industrial uses. Within this neighborhood, there is one church, eleven houses, over thirty commercial vacant lots, office space and warehouses. There are no grocery stores, convenient stores,

laundromats, or gas stations. The small community is served by one church. The predominant land use of this area is commercial and industrial.

This alternative would disrupt the community cohesion because one house would be isolated on each side of the proposed route and the Greater Friendship Baptist Church would be displaced. Therefore the community's tenuous cohesion would be further strained.

From IH 30 to Hulen Street, Alternative D would follow along the property line of the existing UPRR Yard, traversing some commercial properties and would not have an impact on any communities along this section. Alternative D would traverse, for the most part, undeveloped parcels of land from the Hulen Street bridge to FM 1187 and would eliminate any negative impacts associated with community cohesion in this area. While no particular group would be affected by relocation because of this alternative, community cohesion would be impacted by this alignment because it splits the only two houses remaining in the neighborhood north of IH 30, east of Forest Park. The neighborhood is located within census tract No. 1019.00.

No-Build Alternative

As the Metroplex, southwest Tarrant County and northern Johnson County continue to grow, the increased number of people, jobs and other activities would overburden the existing transportation infrastructure. Widening of thoroughfares, streets, highways and arterials would be needed to accommodate the increased traffic demands. These expansion projects could impact community cohesion through displacements of businesses and residences.

5.5. Public Safety Impacts

5.5.1. Alternatives A, B, C, C/A and D

The Build alternatives are expected to improve highway and public safety. By relocating through traffic on existing arterials onto a controlled access facility, the opportunity for pedestrian/vehicle accidents would be diminished. The opportunity for access-conflict accidents (vehicle striking

vehicle while attempting to turn) also would decrease on the existing roadways because of reduced traffic volumes.

Construction of the proposed facility would improve access to schools, hospitals, churches and other public facilities along the project. Fire protection and other emergency services would be improved because of the ease of travel afforded by completion of this project. The public safety services provided by these facilities would be enhanced by an expected decrease of congestion within the PSC.

Access to the roadways leading to the medical center would be maintained and remain open during construction. The only exception would be during the placement of bridge beams, reconstruction of the Rosedale bridges or during short-term, temporary closures, but even during these actions, adequate access would be maintained on other routes to the medical center. County and local public safety officials would be notified of any road closure resulting from the project construction. Detour timing and necessary rerouting of emergency vehicles would be coordinated with the proper local agencies.

The construction of SH 121 would temporarily affect the use of the hike and bike trail along the Clear Fork of the Trinity River. The effects would be construction related and are considered to be short-term (refer to Section 5.8, Pedestrian and Bicycle Impacts). Elevated bridge structures would cross the river and would not affect the existing facilities. Site investigation of the proposed route corridor and coordination of information with applicable public agencies indicate that the route would not permanently impact any existing public park or recreation area. A short-term detour would be needed while beams are placed overhead during bridge construction.

5.5.2. No-Build Alternative

The No-Build alternative would not decrease traffic volumes on existing roadways and would likely result in increased traffic accidents and increased response time for emergency providers as future traffic volumes rise.

The No-Build alternative would cause no impact on recreational facilities.

5.6. Relocation Impacts

According to the Real Estate Center at Texas A&M University and the United States Census Data, building permit activity data indicates an increase in single-family housing of 120 percent in 2000 compared to 1990 in the Fort Worth/Arlington metropolitan area and 108 percent in Tarrant County. Multi-family housing increased by 85 percent in the City and 102 percent in Tarrant County for the same year. The NCTCOG's *Profile of General Demographic Characteristics for Tarrant County, Texas: 2000* reports that from a total of 565,830 housing units, 533,864 are occupied and 31,966 are vacant. The City alone has a total of 211,165 housing units of which 195,146 (92.4 percent) are occupied and 16,019 (7.6 percent) are vacant.

The TaxNetUSA: Tarrant County Property Information database, city maps and visual field inspections were the main tools used to determine the total number of displacements for each land use category for each alternative. Information for each of the alternatives is presented in the following: The majority of the properties located within each of the proposed alternatives' ROW requirements consist of vacant commercial lots, lots containing warehouses and offices/retail locations and City/State property, as well as abandoned buildings. These were not included on the tables detailing each alternative's relocation displacements. Exhibit 5.1 depicts the relocation impacts by socio-economic classifications.

5.6.1. Alternative A

The relocation of residential and commercial property would be required for approximately three miles along the northern section of Alternative A. One of the affected areas would be from the northern terminus, at Summit Avenue, to just west of Hulen Street. This area is located within census tract 1019.00. Based on the census data (Please see Table 4-1 and Table 4-2), the population of this area is predominantly non-minority and the median income is below that of the City. Alternative A's varying ROW requirements north and south of IH 30 and to the west along Vickery Boulevard would cause the relocation of a motel, several businesses and a few residences as

described in the following. This area is located within census tract 1053.00. Based on the census data (Please see Table 4-1 and Table 4-2), the population for this area is predominantly minority and the median income is below that of the City.

The area south of IH 20 to just south of Overton Ridge Boulevard would impact the housing units of three apartment complexes. This area is located within census tract 1055.06. Based on the census data (Please see Table 4-1 and Table 4-2), the population for this area is predominantly non-minority and the median income is above that of the City. The three impacted complexes would be Hunters Ridge Apartments, Hunters Green Apartments and Marina Club Apartments. Hunters Ridge Apartments, located on River Ranch Boulevard, contains 248 units with approximately 245 units occupied. The proposed ROW would require the relocation of three apartment unit buildings, including 28 apartments and several covered parking structures. Hunters Green Apartments, located on Overton Ridge Boulevard, contains 248 units with approximately 239 units occupied. ROW requirements would require the relocation of three apartment unit buildings, including 48 apartments. Marina Club Apartments, located on Overton Ridge Apartments, contains 387 units in its complex with a varying number of vacancies. The ROW requirements would require the relocation of two apartment unit buildings, including 32 apartments, within the complex.

Between Oakmont Boulevard and Altamesa Boulevard, the ROW requirements could require the relocation of several single-family residences. This area is located within census tract 1055.08. Based on the census data (Please see Table 4-1 and Table 4-2), the population for this area is predominantly non-minority and the median income is above that of the City. The estimated 400 ft to 600 ft of ROW to the west of Stockton Drive, near the Hulen Bend Addition, would require the relocation of several single-family residences. A number of homes that were under construction would also be impacted in the Hulen Bend area. The estimated 500 ft of ROW to the west of Lomo Alto Drive would require the relocation of seven single-family residences.

The total number of displacements, for Alternative A, per land use category is listed on Table 5-3. A total of 154 displacements were estimated within the project ROW. These displacements include 42 single-family, six single-family residences under construction at the time of the site investigation, one

Table 5-3 – Total Displacements for Alternative A

Land Use	No. Of Displacements
Residential	
Single-family Residential	42
Single-family Being Constructed as of 5/02	6
*Multi-Family Residential	3
Business/Commercial	
Retail	11
Warehouse	27
Office	34
Auto Service	6
Motel	1
Auto Dealership	2
Misc.	1
Total	**133**

* *Applies to actual number of apartment complexes potentially affected for which at least one apartment building unit is displaced.*

motel, three multi-family residential areas (apartment complexes) and 81 businesses, which include retail shops, warehouses, manufacturers, offices, auto dealerships and auto service businesses. A total of 21 billboards would also be affected.

5.6.2. Alternative B

The relocation of residential and commercial property would be required along approximately three miles of the proposed SH 121. This area is located within census tract 1019.00. Based on the census data (Please see Table 4-1 and Table 4-2), the population of this area is predominantly non-minority and the median income is below that of the City. One of the affected areas would be from the beginning of the project, at Forest Park Boulevard (the northern terminus), to just north of IH 30. The estimated 180 ft of ROW required for this section, would cause the relocation of commercial properties and private residences and land conversion of both City and private land. The area just north and south of IH 30 and east of Forest Park Boulevard, would require relocation of several businesses and commercial properties. This area is located within census tract 1019.00 and 1028.00. Based on the census data (Please see Table 4-1 and Table 4-2), the population of tract 1019.00 is predominantly non-minority and the median income is below that of the City. The population of

tract 1028.00 is predominantly non-minority and the median income is above that of the City. The proposed ROW requirements south of IH 30 and west along Vickery Boulevard would cause the relocation of one motel, several businesses and commercial properties as described in the following. This area is located within census tract 1053.00. Based on the census data (Please see Table 4-1 and Table 4-2), the population of tract 1053.00 is predominantly minority and the median income is below that of the City.

The total number of displacements per land use category is listed on Table 5-4. A total of 104 displacements were estimated within the project ROW. These displacements include five single-family residences, one motel, City owned facility and 76 businesses, which include retail shops, warehouses, offices, auto dealerships and auto service businesses. A total of 21 billboards would also be relocated.

Table 5-4 – Total Displacements for Alternative B

Land Use	No. Of Displacements
Residential	
Single-family Residential	5
Business/Commercial	
Retail	11
Warehouse	25
Office	33
Auto Service	5
Motel	1
Auto Dealership	2
City Facility	1
Total	**104**

5.6.3. Alternative C and C/A

The relocation of residential and commercial property would be required along approximately three miles of the proposed SH 121. The area containing the most relocations would be from the beginning of the project, at Summit Avenue (the northeast terminus), to just west of Hulen Street. This area is located in census tracts 1019.00. Based on the census data (Please see Table 4-1 and Table 4-2), the population of tract 1019.00 is predominantly non-minority and the median income is below that of the City. The area just south and north of IH 30 and east of Forest Park Boulevard,

would require relocation of several businesses, commercial properties and a few residences. This area is located within census tract 1028.00. The population of tract 1028.00 is predominantly non-minority and the median income is above that of the City. The proposed ROW requirements to the west along Vickery Boulevard would cause the relocation of one motel, several businesses and commercial properties as described in the following. This area is located within tract 1053.00. The population of tract 1053.00 is predominantly minority and the median income is below that of the City.

The total number of displacements per land use category is listed on Table 5-5. A total of 85 displacements were estimated within the project ROW. These displacements include three single-family residences, one motel and 81 businesses that include retail shops, warehouses, offices, automobile dealerships and automobile service businesses. A total of 21 billboards would also be relocated.

Table 5-5 – Total Displacements for Alternative C and C/A

Land Use	No. of Displacements
Residential	
Single-family Residential	3
Business/Commercial	
Retail	11
Warehouse	27
Office	34
Auto Service	6
Motel	1
Auto Dealership	2
Misc.	1
Total	**85**

5.6.4. Alternative D

The relocation of residential and commercial property would be required along approximately three miles of the proposed SH 121. One of the affected areas would be from the beginning of the project, at Forest Park Boulevard (the northern terminus), to just north of IH 30. This area is located in census tracts 1019.00. Based on the census data (Please see Table 4-1 and Table 4-2), the population of tract 1019.00 is predominantly non-minority and the median income is below that of the City. The

estimated 220 ft of ROW required for this section, would cause the relocation of commercial properties and private residences and land conversion of both county and private land including a church located just west of 11th Avenue and east of 15th Avenue. The area just south of IH 30 would require relocation of several businesses and commercial properties. This area is located within census tract 1028.00. The population of tract 1028.00 is predominantly non-minority and the median income is above that of the City. The proposed ROW requirements south of IH 30, to the west along Vickery Boulevard, would cause the relocation of a motel, several businesses and residences as described in the following. This area is located within tract 1053.00. The population of tract 1053.00 is predominantly minority and the median income is below that of the City.

The total number of displacements per land use category is listed on Table 5-6. A total of 84 displacements were estimated within the project ROW. These displacements include 10 single-family residences, one church, one motel, City owned facility and 71 businesses that include retail, warehouses, manufacturers, offices and auto service businesses. A total of 21 billboards would also be relocated.

Table 5-6 – Total Displacements for Alternative D

Land Use	No. Of Displacements
Residential	
Single-family Residential	10
Places of Worship	1
Business/Commercial	
Retail	10
Warehouse	22
Manufacturing	2
Office	31
Auto Service	4
Motel	1
Auto Dealership	2
City Facility	1
Total	**84**

The church that would be relocated serves a community that, because of its location in an industrial/commercial zone and in such close proximity to the highway, is already suffering poor

community cohesion. An interview with an employee of the church revealed that attendance is poor. Minimum impacts on its membership and the community that it serves are expected.

The 2000 census data for the census tracts located within Camp Bowie Southwest Boulevard, Clear Fork of the Trinity River and Henderson Street (census tracts #1019, 1020, 1024.01,1024.02, 1025, 1026, 1027, 1028, 1053and 1054.05), shows there is a total of 1,572 vacant housing units. Additionally, there are 387 vacant housing units within the area encompassed by Bryant Irvin Road, IH 20, Hulen Street, Old Granbury Road and Altamesa/Dirks Road (census tracts 1055.08 and 1055.06). Included in this number of vacant houses reported, are units for lease and for sale, of comparable price and quality, which could meet the needs of those that would be displaced because of the project. Most of the relocated businesses are commercial warehouses and offices. There are enough vacant commercial lots in the area outside the proposed corridor for relocation of these businesses. The May 2001 Fort Worth Introduction: A statistical profile of Fort Worth and the Fort Worth-Arlington Metropolitan Area by Fort Worth Chamber of Commerce reports that 13.2 percent of Class "A" office space, 30.8 percent of Class "B" office space, 6.7 percent of Suburban Class "A" office space, 14.7 percent of Suburban Class "B" office space and 5.9 percent of warehouse/industrial space is vacant in the project area. Class "A" office space is considered to be of good to excellent quality, outlay and appearance, good workmanship and materials. Exterior trim is good, more detailed. Class "B" is considered to be of average to good quality built with good quality materials and outlay. Exterior trim is simple.

5.6.5. No-Build Alternative

No relocation measures would be needed if the No-Build alternative were implemented.

5.7. Economic Impacts

This section compares the economic, employment and tax revenue effects and public cost-benefit potential of the No-Build and Build Alternatives for SH 121. This analysis assesses the potential for market-driven development opportunities that would be created by the proposed SH 121 project. The economic analysis would have similar results for any of the Build alternatives.

5.7.1. Analysis Methodology

Key project components were evaluated for a Build alternative, including:

- Public Investments - Public expenditures by NTTA, TxDOT, City of Fort Worth and its other funding sources for design, engineering, construction, remediation and ROW requirements,
- Private Investments - Expenditures of private capital due to enhanced development potential created along the route's newly created visibility and access corridor.

Private commercial development opportunities were evaluated for the size, type and timing of land uses that could be reasonably expected for each. Ample acreage would be available to accommodate market-driven development over the period of the study. The study area for the purposes of economic impact analysis was defined as a quarter-mile on either side of the proposed ROW. Based on this definition, the analysis included 4,560 ac of development. Calculations for jobs, employment, development and taxes are economic effects generated within that area only. Only those changes in the character of land use that could clearly be related to the SH 121 public investment were used for computing new opportunity. No residential uses were included as these uses are expected to continue to be strong in the study area regardless of the presence of SH 121 given current development trends.

Under the No-Build Alternative, all properties would remain in their current taxable status, with no further ROW acquisition or road improvement planning done in conjunction with SH 121. In the No-Build Alternative, only those commercial market-driven opportunities that are likely to occur within the available areas of the designated study corridor were forecast using growth rates in population and employment as forecast by the NCTCOG.

All land use estimates were verified using a 20-year history of local real estate absorption, demography, and economic performance. Projections were also reviewed for consistency with each community's master plans and with the traffic forecast models in use by NCTCOG. A consensus on the reasonableness of development issues and an assumptions of use, land availability, improved access and visibility was reached through a review of the engineering assumptions and meetings with the project engineers, property owners and local planning staffs. The impacts were examined and

results compared over a 27-year development period (2004 to 2030) using state-of-the-art econometric models to analyze various aspects of the total project's capital and operating costs.

The types of effect examined included economic impact, direct and indirect employment and direct and indirect tax impact. The net public cost-benefit effect includes new sales and hotel taxes, new property taxes, jobs, new developable property and ROW reinvestment, as well as costs for construction, ROW purchases and assessed value losses. Total public cost is compared to total benefit to provide the net public cost-benefit impact, or difference.

Positive impacts include reinvestment, or re-spending, of the dollars paid for ROW acquisition as well as dollars spent for professional services and construction.

Negative impacts include the permanent loss of taxable values of properties removed from the tax rolls, which are offset against the positive ROW values of replacement purchases (where applicable).

5.7.2. Assumptions

The assumptions used in the development of economic effects models and analyses are as follows:

- Total economic impact of the development would extend throughout the four-county Fort Worth Primary Metropolitan Statistical Area (PMSA).
- Economic impact does not include other cost or benefit calculations typically associated with engineering analyses, including other required delay savings or business interruption losses.
- Employment of any part-time workers has been reduced to "full-time equivalent" positions using a standard workweek and benefits.
- Tax revenue impact includes sales taxes on-premise retail sales, private construction purchases, equipment and ordinary operating expenses. Sales taxes are excluded for private industry-specific products or services which may be sales taxable and are the work product of the business, such as on-site software development.
- Tax impact does not include Federal income tax or State franchise tax on the activities of individual businesses, which are determined as a tax on annual net profits or book values.
- For purposes of analysis, "like kind" ROW reinvestments are assumed to be made in the city and county where the ROW was relinquished.
- No tax deferrals, incentives, or abatements are included in these calculations.
- Models use a "constant dollar" analysis for 2004, with no property value or tax increases, no depreciation and no Consumer Price Index or Cost of Living Adjustment increases assumed.

- Any material changes in the assumptions with regard to project timing or funding levels would change the outcome of the findings.

5.7.3. Results

Calculations for jobs, employment, development and taxes are economic effects within the study area only. The economic effect includes the construction and operation of public and private investments over 27 years. It is driven by all areas of purchasing, employment and operating functions. The economic impact of SH 121 from 2004 to 2030 on the 4,560 ac project study area would be $24.76 billion for the No-Build Alternative and $49.75 billion for Build Alternative. Employment effects of the alternatives are presented in Table 5-7. Direct jobs and work years refer to public jobs associated with the construction of the SH 121 and private sector jobs from development. Indirect jobs and work years refer to supporting and service jobs that are generated by the purchase of goods and services by public and private development entities and their employees.

Table 5-7 – Cumulative Employment Impact, 2004-2030

	Jobs			Work Years		
	Direct	**Indirect**	**Total**	**Direct**	**Indirect**	**Total**
No-Build Alternative	11,339	11,343	22,682	190,248	199,790	390,038
SH 121 Build	19,387	20,919	40,306	376,793	410,524	787,317

Building SH 121 could generate over 40,000 jobs because it would provide access to more acre of land with a higher potential of development for commercial and retail uses, which results in higher number of projected jobs.

Tax revenues for the alternatives from 2004 to 2030 vary as well and are shown in Table 5-8. Tax revenue for the No-Build is estimated to be approximately $2.0 billion where as building SH 121 could generate $3.7 billion in total tax revenue. The difference in projected tax revenue reflects the amount of land with development potential and the number of direct and indirect jobs created under each alternative, resulting in differences in land value and retail, sales potential and ultimately in projected tax revenue.

Table 5-8 – Cumulative Direct and Indirect Taxes, 2004-2030

Jurisdiction	No-Build Alternative	SH 121 Build
City of Fort Worth	$363,318,000	$615,762,000
Tarrant County	$232,761,000	$463,725,000
Fort Worth ISD	$340,569,000	$542,825,000
Crowley ISD	$40,159,000	$154,254,000
Regional Water District	$7,192,000	$12,817,000
Emergency Services District	$0	$2,391,000
FWTA	$47,867,000	$76,955,000
State of Texas	$964,099,000	$1,840,654,000
TOTAL	**$1,995,965,000**	**$3,709,383,000**

Capital projects of all types generate costs as well as benefits. Table 5-9 lists the benefits, costs and net public cost-benefit of the alternatives. Costs include construction and ROW costs plus the lost revenue of the land removed from the tax rolls to be used for ROW. Tax benefits are based on the tax generated by new development and economic growth. The net cost-benefit of the No-Build Alternative would be approximately $2.0 billion and building SH 121 would have a net tax cost-benefit of approximately $3.3 billion.

Table 5-9 – Net Public Cost-Benefit

	No-Build Alternative	Build Alternative
Total Direct and Indirect Taxes	$1,995,964,000	$3,709,383,000
Taxes on ROW Reinvestment	$0	$39,615,000
Subtotal - Total Tax Benefit	$1,995,964,000	$3,748,998,000
Minus Construction Costs	$0	$342,216,000
Minus ROW Purchase	$0	$58,477,000
Minus Tax Loss from ROW Acquisition	$0	$24,801,000
Subtotal - Costs	$0	$425,494,000
Net Tax Cost-Benefit	**$1,995,964,000**	**$3,323,504,000**

Projected economic benefits of this project reflect improved access to areas designated for commercial and retail development by the City.

5.8. Pedestrian and Bicycle Impacts

According to *Mobility 2025 – 2004 Update*, as drafted by the MPO for the DFW Metropolitan Area, bicycle and pedestrian enhancements are included as strategies to reduce the dependency on automobile travel. The plan identifies the widening of outside lanes on arterial streets to create a safer environment and recommends the development of a companion off-street system referred to as the Regional veloweb. A veloweb is composed of roads with limited stop signs and traffic signals to accommodate fast moving bicyclists. According to the Regional veloweb primary plan considerations, trails should go over or under major roadways (grade separated crossings). At intersecting roadways, pedestrians and bicyclists would be accommodated by sidewalks and designated bike lanes, as appropriate.

The Trinity Bicycle/Pedestrian Trail is included in the Regional veloweb off-street trail system and is located within the project area. The Trinity Bicycle trail is located on land under the administration (control) of the Tarrant Regional Water District (TRWD) and is located adjacent to the Clear Fork of the Trinity River, generally adjacent to maintenance roads controlled by the TRWD. These areas would be spanned by bridge structures and the ownership of this land would not change hands for this project. The bicycle trail as it exists today, should not be disturbed by this project because SH 121 would span the river and the bicycle trail.

Construction of SH 121 would require the temporary detour for this trail at two locations. One location of the trail proposed for temporary detour is found adjacent to the west bank of the Clear Fork of the Trinity River south of the existing IH 30 crossing of the river. The second location of the trail proposed for temporary detour is found upstream (to the southwest) of the first location and adjacent to the north bank of the Clear Fork of the Trinity River between Bryant Irvin Road and Hulen Street.

The proposed SH 121 would be constructed on structure at these locations and would span the bike trail and all property controlled by the TRWD. Construction activities at these locations would include hanging span structure support beams and construction of the span structure. This

construction would require moving construction material above the trail. No construction machinery would be allowed on the trail.

In order to ensure the safety of the public, trail users would be detoured during construction activities, i.e., moving support beams above the trail, at these locations. Detour of the trail at these locations would be temporary and of short duration. Users of the trail would be detoured only when the area is operating as a construction zone. When construction activities at each location pose no potential harm to trail users the trail would be re-opened for use at that location. No property ownership transfers for any portion of the bike trail or for any property controlled by TRWD would occur. No portion of the bike trail or property controlled by TRWD would be retained for long-term use by NTTA or TxDOT.

NTTA and TxDOT proposes to provide a reasonable and safe detour route for the trail users during the construction at the previous described locations, pursuant to 23 U.S.C. 109 (m). The proposed detour locations are depicted on Exhibit 4.6. The temporary trail detour would not result in temporary or permanent adverse changes to the activities, features, or attributes, which are essential to the purpose or functions of the trail. NTTA and TxDOT would coordinate the route and operation of the temporary detour with the TRWD. Prior to construction, NTTA and TxDOT would secure an agreement with the City and the TRWD concerning the temporary detour at the previous-described locations.

Connections to hike and bike trails would be considered in the amenities portion of the project detailed design at a later date. Park planning and other such activities outside of project ROW are, however, not within NTTA or TxDOT's authority or jurisdiction. The City would be responsible for Parks and Recreation planning and development of such facilities. Members of the Fort Worth Parks and Community Services Department have been present at several meetings during the extensive public involvement process for SH 121. This process has included numerous public meetings conducted by the SH 121 team, the CAC (City of Fort Worth), the Peer Review (City of Fort Worth), the PDT (City of Fort Worth) and other public meetings held by the City. Documentation of

participation in this extensive public involvement process is on file at the TxDOT Fort Worth District Office.

The project would cross the existing off-street hard surface trail along the Trinity River, which is part of the Fort Worth Trinity Trails, at two locations along the Clear Fork of the Trinity River. *Mobility 2025 - 2004 Update* maintains an inventory of existing and planned bicycle and pedestrian facilities. There are no planned or programmed trails along the proposed SH 121 or within project limits. The nearest planned bicycle or pedestrian facilities are the on-street system bicycle route and the City adopted off-street bicycle/pedestrian route located within the Forest Park area.

The project would be a multi-lane controlled access tollroad and, as such, would not incorporate design for pedestrian or bicyclist facilities longitudinally along the tollroad. At intersecting roadways, pedestrian and bicycle accommodations would be coordinated with the local jurisdictions.

5.8.1. Alternatives A, B, C, C/A and D

Impacts to existing bicycle or pedestrian facilities would be limited to the construction phase with no long-term impacts expected. Preliminary design of the project provides for the primary consideration of the Regional veloweb by providing grade-separated crossings at the existing trails. A map of the existing trails (Exhibit 4.6) depicts the proposed SH 121 location and bicycle and pedestrian facilities that would be affected by construction.

5.8.2. No-Build Alternative

The No-Build alternative would have no impact to bicycle or pedestrian facilities.

5.9. Section 4(f) Impacts

Section 4(f) is the national policy created to preserve the natural beauty of the countryside and public park and recreation lands, wildlife and waterfowl refuges and historic sites. It is part of the *DOT Act of 1966*. Regulations issued by the FHWA implementing the *1966 DOT Act* and the *1966 Federal*

Highway Act, as amended by the *1968 Federal Highway Act*, require coordination with jurisdictional agencies when Federal projects use public parks, recreation lands, wildlife and waterfowl refuges or historic sites. The purpose of Section 4(f) is to protect such lands by requiring additional scrutiny and rigorous test requirements before their use in a transportation project can be approved. Section 4(f) states that land from a publicly owned park, recreation area, wildlife/waterfowl refuge or historic site can be used for a transportation project only if there is no feasible and prudent alternative to the use of the resource and all possible planning has been taken to minimize harm to the resource.

5.9.1. Publicly Owned Parks, Recreation, Wildlife and Waterfowl Refuge Lands

Other than the Trinity Bicycle/Pedestrian Trail, there are no publicly owned lands for parks, recreation areas, wildlife and waterfowl refuge that could be classified as Section 4(f) lands within the project area. With regard to the Trinity Bicycle/Pedestrian Trail, FHWA has determined that a Section 4(f) document would not be necessary because ROW would not be acquired and because the trail closure would be temporary with detours provided.

ROW for SH 121 would not be required from publicly owned parks, recreation areas, wildlife and waterfowl refuge of National, State, or local significance.

The Trinity Bicycle/Pedestrian Trail along the Clear Fork of the Trinity River, maintained by the City of Fort Worth Parks and Community Services Department, would not be permanently affected by this project. Measures to avoid impacts to the trail have been addressed within Exhibit 4.6 and further discussion is Section 4.6, Publicly Owned Facilities and Community Services and Section 5.8, Pedestrian and Bicycle Impacts. No permanent impacts to the trail would occur due to the project. The TPWD 1995 TORP shows no plans being developed for future public facilities and community services within the project area.

5.9.2. Cultural Impacts

Archeological Impacts

Archeological resources are discussed in detail in Chapter 4.4.2, Archeological Sites. With regard to potential Section 4(f) properties, a buried prehistoric site has been located on the south side of the Clear Fork of the Trinity River (March 1999 survey). This site is within the northern section of the PSC. Regulatory coordination regarding the possible significance of this site is ongoing. Due to its intact nature, good organic preservation and the presence of intact rock or hearth features, the site might be eligible for inclusion on the NRHP and/or as a SAL. The results of the survey suggest that no additional prehistoric sites exist within the PSC, much of which has been disturbed by historic fill.

Historic Impacts

Historic resources are discussed in detail in Chapter 4.4.3. With regard to Section 4(f) properties, historic resources could potentially be impacted under Alternatives B and D, but would not be impacted under Alternatives A, C and C/A.

Alternatives A

Alternative A does not require property from any historic properties.

Alternative B

Alternative B has been identified as having potential impacts at the Holly Water Plant and the Lancaster bridge that would require Section 4(f) evaluations.

Alternative C and C/A

Alternative C and Alternative C/A do not require property from any historic properties.

Alternative D

Alternative D has been identified as having potential impacts at the Holly Water Plant and the Lancaster bridge that would require Section 4(f) evaluations.

No-Build Alternative

The No-Build alternative would have no impact on Section 4(f) properties.

5.10. Air Quality Impacts

In order to protect the public health, safety and welfare from the hazardous affects of air pollution, the CAA of 1970 mandated the establishment of the NAAQS. Table 5-10 lists both primary and secondary standard pollutant concentrations for sulfur dioxide (SO_2), particulate matter (PM), CO, O_3, Nitrogen Oxides (NO_x) and lead (Pb). When the pollutant levels within an area cause a violation of the standard, the area is classified as non-attainment for the pollutant.

Under the CAAA of 1990, the EPA was authorized to designate areas failing to meet O_3 standards. Where these areas are located, the State is then required to submit a SIP to the EPA. This legal document (SIP) is a collection of regulations that explain how the State would reduce emissions and help meet O_3 standards. The CAAA also required the MPOs and the U.S. DOT to determine the conformity to State or Federal Implementation Plans of Transportation Plans, Programs and Projects Funded under Title 23 USC or the *Federal Transit Act*.

The air quality impacts of any transportation project are addressed by applying a mesoscale and a microscale analysis. The first one is performed on those pollutants that cannot be analyzed on a project-by-project basis but by region, such as O_3. A microscale analysis is performed on CO, which is a project-related concern.

Table 5-10 – National Ambient Air Quality Standards

Pollutant	Averaging Period	Standard	Primary NAAQS	Secondary NAAQS
O_3	1-hour	Not to be at or above this level on more than three days over three years	125 ppb	125 ppb
	8-hour	The average of the annual fourth highest daily eight-hour maximum over a three-year period is not to be at or above this level	85 ppb	85 ppb
CO	1-hour	Not to be at or above this level more than once per calendar year	35.5 ppm	35.5 ppm
	8-hour	Not to be at or above this level more than once per calendar year	9.5 ppm	9.5 ppm
SO_2	3-hour	Not to be at or above this level more than once per calendar year	-	550 ppb
	24-hour	Not to be at or above this level more than once per calendar year	145 ppb	-
	Annual	Not to be at or above this level	35 ppb	-
Nitrogen Dioxide (NO_2)	Annual	Not to be at or above this level	54 ppb	54 ppb
Respirable PM (10 microns or less)	24-hour	The three-year average of the annual 99th percentile for each monitor within an area is not to be at or above this level	155 $\mu g/m^3$	155 $\mu g/m^3$
	Annual	The three-year average of annual arithmetic mean concentrations at each monitor within an area is not to be at or above this level	51 $\mu g/m^3$	51 $\mu g/m^3$
Respirable PM (2.5 microns or less)	24-hour	The three-year average of the annual 98th percentile for each population- oriented monitor within an area is not to be at or above this level	66 $\mu g/m^3$	66 $\mu g/m^3$
	Annual	The three-year average of annual arithmetic mean concentrations from single or multiple community-oriented monitors is not to be at or above this level	15.1 $\mu g/m^3$	15.1 $\mu g/m^3$
Pb	Quarter	Not to be at or above this level	1.55 $\mu g/m^3$	1.55 $\mu g/m^3$

Source: EPA's National Ambient Air Quality Standard.

5.10.1. Mesoscale Analysis

Four areas in Texas: Houston/Galveston, Beaumont-Port Arthur, DFW and El Paso are in non-attainment for O_3 under the 1-hour standard. Under this standard, O_3 concentrations of 125 ppb

should not be met or exceeded more than three times in three consecutive years at the same monitoring site. Tarrant County has recently been classified as non-attainment under the 8-hour ozone standards. A demonstration of transportation conformity for added capacity projects to the 8-hour O3 standard is not required until the end of the EPA one-year grace period. The EPA one-year grace period will end June 15, 2005. Under 8-hour standard, ozone concentrations for the average of the annual fourth highest daily eight-hour maximum over a three year period cannot be at or above 85ppb.

NCTCOG conducted the air quality conformity determinations for *Mobility 2025 - 2004 Update* and for the *2004-2006 TIP* for the Metroplex. The NCTCOG used the EPA's Mobile Source Emission Factor Model (MOBILE) for the 2007, 2015 and 2025 analysis years for the conformity analysis. The Volatile Organic Compounds (VOC) and NO_x emissions from each of the previous mentioned action scenario years are all under the emission budget. Using the same model the NO_x emissions for the same years were also below the emission limit budget. Both precursors of O_3 meet conformity criteria. Results of the conformity determination show that *Mobility 2025 – 2004 Update* and the *2004-2006 TIP* meet the transportation requirements of the CAAA (42 USC. 7504, 750(c) and (d)) and the transportation conformity rule (40 CFR Parts 51 and 93).

In addition to the NAAQS set forth by EPA for the six criteria pollutants, EPA has also established a list of 33 urban air toxics. Urban air toxics, also know as hazardous air pollutants, are pollutants that cause or may cause cancer or other serious health effects or adverse environmental and ecological effects. Most air toxics originate from human-made sources, including on-road mobile sources (i.e., cars, trucks, buses), non-road mobile sources (i.e., construction equipment, aircraft, lawnmowers) and stationary sources (i.e., refineries, power plants, factories), as well as indoor sources (i.e., building materials). Some air toxics are also released from natural sources such as volcanic eruptions and forest fires.

These pollutants are in our atmosphere as a result of our industrialized society, but science has been providing more evidence about the risks they pose to human health. The health risks for people exposed to urban air toxics at sufficiently high concentrations or lengthy durations include an

increased risk for getting cancer or experiencing other serious health effects. These health effects can include damage to the immune system, as well as neurological, reproductive, developmental, respiratory and other health problems.

To better understand the harmful effects road sources of urban air toxics have on human health, in 1996 EPA developed a list of 22 mobile source air toxics (MSAT), such as acetaldehyde, benzene, formaldehyde, diesel exhaust, acrolein and 1,3-butadiene and assessed the risks of various kinds of exposures to these pollutants on human health. In July 1999, the EPA published a strategy to reduce urban air toxics. In March 2001, the EPA issued regulations for the producers of urban air toxics to decrease the amounts of these pollutants by target dates in 2007 and 2020. Under these regulations, between 1999 and 2020, on-road emissions of benzene, formaldehyde, 1,3-butadiene and acetaldehyde will be reduced by 67 to 76 percent and on-road highway PM emissions will be reduced by 90 percent. These reductions are due to the impacts of national mobile source control programs, including the reformulated gasoline program, a new cap on the toxics content of gasoline, the national low emissions vehicle standards, the Tier 2 motor vehicle emissions standards and on-road diesel fuel sulfur control requirements. These are net emission reductions, that is, the reductions that will be experienced even after growth in VMT is taken into account.

The EPA has not yet determined how best to evaluate the impact of future roads and intersections on the ambient concentrations of urban air toxics. There are no standards for MSAT and there are no tools to determine the significance of localized concentrations or of increases or decreases in emissions. Without the necessary standards and tools, we cannot analyze the specific impacts of certain transportation related projects in any meaningful way. With the information currently available, all we can conclude is that 1) there are likely to be localized concentrations of air toxics along the new highway that are similar to those experienced by existing residences at similar distances from other similar arterial corridors and 2) regardless of the alternative chosen, emissions in the project area will decrease over time due to EPA's national control programs.

EPA has determined the health effects of fine PM and has set the PM2.5 standard to ensure that the public health is protected. Many areas of the country, including Texas, are in the process of

monitoring levels of PM2.5 and this monitoring will serve as the basis for whether this pollutant needs to be addressed at the regional scale, local scale, or both. All Texas counties are currently monitoring attainment. FHWA believes that PM2.5 at a project level cannot be determined at this time. It may turn out that PM2.5 is very similar to ozone in that it is a regional effect, not a localized effect. Therefore, a regional analysis of PM2.5 may ultimately be required.

According to *Mobility 2025 - 2004 Update*, the recommended project is planned as a six-lane tollroad from IH 30 to Altamesa/Dirks Road by 2015 and a four-lane tollroad from Altamesa/Dirks Road to FM 1187 for the same year. Opening year of the facility is currently expected to be after 2007 with construction occurring in stages. All projects in the MPO TIP that are proposed for Federal or State funds were initiated in a manner consistent with Federal guidelines in section 450, of Title 23 CFR and Section 613.200, Subpart B, of Title 49 CFR. Energy, environment, air quality, cost and mobility considerations are addressed in the programming of the TIP. The proposed action is consistent with the area's financially constrained *Mobility 2025 - 2004 Update* and the *2004-2006 TIP* found to conform to the CAAA of 1990, by the U.S. DOT on April 8, 2004.

The proposed SH 121 is part of the *Mobility 2025 - 2004 Update* as one of the facilities to improve the regional transportation system by the construction of a new roadway facility and a rural highway southwest of Tarrant County. Therefore, the project is included in a plan that meets conformity.

5.10.2. Microscale Analysis

Tarrant County is in attainment with CO standards. CO concentrations have not exceeded the 1-hour standard of 35.5 ppm as of May 24, 2004. A monitoring site located on Ross Avenue near downtown Fort Worth records 1-hour CO concentrations in ppm for the area. Monthly reports provided by the TCEQ Data Management and Analysis Department show daily maximum 1-hour readings at the station for 2001, 2002, 2003 and 2004 (up to May 24, 2004). The maximum 1-hour concentrations for each year are shown on Table 5-11 as well as the month of occurrence. The reports show no values exceeding the 35.5 ppm standard. The highest concentration was 4.0 ppm recorded in February and November of 2002. This concentration is 14 percent of NAAQS.

Table 5-11 – Yearly Maximum 1-Hour Carbon Monoxide Concentrations, 2001-2004

Year	Max 1-Hour CO Concentration in ppm	Month
2001	3.4	November and December
2002	4.0	February and November
2003	3.9	January
2004	2.3	February

Source: TCEQ Data Management and Analysis Department as of 4/24/2004.

For this project, MOBILE6 composite emission factors and the California Line Source Model (CALINE3) were used to predict the hourly CO concentrations for the estimated time of construction completion (ETC), 2008 and the ETC+20, 2028. MOBILE6 takes into account the benefits gained from the inspection/maintenance (I/M) and anti-tampering programs that have been in place since the mid 80's and early 90's, the existence of newer more efficient vehicles and the elimination of old and inefficient vehicles from the roadway. Modeling speeds used were 65 mi per hour (mph) on the north and south main lanes of the facility, 40 mph on frontage roads and 50 mph on ramps.

The emission factors in grams per mile (gm/mile) (Table 5-12) were then used in CALINE3 to predict the 1-hour CO concentration generated by motor vehicles within the PSC. The worst-case meteorological conditions were used. Results were modeled every 30 degrees of wind direction, with a CO background concentration of 1.8 ppm and the 2008 and 2028 design hourly traffic volume. The CO total concentrations at sensitive receivers and along the ROW were determined for each case.

Table 5-12 – MOBILE6 CO Emission Factors Used (gm/mile)

Speed in mph	2008	2028
65*	22	12
50	20	11
40	19	11

Source: EPA's "look up tables" for the DFW area.
* *Maximum speed (worse case scenario) that can be modeled with MOBILE6.*

The highest 1-hour CO concentrations at each receiver and along the project ROW are depicted in

Table 5-13 for year 2008 and Table 5-14 for year 2028. Exhibit 5.2 through Exhibit 5.5 depict the locations of air modeling sites.

Modeling results show that for the ETC year (2008), north of Bellaire Drive, the average percent of NAAQS (35.5 ppm) along the ROW is 15 percent and the average CO concentration is 5.5 ppm. South of Bellaire Drive, the average NAAQS is 11 percent with an average CO concentration of 3.8 ppm. In ETC + 20 year (2028), north of Bellaire Drive, the average percent of NAAQS along the ROW is 16 percent and the average CO concentration is 6.2 ppm. South of Bellaire Drive, the average NAAQS is 15 percent with an average CO concentration of 5.1 ppm. None of the CO levels at the sensitive receivers (San Mateo Church, Fort Worth Country Day School, Hunters Green Apartments, Hunters Ridge Apartments, Marina Club Apartments, All Saints Hospital, Harris Methodist Hospital, Hulen Bend Addition and other residential areas) exceeded the 1-hour NAAQS standards. The Toll Plaza was analyzed using the appropriate emission factors to best describe the traffic activity at the approaching lanes and the tollbooths. The CO concentrations north and south of this area were modeled to be 12 and 16 percent of the NAAQS standard (35.5 ppm) in the year 2008 and 14 and 22 percent of the NAAQS standard in the year 2028.

Alternatives A, B, C, C/A and D

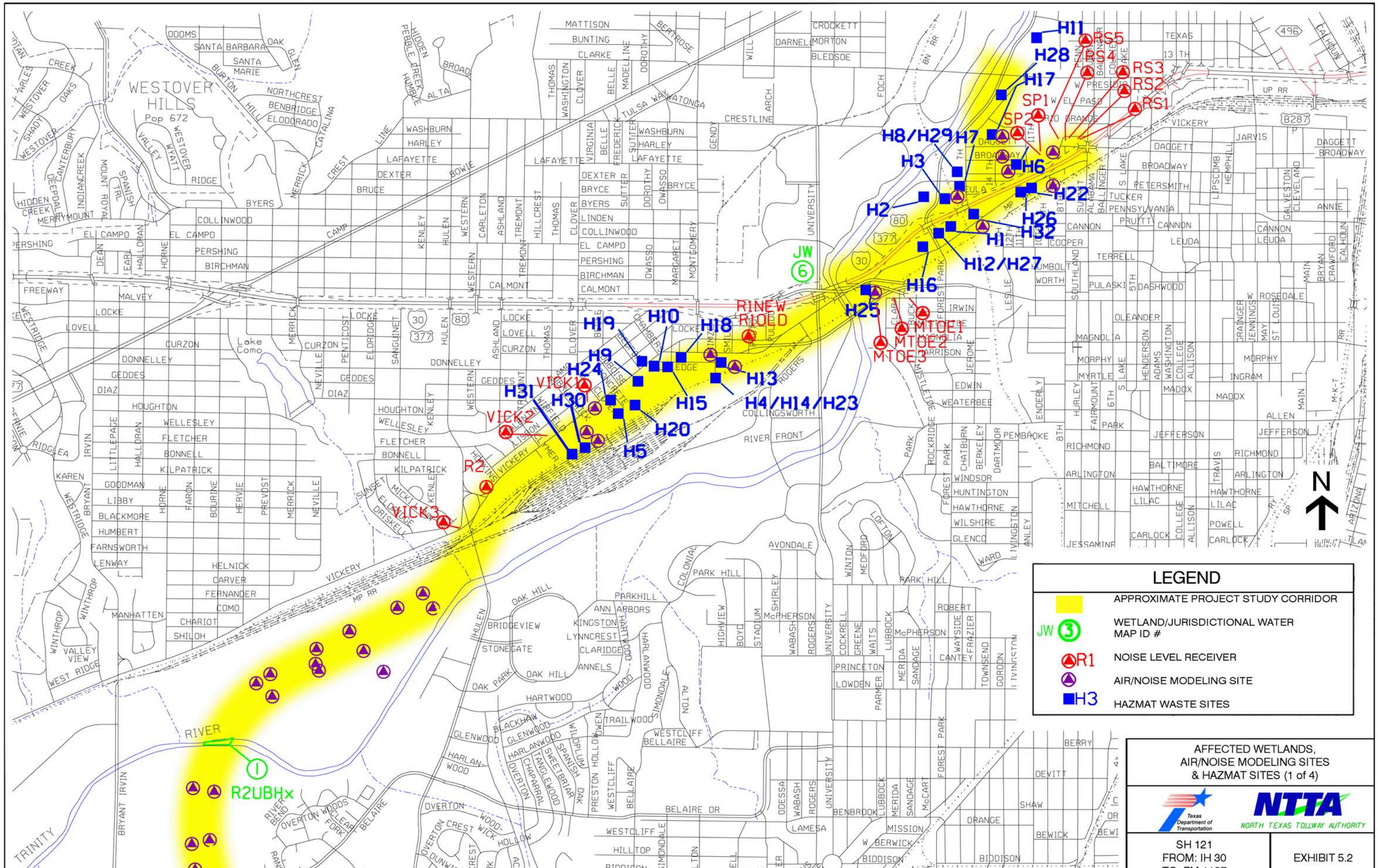
Based on MOBILE6 and CALINE3 air quality models, the Build alternatives would not degrade the air quality in the PSC. CO concentrations are not expected to exceed current NAAQS standards. MOBILE6 emissions are predicted to decrease due to program improvements and the existence of more efficient vehicles, decreasing the CO concentrations. The *Mobility 2025 – 2004 Update* includes the Build alternative of this project, its implementation would help improve air quality and meet the transportation needs of the future.

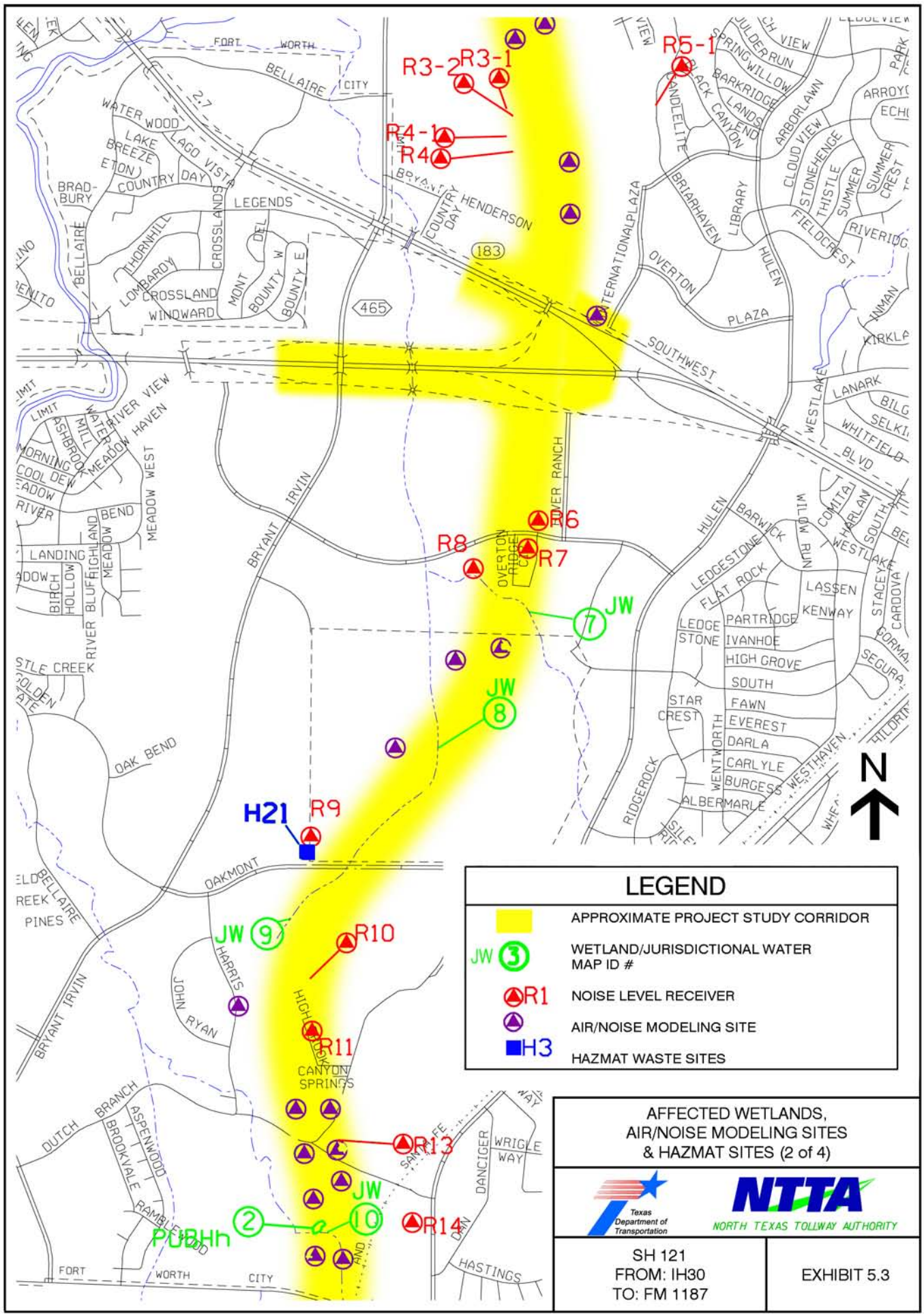
Table 5-13 – Predicted 1-Hour Carbon Monoxide Concentrations in parts per million, 2008

Modeling Years	2008						
Highway Area/Segment	**Traffic Volume in veh/hr**	**1 hr CO at Receiver**	**1 hr CO at ROW**	**Percent of NAAQS (35.5 ppm) at ROW**	**8 hr CO at Receiver**	**8 hr CO at ROW**	**Percent of NAAQS (9 ppm) at ROW**
East of Forest Park, north of IH 30	20,534	NA	10.7	30%	NA	6.5	73%
East of Forest Park, South of IH 30	21,478	NA	8.9	25%	NA	5.5	61%
East of Forest Park Boulevard, along Southwest Parkway, south of IH 30	18,526	NA	4.6	13%	NA	2.9	32%
West of Forest Park to Rosedale	22,186	NA	3.8	11%	NA	2.4	27%
North of Toll Plaza along Vickery Boulevard	5,428	NA	4.1	12%	NA	2.6	29%
South of Toll Plaza	5,428	NA	6	17%	NA	3.7	41%
Hulen Street bridge	9,205	NA	3.9	11%	NA	2.5	27%
San Mateo Church	5,665	4.4	3.3	9%	2.8	2.1	23%
South of Hulen Street bridge to proposed Stonegate	4,350	NA	4.1	12%	NA	2.6	29%
Proposed Stonegate to the Trinity River	9,205	NA	5.1	14%	NA	3.2	35%
South of the Trinity River to Bellaire Drive	10,858	NA	5.6	16%	NA	3.5	39%
Bellaire Drive to SH 183 at Country Day School:	6,389		3.2	9%		2.0	23%
Kindergarten area		3.5			2.2		
Middle school area		3.4			2.16		
Library area		3.0			1.92		
South of Overton Ridge Boulevard to proposed Oakmont Boulevard:	8,025		4	11%		2.5	28%
Hunters Green Apartments		4.5			2.82		
Hunters Ridge Apartments		4.4			2.76		
Marina Club		4.6			2.88		
South of Overton Ridge Boulevard to proposed Oakmont Boulevard:	7,081		4.1	12%		2.6	29%
All Saints Hospital		2.7			1.74		
South of Oakmont Boulevard to Dutch Branch Road:	4,248			10%			24%
Hulen Bend Addition (under construction)		2.6	3.5		1.68	2.2	
Harris Methodist Hospital		2.5	2.7		1.62	1.7	
Dutch Branch Road to Dirks Road	6,844		3.8	11%		2.4	27%
New Residence 1		4.1			2.58		
New Residence 2		4.6			2.88		
Sycamore School Road To proposed McPherson	5,310	NA	3	8%	NA	1.9	21%
Proposed McPherson to Cleburne-Crowley Road	2,360	NA	4.2	12%	NA	2.6	29%
Cleburne-Crowley Road to FM 1187	4,484	NA	4.4	12%	NA	2.8	31%

Table 5-14 – Predicted 1-Hour Carbon Monoxide Concentrations in parts per million, 2028

Modeling Years	2028						
Highway Area/Segment	**Traffic Volume in veh/hr**	**1 hr CO at Receptor**	**1 hr CO at ROW**	**Percent of NAAQS (35.5 ppm) at ROW**	**8 hr CO at Receptor**	**8 hr CO at ROW**	**Percent of NAAQS (9 ppm) at ROW**
East of Forest Park, north of IH 30	37,088	NA	10.7	30%	NA	6.5	73%
East of Forest Park, South of IH 30	38,793	NA	9	25%	NA	5.5	61%
East of Forest Park Boulevard, along Southwest Parkway, south of IH 30	33,466	NA	4.7	13%	NA	2.9	33%
West of Forest Park to Rosedale	23,891	NA	3.7	10%	NA	2.3	26%
North of Toll Plaza along Vickery Boulevard	9,804	NA	5.1	14%	NA	3.2	35%
South of Toll Plaza	9,804	NA	7.7	22%	NA	4.7	53%
Hulen Street bridge	16,626	NA	6.1	17%	NA	3.8	42%
San Mateo Church	11,801	4.6	3.4	10%	2.1	2.2	24%
South of Hulen Street bridge to proposed Stonegate	13,615	NA	5.6	16%	NA	3.5	39%
Proposed Stonegate to the Trinity River	16,626	NA	6.4	18%	NA	4.0	44%
South of the Trinity River to Bellaire Drive	28,913	NA	5.5	15%	NA	3.4	38%
Bellaire Drive to SH 183 at Fort Worth Country Day School:	11,540		3.9	11%		2.5	28%
Kindergarten area		3.5			2.2		
Middle school area		3.4			2.2		
Library area		3.0			1.9		
South of Overton Ridge Boulevard to proposed Oakmont Boulevard:	14,494		5.2	15%		3.2	36%
Hunters Green Apartments		4.7			2.9		
Hunters Ridge Apartments		4.7			2.9		
Marina Club		4.6			2.9		
South of Overton Ridge Boulevard to proposed Oakmont Boulevard:	20,128		5.6	16%		3.5	39%
All Saints Hospital		3.2			2.0		
South of Oakmont Boulevard to Dutch Branch Road:	13,309			13%			
Hulen Bend Addition (under construction)		3.2	4.6		2.0	2.9	32%
Harris Methodist Hospital		2.9	4.4		1.9	2.8	31%
Dutch Branch Road to Dirks Road	12,363		4.5	13%		2.8	31%
New Residence 1		4.8			3.0		
New Residence 2		5.4			3.4		
Sycamore School Road to proposed McPherson	9,591	NA	3.9	11%	NA	2.5	27%
Proposed McPherson to Cleburne-Crowley Road	8,785	NA	6.6	19%	NA	4.1	45%
Cleburne-Crowley Road to FM 1187	9,091	NA	7	20%	NA	4.3	48%


LEGEND
APPROXIMATE PROJECT STUDY CORRIDOR
JW 3 WETLAND/JURISDICTIONAL WATER MAP ID #
R1 NOISE LEVEL RECEIVER
AIR/NOISE MODELING SITE
H3 HAZMAT WASTE SITES
AFFECTED WETLANDS, AIR/NOISE MODELING SITES & HAZMAT SITES (1 of 4)
Texas Department of Transportation
NTTA NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 5.2
N
H11
RS5
RS4
RS3
RS2
RS1
H28
H17
SP1
SP2
H8/H29
H7
H3
H6
H22
H2
H26
H32
H1
H12/H27
H16
H25
RINEW
RIOLD
MTOE1
MTOE2
MTOE3
JW 6
H19
H10
H18
H9
H24
VICK1
H31
H30
H13
H15
H4/H14/H23
VICK2
H20
H5
R2
VICK3
JW 1
R2UBHx
RIVER
TRINITY
WESTOVER HILLS
Pop 672
Lake Como


R3-2
R3-1
R5-1
R4-1
R4
R6
R7
R8
R9
R10
R11
R13
R14
H21
JW 7
JW 8
JW 9
JW 10
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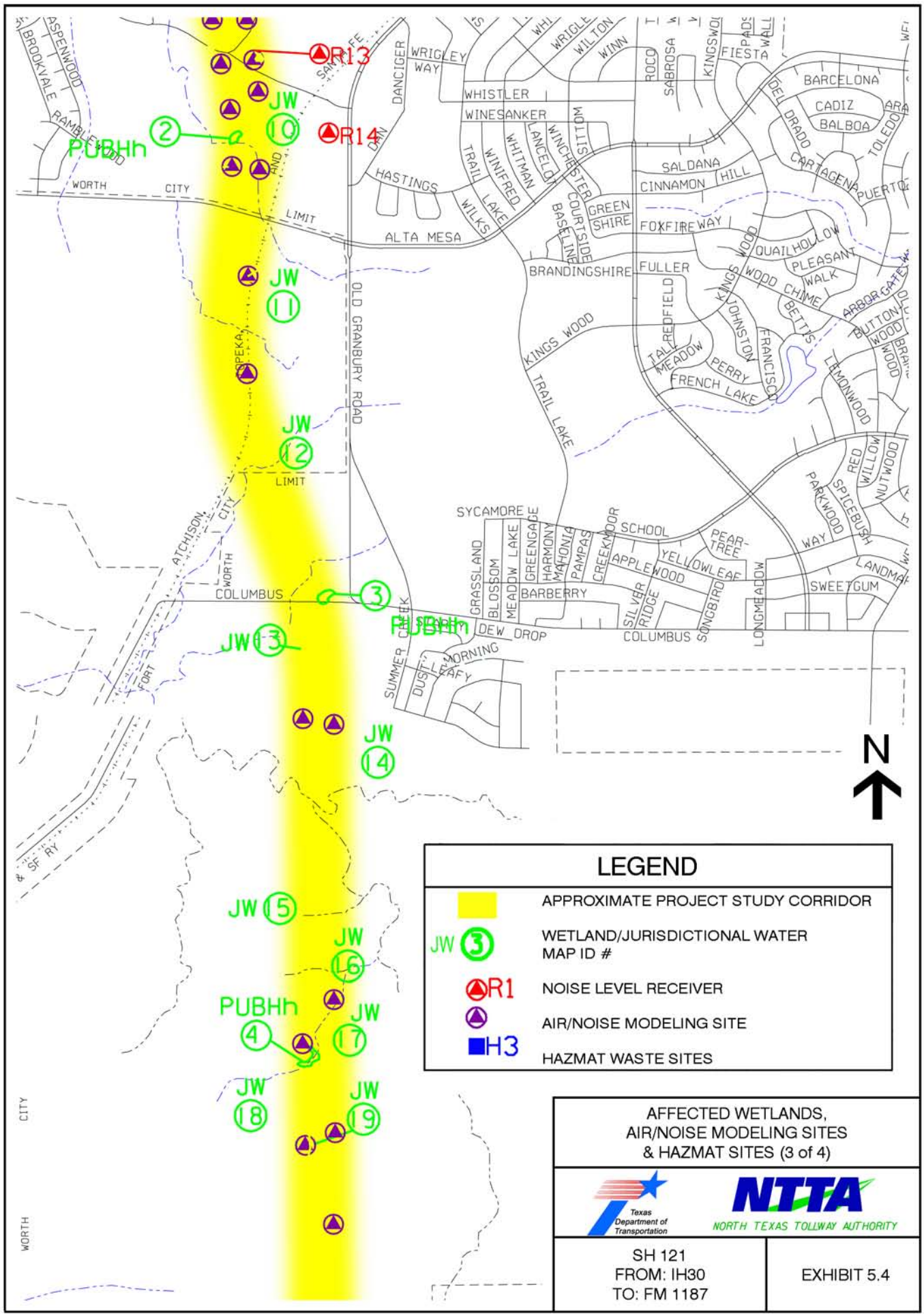
LEGEND
APPROXIMATE PROJECT STUDY CORRIDOR
WETLAND/JURISDICTIONAL WATER MAP ID #
NOISE LEVEL RECEIVER
AIR/NOISE MODELING SITE
HAZMAT WASTE SITES
N
FORT WORTH
BELLAIRE
CITY
BRYANT IRVIN
HENDERSON
SOUTHWEST
INTERNATIONAL PLAZA
OVERTON
HULEN
RIVER RANCH
OAKMONT
HARRIS
JOHN RYAN
CANYON SPRINGS
DANCIGER
WRIGLE WAY
HASTINGS
OAK BEND
DUTCH BRANCH
AFFECTED WETLANDS, AIR/NOISE MODELING SITES & HAZMAT SITES (2 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 5.3



LEGEND

	APPROXIMATE PROJECT STUDY CORRIDOR
JW 3	WETLAND/JURISDICTIONAL WATER MAP ID #
R1	NOISE LEVEL RECEIVER
	AIR/NOISE MODELING SITE
H3	HAZMAT WASTE SITES

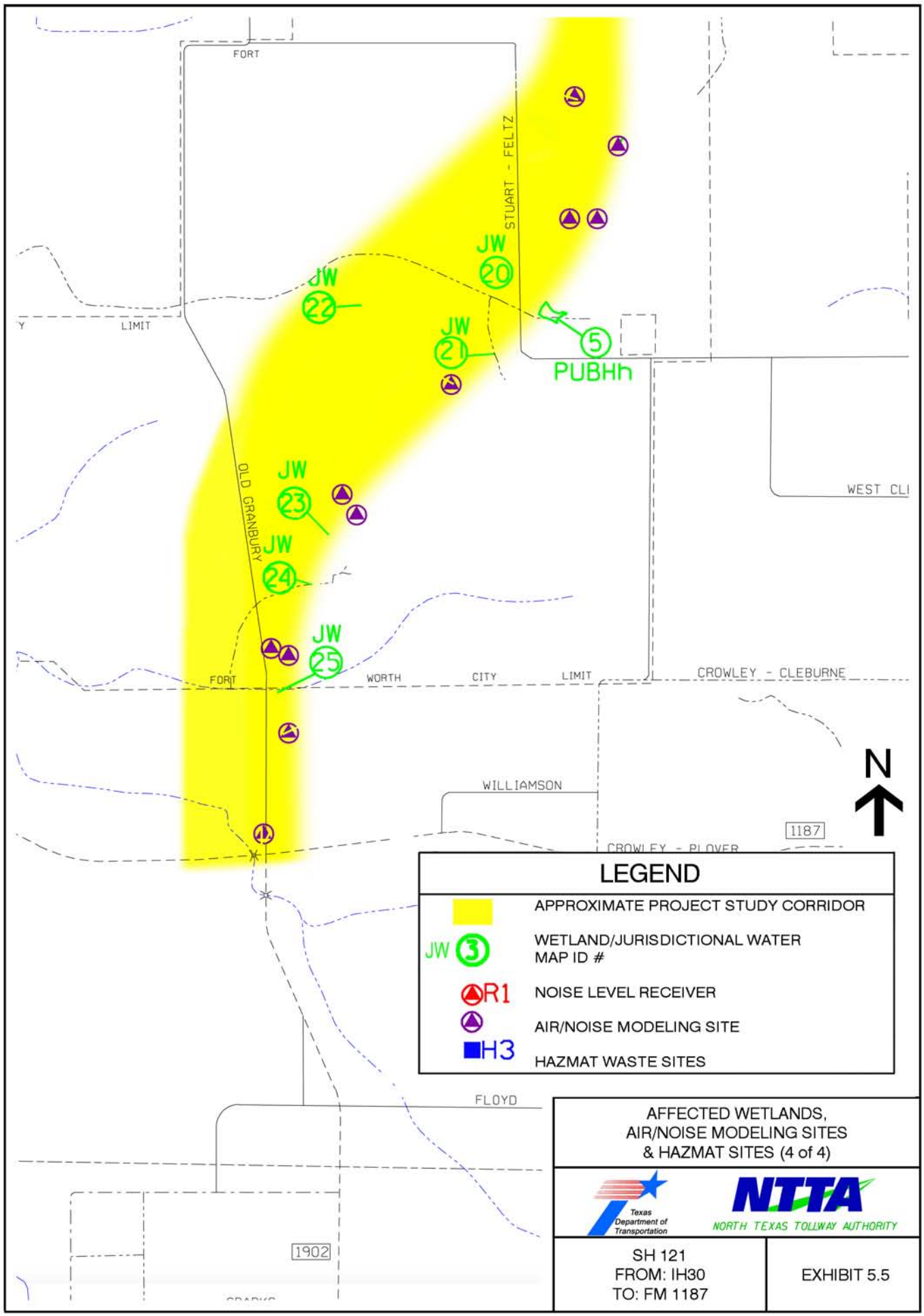
AFFECTED WETLANDS, AIR/NOISE MODELING SITES & HAZMAT SITES (3 of 4)

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 5.4


FORT
STUART - FELTZ
JW 20
JW 22
JW 21
5
PUBHh
LIMIT
WEST CLI
OLD GRANBURY
JW 23
JW 24
JW 25
FORT WORTH CITY LIMIT
CROWLEY - CLEBURNE
N
WILLIAMSON
1187
CROWLEY - PLOVER
LEGEND
APPROXIMATE PROJECT STUDY CORRIDOR
JW 3
WETLAND/JURISDICTIONAL WATER
MAP ID #
R1
NOISE LEVEL RECEIVER
AIR/NOISE MODELING SITE
H3
HAZMAT WASTE SITES
FLOYD
1902
AFFECTED WETLANDS,
AIR/NOISE MODELING SITES
& HAZMAT SITES (4 of 4)
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 5.5

5.10.3. No Build Alternative

The No Build alternative would not be consistent with local transportation plans and programs. Based on the predicted 2025 population and employment growth and the traffic congestion, the No Build alternative of this project might contribute to air quality degradation.

5.11. Noise Impacts

A preliminary noise analysis in accordance with FHWA Regulation 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise and TxDOT's 1996 Guidelines for Analysis and Abatement of Highway Traffic Noise was conducted for the proposed tollroad and presented in the DEIS. The purpose of the analysis was to determine potential traffic noise impacts on developed land adjacent to the alternatives under consideration. A more detailed, in depth analysis in accordance with FHWA Regulation 23 CFR 772, Procedures for Abatement of Highway Traffic Noise and Construction Noise and TxDOT's 1996 Guidelines for Analysis and Abatement of Highway Traffic Noise has been performed for the recommended alternative and is included herein.

5.11.1. Sound Measurement Units

Sound from highway traffic is generated primarily from vehicle tires, engine and exhaust. It is commonly measured in 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 sound. This adjustment is called A-weighting and is expressed as dB(A).

Also, because traffic sounds 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 L_{eq}. L_{eq} is defined as the equivalent steady state sound levels, which, in a stated period of time, contains the same acoustic energy as the time-varying sound level during the same period. $L_{eq}Hr$

means the L_{eq} established over a one-hour period. Common outdoor and indoor sound levels are listed on Table 5-15.

Table 5-15 – Common Sound/Noise Levels

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

The traffic noise analysis typically includes the following elements:

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

The FHWA has established NAC shown in Table 5-16, for various land use activity areas that are used to determine if a traffic noise impact has occurred.

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

Absolute Criterion: The predicted noise level at a receiver approaches, equals or exceeds the NAC. Approach is defined as one 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.

Table 5-16 – Federal Highway Administration Noise Abatement Criteria

Activity Category	dB(A) L_{eq}	Description of Land Use Activity Areas
A	57 (exterior)	Lands on which serenity and quiet are of extra-ordinary significance and serve an important public need and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 (exterior)	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 (exterior)	Developed lands, properties or activities not included in categories A or B above.
D	—	Undeveloped lands.
E	52 (interior)	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals and auditoriums.

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

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), i.e., an 11 dB(A) increase.

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

5.11.2. Methodology

Presently the predominant noise generators north of Bellaire Drive in the proposed tollroad project area are vehicular traffic and the UPRR Yard. Noise from the railroad yard is attributed to the existing train hump station. This station is where railcars are released from the train they are on and

sent over a hump to self propel to a new train by a computer operated switch network. The noise from the impact as the railcar connects with a new train can be heard from quite a distance.

Land use from Vickery Boulevard to FM 1187, is predominantly undeveloped with a few exceptions such as a school, a church, two hospitals and residential areas. The church, the hospital and the multi-family residential areas have no frequent human outdoor activity areas between highway and receiver; therefore, they were analyzed as activity category E (interior), with FHWA NAC of 52 dB(A). Because the school and the single-family areas south of Oakmont Boulevard, Sunset Terrace and Mistletoe Heights have frequent human outdoor activity areas facing the proposed SH 121, they were analyzed as activity NAC category B (exterior), with FHWA NAC of 67 dB(A).

The receivers identified in Table 5-17 were modeled along the tollroad. The noise levels for the interior categories were modeled and estimated using a noise reduction factor based on the type of building structure. Existing and predicted noise levels at each site, as well as receiver location are shown on Table 5-17. Noise modeling sites were also located along the undeveloped land based on future land use or zoning designations. Exhibit 5.6 shows the location of the noise monitoring/modeling sites.

The FHWA Traffic Noise Model software was used to calculate predicted traffic noise levels. The model considers the number, type and speed of vehicles; highway alignment and grade; cuts, fills and natural berms; surrounding terrain features; and the location of activity areas likely to be impacted by the associated traffic noise. Predicted traffic noise levels for the year 2025 were modeled at locations that represent activity areas B, C, D and E adjacent to the roadway that might be impacted by traffic noise and that may potentially benefit from reduced noise levels.

5.11.3. Results

As indicated in Table 5-15, predicted noise levels exceed existing levels by a maximum of 18 dB(A), the NAC was approached, equaled or exceeded (absolute criterion) and substantially exceeded the existing levels at 16 receivers. Therefore, the project would result in a traffic noise impact and the

Table 5-17 – Traffic Noise Levels L_{eq}

Receiver	Site	Location	NAC Category	NAC Level	Existing Noise Level	Predicted Noise Level	Change (+/-)	Impact
RS1	Sunset Terrace House 1	Sunset Terrace	B	67	57	61	4	N
RS2	Sunset Terrace Apartment	Sunset Terrace	E	52	41	46	5	N
RS3	Sunset Terrace House 3	Sunset Terrace	E	52	40	45	5	N
RS4	Sunset Terrace House 4	Sunset Terrace	B	67	63	71	8	Y
RS5	Sunset Terrace House 5	Sunset Terrace	E	52	40	44	4	N
SP1	St. Paul School	West Freeway	E	52	40	41	1	N
SP2	St. Paul Church	West Freeway	E	52	40	43	3	N
MTOE1	Mistletoe House 1	West Rosedale Street	B	67	65	67	2	Y
MTOE2	Mistletoe House 2	West Rosedale Street	B	67	68	70	2	Y
MTOE3	Mistletoe House 3	Mistletoe Drive	B	67	68	71	3	Y
R1-NEW	San Mateo church (new building)	Lovell Avenue	E	52	40	48	8	N
R1-OLD	San Mateo church (old building)	Lovell Avenue	E	52	40	48	8	N
VICK1	AlamoHeights House 1	Vickery Boulevard	B	67	65	69	4	Y
VICK2	AlamoHeights House 2	Vickery Boulevard	B	67	66	70	4	Y
VICK3	AlamoHeights House 3	Vickery Boulevard and South Hulen Street	B	67	67	73	6	Y
R4	Fort Worth Country Day Middle School	Country Day Middle School building	B	67	50	63	13	Y
R4-1	Fort Worth Country Day Middle School	Country Day Middle School outdoor activity area	B	67	50	63	13	Y
R5-1	Overton Woods residences	Across Country Day Lane	B	67	50	50	0	N
R6	Hunters Ridge Apartments 1st floor	Briarhaven Road	E	52	40	44	4	N
R7	Hunters Green Apartments 1st floor	Overton Ridge Boulevard	E	52	40	40	0	N
R8	Marina Club Apartments 1st floor	Overton Ridge Boulevard	E	52	40	40	0	N
R9	All Saints Episcopal Hospital	Oakmont Boulevard	E	52	40	40	0	N
R10	Hulen Bend Addition House 1	East of Harris Parkway	B	67	56	74	18	Y
R11	Hulen Bend Addition House 2	East of Harris Parkway	B	67	56	73	17	Y
R13	Park Palisades House 1	North of Dutch Branch Road	B	67	56	70	14	Y
R14	Park Palisades House 2	South of Dutch Branch Road	B	67	56	71	15	Y

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.

5.11.4. Noise Abatement

Before any abatement measure can be incorporated into the project, it must be both feasible and reasonable. In order to be feasible, the measure should reduce noise levels by at least five dB(A) per benefited receiver; and to be reasonable the construction cost should not exceed $25,000 per benefited receiver.

Traffic management: control devices could be used to reduce the speed of the 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 SHs.

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

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

Noise barriers: this is the most commonly used noise abatement measure. For this project, a noise barrier would restrict access to a majority of the adjacent activity areas. Numerous gaps in the noise barrier would satisfy access requirements but would render the barrier ineffective (unfeasible). Also, noise barriers could have a detrimental impact on nearby businesses by restricting views and access by potential customers. Finally, a noise barrier would not be cost effective for an individual receiver. For these reasons, a noise barrier would not be feasible and reasonable for the receivers at Sunset

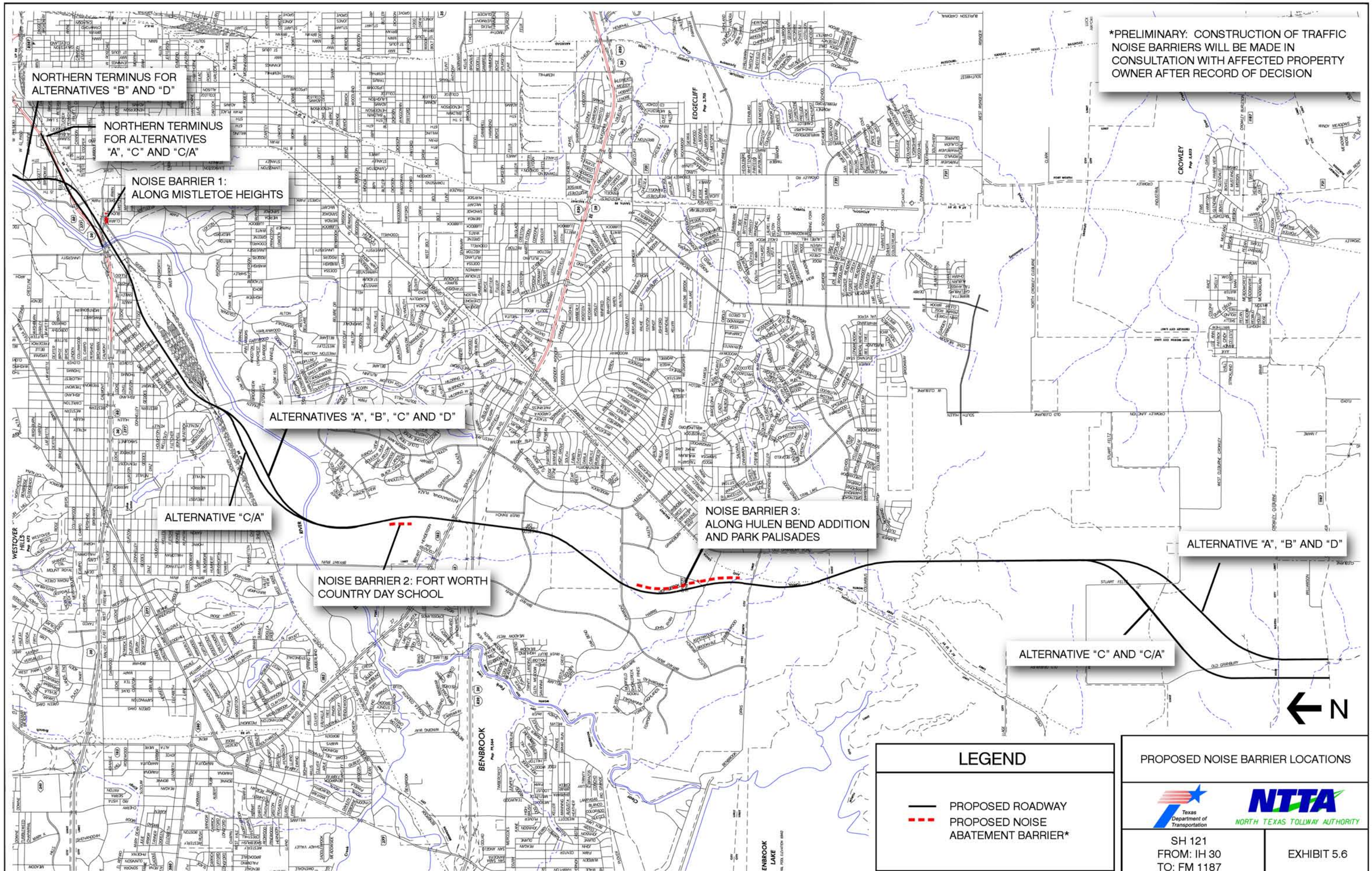
Terrace, Marcus Cable, Alamo Heights and one receiver at Mistletoe Heights (MTOE3). However, a noise barrier was determined to be both feasible and reasonable for Mistletoe Heights (Receivers MTOE1 and MTOE2), Fort Worth Country Day School (Receivers R3-1, R3-2, R4 and R4-1) and Hulen Bend Addition/Park Palisades (Receivers R10, R11, R13 and R14); therefore, these noise barriers are proposed for incorporation into the project. Details of these proposed noise barriers are shown in Table 5-18 and the general location shown on Exhibit 5.6. The final decision to construct the proposed noise barrier would be made after the ROD and following consultation with the affected property owners.

Table 5-18 – Noise Barrier Proposal

Barrier	Area	#Benefited Receivers	Length (ft)	Height (ft)	Total Cost	$/Benefited Receivers
1	Mistletoe Heights	4	524	5*	$43,720	$10,930
2	Fort Worth Country Day School	11	1,000	12 to 16	$244,800	$22,255
3	Hulen Bend Addition/Park Palisades	84	5,200	8 to 12	$813,800	$9,688

* *The five ft high wall would be added on top of an existing berm producing a total barrier height ranging between nine and 12 ft high.*

Because the City zoning maps were developed taking into consideration the proposed SH 121, the project area continues to be predominately undeveloped. In particular, the areas between Hulen Street and IH 20, including the areas north and south of the proposed Arborlawn Road interchange. South of IH 20, the area is also mainly undeveloped with the exception of multi-family residential areas north and south of Overton Ridge Boulevard and the single-family residential area (Hulen Bend Addition and Park Palisades). The undeveloped areas along the alignment are currently zoned commercial and residential, falling under NAC activity category D, which has no established FHWA NAC. Exhibit 5.2 through Exhibit 5.5 depict the existing and undeveloped/zoned land uses along the PSC.


NORTHERN TERMINUS FOR ALTERNATIVES "B" AND "D"
NORTHERN TERMINUS FOR ALTERNATIVES "A", "C" AND "C/A"
NOISE BARRIER 1: ALONG MISTLETOE HEIGHTS
ALTERNATIVES "A", "B", "C" AND "D"
ALTERNATIVE "C/A"
NOISE BARRIER 2: FORT WORTH COUNTRY DAY SCHOOL
NOISE BARRIER 3: ALONG HULEN BEND ADDITION AND PARK PALISADES
ALTERNATIVE "A", "B" AND "D"
ALTERNATIVE "C" AND "C/A"
*PRELIMINARY: CONSTRUCTION OF TRAFFIC NOISE BARRIERS WILL BE MADE IN CONSULTATION WITH AFFECTED PROPERTY OWNER AFTER RECORD OF DECISION
EDGECLIFF
CROWLEY
WESTOVER HILLS
BENBROOK
ENBROOK LAKE
N
LEGEND
PROPOSED ROADWAY
PROPOSED NOISE ABATEMENT BARRIER*
PROPOSED NOISE BARRIER LOCATIONS
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 5.6

In order to avoid noise impacts that might 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, that no new activities are planned or constructed along or within the predicted 2025 noise impact contours shown on Table 5-19. For the purpose of this analysis, the noise contour lines for the recommended alternative were developed based on the corresponding land uses established by the City.

Noise associated with the construction of the project is difficult to predict. Heavy machinery, the major source of noise in construction, is constantly moving in unpredictable patterns. However, construction normally occurs during daylight hours when occasional loud noises are more tolerable.

None of the receivers are expected to be exposed to construction noise for a long duration; therefore, any extended disruption of normal activities is not expected. Provisions would be included in the plans and specifications that require the contractor to make every reasonable effort to minimize construction noise through abatement measures such as work-hour controls and proper maintenance of muffler systems.

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

5.11.5. No-Build Alternative

The No-Build alternative would not result in noise impacts along the PSC but could result in noise impacts at other locations along other arterials where traffic growth could cause noise impacts.

Table 5-19 – Noise Impact Contours, 2025

Location	Undeveloped Area	Land Use	Impact Contour	Distance from ROW (ft)
Hulen Street to Trinity River	Along SH 121	Industrial	71	0
Trinity River and Arborlawn Road	East of SH 121	Residential	66	200
	West of SH 121	Residential	66	250
South of Arborlawn Road	Along SH 121	Residential	66	0
Overton Ridge to Oakmont Boulevard	East of SH 121	Commercial	71	100
	West of SH 121, from Overton Ridge to 0.4 mi north of Oakmont Blvd	Residential	66	150
	West of SH 121, north of Oakmont Blvd	Commercial	71	0
Oakmont to Dutch Branch Road	West of SH 121	Commercial	71	100
Dutch Branch to Dirks/Altamesa Road	West of SH 121	Commercial	71	0
Dirks/Altamesa Road to Future Sycamore	Along SH 121	Residential	66	250
Future Sycamore to Future Risinger	East of SH 121	Residential	66	200
	West of SH 121	Commercial	71	100
Future Risinger to McPherson	East of SH 121	Residential	66	200
		Commercial	71	0
	West of SH 121	Commercial	71	0
McPherson to Stuart-Feltz	East of SH 121	Residential	66	150
	West of SH 121	Residential	66	250
		Commercial	71	100
Stuart-Feltz to Cleburne-Crowley	East of SH 121	Residential	66	200
		Commercial	71	50
	West of SH 121	Residential	66	200
		Commercial	71	75
Cleburne-Crowley to FM 1187	Along SH 121	Residential	66	200
		Commercial/Industrial	71	50

5.12. Water Quality Impacts

5.12.1. Surface Water Quality

Alternatives A, B, C, C/A and D

The surface water quality impacts would occur mainly during the construction phase of the SH 121 project and can be divided into two types, temporary and potential. Soil erosion and sediment-laden runoff from the construction areas account for most of the potential impacts to streams and rivers within the PSC. These types of impacts on the project crossings with the Clear Fork of the Trinity River (segment 0829) would be minimized through the development and implementation of SW3Ps and sedimentation control devices and practices. Chapter 8.0, Summary of Mitigation Measures, provides a more detailed explanation of these pollution prevention measures that would be taken. Some potential surface water quality impacts might occur because of non-point source pollution from street surface runoff, use of herbicides for ROW maintenance, toxic chemical spills or accidents, etc. However, the roadway would be designed to allow for street surface runoff to be discharged in compliance with TCEQ regulations.

The herbicides currently in use for maintenance are Round-Up and Rodeo. Round-Up, or Glyphosate is a non-selective, foliar herbicide that cannot be used over water because it contains a surfactant not approved for aquatic uses. Rodeo, also containing Glyphosate, is also a non-selective, foliar herbicide approved for use near or around water. The EPA and the Texas Department of Agriculture (TDA) approved both herbicides for use, with stipulation that when used properly, either would have minimum affects on water quality.

No-Build Alternative

A No-Build alternative would have no impacts on the surface water quality of the streams or river along the PSC.

5.12.2. Groundwater Impacts

The outcrop of the Trinity Aquifer is located west of the PSC. The outcrop of the Woodbine Aquifer is located east of the PSC.

5.12.3. Alternatives A, B, C, C/A and D

Due to the nature of the underlying aquifers, no groundwater contamination is expected to occur from the construction and use of SH 121. The project would not cross the recharge zone of any of the aquifers underlying the project.

5.12.4. No-Build Alternative

A No-Build alternative would have no impacts on the groundwater quality of the aquifers underlying the PSC.

5.13. Permits

Under the CWA, Section 404 requires a USACE permit for the discharge of dredged or fill material into waters of the United States, including wetlands. It is anticipated that construction of the proposed SH 121 would require USACE NWPs 25 and 33 for the crossings of the Clear Fork of the Trinity River, JW1 and JW6. In addition, a USACE IP is anticipated to be required for impacts to the pond JW5 and jurisdictional waters JW11, JW12 and JW21, shown on Exhibit 5.4 and Exhibit 5.5. A NWP 14 with a preconstruction notification (PCN) is anticipated to be required for impacts to the ponds JW2, JW3 and JW4, Exhibit 5.3 and Exhibit 5.4 depict jurisdictional waters JW7, JW8, JW9, JW10, JW13, JW14, JW16, JW17, JW18, JW19, JW22, JW23, JW25.

In December 1996, the U.S. EPA issued the City an National Pollution Discharge Elimination System (NPDES) Permit for its municipal separate storm sewer system (MS4), (Phase I). TxDOT operates under the same permit and as such participates in the program to protect surface water quality. Although the permit has expired, the City anticipates a renewal of the permit in 2005 from the TCEQ, which has been delegated administration of the program from the EPA.

The forthcoming EPA permit would remain in effect during the course of the project. Some of the major elements of the City's EPA permit are listed in the following:

- Storm water collection system (operation and maintenance)
- Areas of new development and redevelopment (minimize pollutants)
- Roadways (minimize de-icing pollutants)
- Flood control projects (assess water quality improvements / retrofitting)
- Pesticide, herbicide and fertilizer application (educate staff / contractors)
- Improper discharges and disposal (enforce, collect, etc.)
- Spill prevention and response (prevent, contain and respond to spills)
- Industrial and high risk runoff (conduct I/M)
- Construction site runoff (ordinance, inspections/enforcement and training)
- Public education (promote pollution prevention and public reporting)
- Monitoring programs (conduct six types of monitoring)
- Computer modeling (seasonal loadings in watersheds)

Because this project would disturb more than one acre, NTTA and TxDOT would be required to obtain a TCEQ Phase II TPDES Construction General Permit. This would be accomplished by filing a NOI to comply with the TPDES stating that NTTA would have a SW3P in place during construction of the project. No long-term water quality impacts are expected as a result of the project.

5.14. Jurisdictional Waters of the United States and Wetlands Impacts

As a result of impacts to jurisdictional waters associated with the construction of this project, Tier I Erosion Control, Post-Construction Total Suspended Solids (TSS) Control and Sedimentation Control devices would be required under the TCEQ Section 401 Water Quality Certification process.

Prior to construction, at least one sedimentation control BMP (i.e., sand bag berm, silt fence, triangular filter dike, rock berms, compost berms, hay bale dike) must be maintained and remain in place until project completion and would follow the TxDOT's manual, *Standard Specification for the Construction of Highways, Streets and Bridges*. Sediment control BMPs would prevent the introduction of sediment to adjacent wetlands or water bodies by confining the sediment.

Erosion control measures would minimize impacts to water quality during construction. At least one soil stabilization BMP designed to minimize erosion (i.e., temporary vegetation, blankets/matting, sodding, or mulching) would be installed and remain in place until the disturbed areas have been stabilized. Where appropriate, the 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 order to maintain a natural water quality buffer and minimize the amount of erodible earth exposed at any one time.

Upon completion of the earthwork operations, disturbed areas would be restored and re-seeded according to TxDOT's specifications for "Seeding for Erosion Control." If contaminated dredged material were encountered during dredging, construction operations would cease immediately. The USACE would be notified and the contaminated material would be re-mediated or disposed of in accordance with TCEQ rules. Dredging activities would not be resumed until authorized by the TCEQ.

Permit requirements for jurisdictional waters of the United States, which for the purpose of this document constitute all ponds and streams crossings, were addressed by estimating the area within the proposed ROW for each of the Build alternatives. The USACE permits associated with each one of the Build alternatives are as follows:

NWP 14-Linear Transportation Crossings authorizes an acreage limit of 0.50 ac with a PCN threshold of 0.10 ac

NWP 25-Structural Discharges authorizes the discharges of material such as concrete, sand, rock, etc. into tightly sealed forms or cells where the material would be used as a structural member for standard pile supported structures, such as bridges.

NWP 33-Temporary Construction, Access and Dewatering authorizes temporary structures, work and discharges, including cofferdams, necessary for construction activities or access fills or

dewatering of construction sites; provided that the associated primary activity is authorized by the USACE Individual Permit, Section 404 permit that is not activity specific

Construction impacts depicted in the following Table 5-20 through Table 5-23 represent the worst-case scenario for each alternative. Use of bridge structures in jurisdictional areas would eliminate or lessen the degree of impact to waters of the United States. It is anticipated that bridge structures would be used in some, if not most areas; however, design work has not yet been initiated for the project.

5.14.1. Alternative A

A total of five wetlands, as defined by the NWI maps, are located within Alternative A's ROW, all of which are palustrine except for one riverine. The affected wetlands include R2UBHx (JW1), PUBFh (JW2) and PUBHh (JW3, JW4 and JW5), depicted in Exhibit 5.2 through Exhibit 5.5. The jurisdictional waters of the United States (JW6 through JW23) are also depicted in Exhibit 5.2 through Exhibit 5.6. The approximate linear fill footage for each waters of the United States is as follows: JW1, no fill required, a bridge structure would cross the stream; JW2, 111 ft; JW3, 219 ft; JW4, 275 ft and JW5, 142 ft. Table 5-20 depicts the estimated impacts to wetlands and jurisdictional waters with total acreage and the approximate impacted acreage as well as their wetland classification. A total of approximately 0.27 ac of the PUBFh (semi-permanently flooded); 1.29 ac of PUBHh (permanently flooded); 0.90 ac R2UBHx and 6.78 ac of jurisdictional waters are within the ROW.

Construction would potentially impact approximately 0.90 ac of riverine wetlands, 1.56 ac of palustrine wetlands and 6.78 ac of jurisdictional waters of the United States.

A USACE Section 404 NWP 25-Structural Discharges and 33-Temporary Construction, Access and Dewatering and PCN are anticipated to be required for the wetlands impacted at the Clear Fork of the Trinity River Crossing (JW1 and JW6). A Section 404 IP is anticipated for the pond at JW5, JW11, JW12 and JW21. A NWP 14 with a PCN is anticipated to be required for impacts at JW2, JW3 and

Table 5-20 – Estimated Impacts to Jurisdictional Waters – Alternative A

ID#	Soil Type	Cowardin** Classification	Area (ac)	Linear Fill (ft)	Affected Area (ac)	Affected Area (%)	Expected Permits
1	Frio Silt	R2UBHx	0.90	0	0.90	100%	NWPs 25, 33 and PCN
2	Slidell clay	PUBFh	0.30	111	0.27	90%	NWP 14 and PCN
3	Sanger Clay	PUBHh	0.64	219	0.18	28%	NWP 14 and PCN
4	Sanger Clay	PUBHh	0.74	275	0.44	59%	NWP 14 and PCN
5	Sanger Clay	PUBHh	1.17	142	0.67	57%	404 IP
6	Urban land*	NA	1.00	NA	1.00	100%	NWPs 25, 33 and PCN
7	Frio Silty Clay	NA	0.42	NA	0.42	100%	NWP 14 and PCN
8	Slidell Clay	NA	0.45	NA	0.45	100%	NWP 14 and PCN
9	Sanger Clay	NA	0.28	NA	0.28	100%	NWP 14 and PCN
10	Slidell Clay	NA	0.43	NA	0.43	100%	NWP 14 and PCN
11	Slidell Clay	NA	1.25	NA	1.25	100%	404 Individual Permit
12	Slidell Clay	NA	0.83	NA	0.83	100%	404 IP
13	Slidell Clay	NA	0.31	NA	0.31	100%	NWP 14 and PCN
14	Sanger Clay	NA	0.24	NA	0.24	100%	NWP 14 and PCN
15	Sanger Clay	NA	0.04	NA	0.04	100%	NWP 14
16	Sanger Clay	NA	0.16	NA	0.16	100%	NWP 14 and PCN
17	Sanger Clay	NA	0.16	NA	0.16	100%	NWP 14 and PCN
18	Sanger Clay	NA	0.10	NA	0.10	100%	NWP 14 and PCN
19	Sanger Clay	NA	0.31	NA	0.31	100%	NWP 14 and PCN
21	Sanger Clay	NA	0.03	NA	0.03	100%	NWP 14
22	Sanger Clay	NA	0.25	NA	NONE	NONE	NA
23	Sanger Clay	NA	0.56	NA	0.56	100%	404 IP
24	Sanger Clay	NA	0.10	NA	0.10	100%	NWP 14 and PCN
25	Frio Silty Clay	NA	0.11	NA	0.11	100%	NWP 14 and PCN
		TOTALS	**10.53**		**9.24**		

* *An "Urban land" soil is defined by NRCS as that soil that have been altered and obscured to the extent that it cannot be classified.*

** *Information under these categories was determined from the FWS NWI and classification maps, "NA" means that the information was not available from these sources.*

Table 5-21 – Estimated Impacts to Jurisdictional Waters - Alternative B

ID#	Soil Type	Cowardin** Classification	Area (ac)	Linear Fill (ft)	Affected Area (ac)	Affected Area (%)	Expected Permits
1	Frio Silt	R2UBHx	1.05	0	1.05	100%	NWPs 25, 33 and PCN
2	Slidell clay	PUBFh	0.30	111	0.21	70%	NWP 14 and PCN
3	Sanger Clay	PUBHh	0.64	219	0.18	28%	NWP 14 and PCN
4	Sanger Clay	PUBHh	0.74	275	0.44	59%	NWP 14 and PCN
5	Sanger Clay	PUBHh	1.17	142	0.67	57%	404 IP
6	Urban land*	NA	1.00	NA	1.00	100%	NWPs 25, 33 and PCN
7	Frio Silty Clay	NA	0.22	NA	0.22	100%	NWP 14 and PCN
8	Slidell Clay	NA	0.22	NA	0.22	100%	NWP 14 and PCN
9	Sanger Clay	NA	0.33	NA	0.33	100%	NWP 14 and PCN
10	Slidell Clay	NA	0.43	NA	0.43	100%	NWP 14 and PCN
11	Slidell Clay	NA	1.25	NA	1.25	100%	404 IP
12	Slidell Clay	NA	0.83	NA	0.83	100%	404 IP
13	Slidell Clay	NA	0.31	NA	0.31	100%	NWP 14 and PCN
14	Sanger Clay	NA	0.24	NA	0.24	100%	NWP 14 and PCN
15	Sanger Clay	NA	0.04	NA	0.04	100%	NWP 14
16	Sanger Clay	NA	0.16	NA	0.16	100%	NWP 14 and PCN
17	Sanger Clay	NA	0.16	NA	0.16	100%	NWP 14 and PCN
18	Sanger Clay	NA	0.10	NA	0.10	100%	NWP 14 and PCN
19	Sanger Clay	NA	0.31	NA	0.31	100%	NWP 14 and PCN
20	Sanger Clay	NA	0.03	NA	0.03	100%	NWP 14
21	Sanger Clay	NA	0.56	NA	0.56	100%	404 IP
22	Sanger Clay	NA	0.25	NA	NONE	NONE	NA
23	Sanger Clay	NA	0.10	NA	0.10	100%	NWP 14 and PCN
24	Sanger Clay	NA	0.10	NA	0.10	NA	NWP 14 and PCN
25	Frio Silty Clay	NA	0.11	NA	0.11	100%	NWP 14 and PCN
		TOTALS	**10.30**		**8.95**		

* *An "Urban land" soil is defined by NRCS as that soil that have been altered and obscured to the extent that it cannot be classified.*

** *Information under these categories was determined from the FWS NWI and classification maps, "NA" means that the information was not available from these sources.*

Table 5-22 – Estimated Impacts to Jurisdictional Waters - Alternative C and C/A

ID#	Soil Type	Cowardin** Classification	Area (ac)	Linear Fill (ft)	Affected Area (ac)	Affected Area (%)	Expected Permits
1	Frio Silt	R2UBHx	1.11	0	1.11	NA	NWPs 25, 33 and PCN
2	Slidell clay	PUBFh	0.30	111	0.21	NA	NWP 14 and PCN
3	Sanger Clay	PUBHh	0.64	219	0.18	NA	NWP 14 and PCN
4	Sanger Clay	PUBHh	0.74	275	0.44	NA	NWP 14 and PCN
5	Sanger Clay	PUBHh	1.17	142	NONE	NONE	NA
6	Urban land*	NA	1.00	NA	1.00	NA	NWPs 25, 33 and PCN
7	Frio Silty Clay	NA	0.22	NA	0.22	NA	NWP 14 and PCN
8	Slidell Clay	NA	0.22	NA	0.22	NA	NWP 14 and PCN
9	Sanger Clay	NA	0.33	NA	0.33	NA	NWP 14 and PCN
10	Slidell Clay	NA	0.43	NA	0.43	NA	NWP 14 and PCN
11	Slidell Clay	NA	1.25	NA	1.25	NA	404 IP
12	Slidell Clay	NA	0.83	NA	0.83	NA	404 IP
13	Slidell Clay	NA	0.31	NA	0.31	NA	NWP 14 and PCN
14	Sanger Clay	NA	0.24	NA	0.24	NA	NWP 14 and PCN
15	Sanger Clay	NA	0.04	NA	0.04	NA	NWP 14
16	Sanger Clay	NA	0.16	NA	0.16	NA	NWP 14 and PCN
17	Sanger Clay	NA	0.16	NA	0.16	NA	NWP 14 and PCN
18	Sanger Clay	NA	0.10	NA	0.10	NA	NWP 14 and PCN
19	Sanger Clay	NA	0.31	NA	0.31	NA	NWP 14 and PCN
20	Sanger Clay	NA	0.05	NA	0.05	NA	NWP 14
21	Sanger Clay	NA	0.56	NA	NONE	NONE	NA
22	Sanger Clay	NA	0.25	NA	0.25	NA	NWP 14 and PCN
23	Sanger Clay	NA	0.10	NA	NONE	NONE	NA
24	Sanger Clay	NA	0.15	NA	0.15	NA	NWP 14 and PCN
25	Frio Silty Clay	NA	0.11	NA	0.11	NA	NWP 14 and PCN
		TOTALS	**8.95**		**8.10**		

* *An "Urban land" soil is defined by NRCS as that soil that have been altered and obscured to the extent that it cannot be classified.*

** *Information under these categories was determined from the FWS NWI and classification maps, "NA" means that the information was not available from these sources.*

Table 5-23 – Estimated Impacts to Jurisdictional Waters – Alternative D

ID#	Soil Type	Cowardin** Classification	Area (ac)	Linear Fill (ft)	Affected Area (ac)	Affected Area (%)	Expected Permits
1	Frio Silty Clay	R2UBHx	1.05	0	1.05	100%	NWPs 25, 33 and PCN
2	Slidell Clay	PUBFh	0.30	111	0.21	70%	NWP 14 and PCN
3	Sanger Clay	PUBHh	0.64	219	0.18	28%	NWP 14 and PCN
4	Sanger Clay	PUBHh	0.74	275	0.44	59%	NWP 14 and PCN
5	Sanger Clay	PUBHh	1.17	142	0.67	57%	404 IP
6	Urban land	NA	1.00	NA	1.00	100%	NWPs 25, 33 and PCN
7	Frio Silty Clay	NA	0.22	NA	0.22	100%	NWP 14 and PCN
8	Slidell Clay	NA	0.22	NA	0.22	100%	NWP 14 and PCN
9	Sanger Clay	NA	0.33	NA	0.33	100%	NWP 14 and PCN
10	Slidell Clay	NA	0.43	NA	0.43	100%	NWP 14 and PCN
11	Slidell Clay	NA	1.25	NA	1.25	100%	404 IP
12	Slidell Clay	NA	0.83	NA	0.83	100%	404 IP
13	Slidell Clay	NA	0.31	NA	0.31	100%	NWP 14 and PCN
14	Sanger Clay	NA	0.24	NA	0.24	100%	NWP 14 and PCN
15	Sanger Clay	NA	0.04	NA	0.04	100%	NWP 14
16	Sanger Clay	NA	0.16	NA	0.16	100%	NWP 14 and PCN
17	Sanger Clay	NA	0.16	NA	0.16	100%	NWP 14 and PCN
18	Sanger Clay	NA	0.10	NA	0.10	100%	NWP 14 and PCN
19	Sanger Clay	NA	0.31	NA	0.31	100%	NWP 14 and PCN
20	Sanger Clay	NA	0.05	NA	0.05	100%	NWP 14
21	Sanger Clay	NA	0.03	NA	NONE	NONE	NA
22	Sanger Clay	NA	0.25	NA	NONE	NONE	NA
23	Sanger Clay	NA	0.56	NA	0.56	100%	404 IP
24	Sanger Clay	NA	0.10	NA	0.10	100%	NWP 14 and PCN
25	Frio Silty Clay	NA	0.11	NA	0.11	100%	NWP 14 and PCN
		TOTALS	**10.30**		**8.95**		

* *An "Urban land" soil is defined by NRCS as that soil that have been altered and obscured to the extent that it cannot be classified.*

** *Information under these categories was determined from the FWS NWI and classification maps, "NA" means that the information was not available from these sources.*

JW4 ponds as well as for the impacts at JW7, JW8, JW9, JW10, JW13, JW14, JW16, JW17, JW18, JW19, JW22 and JW23. A NWP 14 without a PCN is anticipated to be necessary for impacts at JW15 and JW20. Mitigation for the loss of palustrine wetlands is not anticipated because they constitute stock ponds. Impacts to riverine wetlands and jurisdictional waters of the United States would be temporary during construction and these areas would be allowed to return to their

preconstruction state. Chapter 8.0, Summary of Mitigation Measures, provides a more detailed explanation of the pollution prevention measures that would be taken.

5.14.2. Alternative B

A total of five palustrine and one riverine wetland, as defined by NWI maps, are located within the ROW. The potentially affected wetlands include R2UBHx (JW1), PUBFh (JW2) and PUBHh (JW3, JW4 and JW5), depicted in Exhibit 5.2 through Exhibit 5.5. The jurisdictional waters (JW6 through JW23) are also depicted in Exhibit 5.2 through Exhibit 5.5. The approximate linear fill footage for each palustrine/riverine wetland is as follows: JW1, no fill required, a bridge structure would cross the stream; JW2, 111 ft; JW3, 219 ft; JW4, 275 ft; and JW5, 142 ft. Table 5-21 presents the estimated impacts to wetlands and jurisdictional waters total acreage and the approximate impacted acreage as well as their wetland classification. A total of approximately 0.21 ac of the PUBFh (semi-permanently flooded); 1.29 ac of PUBHh (permanently flooded); 1.05 ac R2UBHx and 6.40 ac of jurisdictional waters are within the Alternative B ROW.

Construction would potentially impact approximately 1.05 ac of riverine wetlands, 1.5 ac of palustrine wetlands and 6.40 ac of jurisdictional waters.

A USACE Section 404 NWP 25-Structural Discharges and 33-Temporary Construction, Access and Dewatering and PCN are anticipated to be required for the wetlands impacted at the Clear Fork of the Trinity River Crossings (JW1 and JW6). A Section 404 IP is anticipated for the pond at JW5, JW11, JW12 and JW21. A NWP 14 with a PCN is anticipated to be required for JW2, JW3 and JW4 ponds and the jurisdictional waters crossings at JW7, JW8, JW9, JW10, JW13, JW14, JW16, JW17, JW18, JW19, JW22 and JW23. A NWP 14 without a PCN is anticipated to be required at JW15 and JW20. Mitigation for the loss of palustrine wetlands is not anticipated because they constitute stock ponds. Impacts to riverine wetlands and jurisdictional waters of the United States would be temporary during construction and these areas would be allowed to return to their preconstruction state. Chapter 8.0, Summary of Mitigation Measures, provides a more detailed explanation of the pollution prevention measures that would be taken.

5.14.3. Alternative C and C/A

There are a total of four wetlands, as defined by the NWI maps, located within the Alternative C ROW, all of which are of the palustrine type except for one riverine. The potentially affected wetlands include R2UBHx (JW1), PUBFh (JW2) and PUBHh (JW3 and JW4), depicted in Exhibit 5.2 through Exhibit 5.5. The jurisdictional waters of the United States (JW6 through JW19 and JW23 through JW25) are also located on in Exhibit 5.2 through Exhibit 5.5. The approximate linear fill footage for each palustrine/riverine wetland is as follows: jurisdictional water JW1, no fill required, a bridge structure would cross the stream; JW2, 111 ft; JW3, 219 ft; and JW4, 275 ft. Table 5-22 presents the potentially affected jurisdictional waters total acreage and the approximate impacted acreage as well as the their wetland classification. A total of approximately 0.21 ac of the PUBFh (semi-permanently flooded); 0.62 ac of PUBHh (permanently flooded); 1.11 ac R2UBHx and 6.16 ac of jurisdictional waters are within the ROW.

Construction would potentially impact approximately 1.11 ac of riverine wetlands, 0.83 ac of palustrine wetlands and 6.16 ac of jurisdictional waters of the United States.

USACE Section 404 NWP 25-Structural Discharges and 33-Temporary Construction, Access and Dewatering and PCN are anticipated to be required for the wetlands impacted at the Clear Fork of the Trinity River Crossings (JW1 and JW6). A Section 404 IP is anticipated for the pond at JW11, JW12 and JW21. A NWP 14 and a PCN is anticipated to be required for JW2, JW3 and JW4 ponds and the jurisdictional waters for JW7, JW8, JW9, JW10, JW13, JW14, JW16, JW17, JW18, JW19, JW23, JW24 and JW25. A NWP 14 without a PCN is anticipated to be required for JW15 and JW24. Mitigation for the loss of palustrine wetlands is not anticipated because they constitute stock ponds and are not currently wildlife habitat friendly areas. Impacts to riverine wetlands and jurisdictional waters of the United States would be temporary during construction and these areas would be allowed to return to their preconstruction state. Chapter 8.0, Summary of Mitigation Measures, provides a more detailed explanation of the pollution prevention measures that would be taken.

5.14.4. Alternative D

A total of five wetlands, as defined by the NWI maps, are located within the Alternative D ROW, all of which are of the palustrine type except for one riverine. The potentially affected wetlands include R2UBHx (JW1), PUBFh (JW2) and PUBHh (JW3, JW4 and JW5), depicted in Exhibit 5.2 through Exhibit 5.5. The jurisdictional waters of the United States (JW6 through JW23) are also depicted in Exhibit 5.2 through Exhibit 5.5.

The approximate linear fill footage for each palustrine/riverine wetland is as follows: jurisdictional water JW1, no fill required, a bridge structure would cross the stream; JW2, 111 ft; JW3, 219 ft; JW4, 275 ft; and JW5, 142 ft. Table 5-23 presents the estimated impacts to wetlands and jurisdictional waters total acreage and the approximate impacted acreage as well as their wetland classification. A total of approximately 0.21 ac of the PUBFh (semi-permanently flooded); 1.29 ac of PUBHh (permanently flooded); 1.05 ac R2UBHx and 6.40 ac of jurisdictional waters are within the ROW. Construction would potentially impact approximately 1.05 ac of riverine wetlands, 1.50 ac of palustrine wetlands and 6.40 ac of jurisdictional waters of the United States.

USACE Section 404 NWP 25-Structural Discharges and 33-Temporary Construction, Access and Dewatering and PCN are anticipated to be required for the wetlands impacted at the Clear Fork of the Trinity River Crossings (JW1 and JW6). A Section 404 IP is anticipated for the pond at JW6, JW11, JW12 and JW21. A NWP 14 with a PCN is anticipated to be required for JW2, JW3 and JW4 ponds and the jurisdictional waters crossings at JW7, JW8, JW9, JW10, JW13, JW14, JW16, JW17, JW18, JW19, JW22 and JW23. A NWP 14 without a PCN is anticipated to be required at JW15 and JW20. Mitigation for the loss of palustrine wetlands is not anticipated because they constitute stock ponds. Impacts to riverine wetlands and jurisdictional waters of the United States would be temporary during construction and these areas would be allowed to return to their preconstruction state.

5.14.5. No-Build Alternative

The No-Build alternative would not impact any jurisdictional waters of the United States.

5.14.6. Practicable Measures to Minimize Harm

During project design avoidance minimization measures would be determined to avoid the affected areas at each site. If the project proceeds to detailed design, the specific area impacted and the appropriate permit would be determined and permitting actions with the USACE would occur.

Estimated impacts to the jurisdictional waters of the United States, including wetlands, were estimated for all five build alternatives. These estimations were based on preliminary engineering and assumed a worst-case scenario of impacts to jurisdictional areas. The method for determining the boundary of jurisdictional areas included in the use of off-site data sources such as 1992 NWI Maps, aerial photography as well as limited visual on-the-ground inspection. The use of off-site data sources for making this determination is an accepted industry-wide practice as described in the *1987 USACE Wetland Delineation Manual*.

Following the issuance of the ROD, detailed design of the recommended project would begin. During the project's detailed design phase, a detailed on-the-ground jurisdictional water of the United States delineation and project impacts assessment would be completed along the entire recommended project alignment. This jurisdictional waters of the United States delineation would be in accordance with the procedure described in the *1987 USACE Wetland Delineation Manual*.

In accordance with CWA 404 (b)(1) guidelines, design of the project would include measures to avoid and minimize impacts to jurisdictional areas. Unavoidable impacts to jurisdictional areas would be compensated for during the Section 404 permitting process by providing compensatory mitigation for unavoidable losses of waters (functions and values) of the United States as required by any pertinent Section 404 permit administered by the USACE.

5.15. Water Body Modifications and Wildlife Impacts

5.15.1. Alternatives A, B, C, C/A and D

The Build alternatives would affect the small watering ponds located within project limits. Construction of the project would have little or no affect on the designated water uses within the area; no impoundment, relocation or channel deepening of the water bodies would be necessary. Temporary impacts would be limited to the construction phase and are discussed in the part Construction Impacts, (Chapter 8.0, Summary of Mitigation Measures) and would be minimized by applying proper pollution prevention measures. The existing groundwater resources quality would not be adversely affected by usage and ROW maintenance.

The wildlife in the area would be impacted during construction (surface disturbance, equipment and crew traffic) and during facility operation (usage and ROW maintenance). The route of travel of some species would be impacted after construction of the facility, mainly on an east/west traverse between Hulen Street and Bryant Irvin Road. In addition, a Biological Assessment (BA) was completed for the project to address any potentially occurring threatened and endangered species possibly impacted by the recommended project. On June 12, 2002, the FWS provided a response that the project is not likely to adversely affect listed species.

The FWS concurred with a finding of no effect for the project for threatened and endangered species listed in Tarrant County. No Federally endangered or threatened species have been observed within or near the vicinity of the PSC during project surveys. The BA and FWS concurrence are located in Appendix F of the document.

The *Migratory Bird Treaty Act* (MBTA) implements various treaties and conventions between the U.S. and Canada, Mexico other countries for the protection of migratory birds including raptors. Under the Act, taking, killing or possessing migratory birds is unlawful. The Act prohibits the take of native migratory birds without a Federal permit and provides that it is unlawful to pursue, hunt, take, capture or kill; attempt to take, capture or kill; possess, offer to or sell, barter, purchase, deliver or cause to be shipped, exported, imported, transported, carried or received any migratory bird, part,

nest, egg or product, manufactured or not. Following selection of the Preferred Alternative in the ROD, detailed design of the project would begin, but before construction, TxDOT would conduct a survey to identify potential impacts to species protected under the MBTA and develop a plan to avoid impacts to such species.

In accordance with EO 13112 on Invasive Species and the Executive Memorandum on Beneficial Landscaping, landscaping would be limited to approved TxDOT seeding mix in compliance with E.O. 13112 and replanting the ROW with native species of plants where possible. A mix of native grasses and native forbs would be used to re-vegetate the ROW.

The first consideration of landscape and aesthetics planning and design is to improve the safety and function of the transportation network. This means that aesthetics planning is a process that occurs at every stage of design, construction and maintenance. One priority of design would be to fit the facility into the adjacent landscape in a way that is complementary to and enhances, the existing landscape. Achieving this priority requires consideration of natural, ecological, aesthetic, economic and social influences related to that landscape.

The NTTA has developed System-Wide Design Guidelines to provide aesthetic continuity on the tollroad projects that they operate and maintain. These guidelines include landscaping; which is considered an integral element in the roadway design.

5.15.2. No-Build Alternative

The No-Build alternative would have no impact on the water bodies and wildlife mentioned previous.

5.16. Floodplain and Floodway Impacts

Coordination with Federal Emergency Management Agency (FEMA) and review of FEMA maps (last revised in August of 2000) has indicated the existence of both 100-year floodplains and floodways within the PSC. There are a total of 12 locations where the Build alternatives of the

project would cross a floodplain, floodway, river or stream on FEMA classified zones AE and A. Zone AE has been designated as that special flood hazard area inundated by a 100-year flood where base flood elevations have been determined and zone A as the area inundated by a 100-year flood where base flood elevations have not been determined. The floodplains/floodways associated with the project is the Clear Fork of the Trinity River, its' tributaries and Benbrook Lake tributaries.

The waters are not navigable; therefore, neither a USCG Section 9 Permit nor a USACE Section 10 Permit would be required.

Most of the potentially impacted floodplain crossings would involve lateral encroachment (bridge crossings) as opposed to longitudinal encroachments (road construction within the floodplain). Following is a preliminary estimate for each floodplain crossing and type of encroachment, extent of the potential encroachment and type of structure involved in the crossing for each of the alternatives Listed in the following Table 5-24 is a preliminary estimate for each floodplain crossing and type of encroachment, extent of the potential encroachment and type of structure involved in the crossing for each of the alternatives.

Table 5-24 – Stream and 100-Year Floodplain Crossings

Clear Fork of the Trinity River	
1.	Along Forest Park Boulevard, south of Lancaster Avenue
2.	South of IH 30, east of University Drive
3.	North of IH 30, east of University Drive
4.	East of University Drive, south of the railroad bridge,
5.	North of Bellaire Drive, between Hulen Street and Bryant Irvin Road,
Unnamed Tributary of the Clear Fork of the Trinity River	
6.	South of Overton Ridge, between Hulen Street and Bryant Irvin Road,
Unnamed Tributary leading to Benbrook Lake	
7.	North of Columbus Trail and west of Old Granbury Road,
8.	South of Columbus Trail East of Old Granbury Road,
9.	Between the proposed Risinger Road and McPherson Road extensions,
Unnamed Tributary of Rock Creek	
10.	Between Stuart-Feltz Road and Old Granbury Road,
11.	At Old Granbury Road, north of FM 1187 and
12.	At FM 1187 and Old Granbury Road.

5.16.1. Alternative A

Clear Fork of the Trinity River at University Drive south of the IH 30 –
Zone AE (FEMA Map#48439C0405)

The crossing at this location would involve the construction of a new bridge (lateral crossing), the alignment would cross approximately 1,300 ft of the Clear Fork of the Trinity River floodplain. The normal flow in the river would not be affected because bridges would span it. Limited fill material would be necessary for the bridge abutments.

Clear Fork of the Trinity River floodplains –
Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge structure (lateral encroachment) at Hulen Street and the UPRR tracks. The proposed alignment would cross approximately 500 ft floodplain of a tributary to the Clear Fork of the Trinity River.

Clear Fork of the Trinity River north of Bellaire Drive –
Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge structure including main lanes and frontage roads (lateral encroachment) the alignment would cross approximately 300 ft of the Clear Fork of the Trinity River floodplains. Bents in the floodway would be kept to a minimum. The bridge would span the normal flow of the river and no fill material is anticipated within the floodway.

Clear Fork of the Trinity River unnamed tributary south of Overton Ridge –
Zone AE (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 500 ft of the floodplain of an unnamed tributary to the Clear Fork of the Trinity River

floodplain. The number of bents placed within the floodway would be kept to a minimum. The bridge would span the normal flow of the tributary.

East of Benbrook Lake floodplain area north of Cleburne Street (Proposed Sycamore School Road)- Zone A (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 900 ft of the floodplain of an unnamed tributary to the Clear Fork of the Trinity River floodplains. The number of bents placed within the floodway would be kept to a minimum. No fill material is anticipated within the floodway.

East of Benbrook Lake floodplain area south of Cleburne Street (Proposed Sycamore School Road) - Zone A (FEMA Map#48439C0510)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 1,600 ft of the floodplain of an unnamed tributary to the Clear Fork of the Trinity River. Filling operations might be required at this location.

East of Benbrook Lake floodplain area east of Old Granbury Road and south of proposed Risinger Road - Zone A (FEMA Map#48439C0510)

A new at grade elevation road (longitudinal encroachment) would be constructed within approximately 700 ft of the floodplain. Proposed preliminary design includes two-nine ft x seven ft culvert boxes to provide for required floodplain relief. Filling operations would be required at this location.

East of Benbrook Lake floodplain area at Old Granbury Road and north of FM 1187 –
Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 400 ft of the floodplain causing parallel encroachment. Four-10 ft x seven ft culvert boxes would be located at the location to provide for required floodplain relief. Filling operations might be required at this location.

Unnamed tributary to Rock Creek at FM 1187 and Old Granbury Road –
Zone A (FEMA Map#48439C0510)

The crossing at this location would involve lateral encroachment at the south terminus of the project where the proposed highway ties into the existing FM 1187. A new at grade elevation road would be constructed approximately 300 ft within the floodplains to meet the existing highway. No fill material is anticipated at this location.

5.16.2. Alternative B

Clear Fork of the Trinity River along Forest Park Boulevard south of Lancaster Avenue –
Zone AE (FEMA Map #48439C0405)

The floodway impacts at this location would involve a longitudinal encroachment for the construction of a new Forest Park Boulevard connector. Fill material would be necessary for the construction of the road.

Clear Fork of the Trinity River at University Drive south of the IH 30 –
Zone AE (FEMA Map#48439C0405)

The crossing at this location would involve the construction of a new bridge (lateral encroachment), located approximately 1,300 ft within the Clear Fork of the Trinity River floodplain. The normal flow in the river would not be affected because bridges would span it. Limited fill material would be necessary for the bridge abutments.

Clear Fork of the Trinity River tributary south of the railroad tracks –
Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge (lateral encroachment) at Hulen Street and the UPRR tracks. The proposed alignment would cross approximately 500 ft of floodplain of a tributary to the Clear Fork of the Trinity River.

Clear Fork of the Trinity River north of Bellaire Drive –
Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge including main lanes and frontage roads (lateral encroachment) located approximately 300 ft within the Clear Fork of the Trinity River floodplain. The number of bents placed within the floodway would be kept to a minimum. The bridge would span the normal flow of the river and no fill material is anticipated within the floodway.

Clear Fork of the Trinity River unnamed tributary south of Overton Ridge –
Zone AE (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge structure (lateral encroachment), it would cross approximately 500 ft of the unnamed tributary of the Clear Fork of the Trinity River floodplain. Bents in the floodway would be kept to a minimum. The bridge would span the normal flow of the tributary.

East of Benbrook Lake floodplain area north of Cleburne Street (Proposed Sycamore School Road)- Zone A (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 900 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River. The number of bents placed within the floodway would be kept to a minimum. No fill material is anticipated within the floodway.

East of Benbrook Lake floodplain area south of Cleburne Street (Proposed Sycamore School Road) - Zone A (FEMA Map#48439C0510)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 1,600 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River. Filling operations might be required at this location.

East of Benbrook Lake floodplain area east of Old Granbury Road and south of proposed Risinger Road - Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 700 ft of the floodplain causing parallel encroachment. Proposed preliminary design includes two-nine ft x seven ft culvert boxes to provide for required floodplain relief. Filling operations would be required at this location.

East of Benbrook Lake floodplain area at Old Granbury Road and north of FM 1187 –
Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 400 ft of the floodplain causing parallel encroachment. Four-10 ft x seven ft culvert boxes would be located at the site to provide for required floodplain relief. Filling operations might be required at this location.

Unnamed tributary of Rock Creek at FM 1187 and Old Granbury Road –
Zone A (FEMA Map#48439C0510)

The crossing at this location would involve lateral encroachment at the south terminus of the project where the proposed highway ties into the existing FM 1187. A new at grade elevation road would be constructed approximately 300 ft within the floodplain to meet the existing highway. No fill material is anticipated at this location.

5.16.3. Alternative C and C/A

Clear Fork of the Trinity River at University Drive south of the IH 30 –
Zone AE (FEMA Map#48439C0405)

The crossing at this location would involve the construction of a new bridge, located approximately 1,300 ft within the Clear Fork of the Trinity River floodplain. The normal flow in the river would not be affected because bridges would span it. Limited fill material would be necessary for the bridge abutments.

Clear Fork of the Trinity River tributary south of the railroad tracks –
Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge (lateral encroachment) at Hulen Street and the UPRR tracks. The proposed alignment would cross approximately 500 ft of floodplain of a tributary to the Clear Fork of the Trinity River.

Clear Fork of the Trinity River north of Bellaire Drive –
Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge including main lanes and frontage roads (lateral encroachment) located approximately 300 ft within the Clear Fork of the Trinity River floodplains. The number of bents placed within the floodway would be kept to a minimum. The bridge would span the normal flow of the river and no fill material is anticipated within the floodway.

Clear Fork of the Trinity River unnamed tributary south of Overton Ridge –
Zone AE (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 500 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River floodplain. The number of bents placed within the floodway would be kept to a minimum. The bridge would span the normal flow of the tributary.

East of Benbrook Lake floodplain area north of Cleburne Street (Proposed Sycamore School Road)–Zone A (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 900 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River. The number of bents placed within the floodway would be kept to a minimum. No fill material is anticipated within the floodway.

East of Benbrook Lake floodplain area south of Cleburne Street (Proposed Sycamore School Road) - Zone A (FEMA Map#48439C0510)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 1,600 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River. Filling operations might be required at this location.

East of Benbrook Lake floodplain area east of Old Granbury Road and south of proposed Risinger Road - Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 700 ft of the floodplain causing parallel encroachment. Proposed preliminary design includes two-nine ft x seven ft culvert boxes to provide for required floodplain relief. Filling operations would be required at this location.

Unnamed tributary of Rock Creek west of Stuart-Feltz Road –
Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 500 ft of this Zone A floodplain causing longitudinal encroachment. A 400 ft bridge would be located at the site to provide for required floodplain relief.

East of Benbrook Lake floodplain area at Old Granbury Road and north of FM 1187 –
Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 400 ft of the floodplain causing longitudinal encroachment. Four-10 ft x seven ft culvert boxes would be located at the site to provide for required floodplain relief. Filling operations might be required at this location.

Unnamed tributary of Rock Creek at FM 1187 and Old Granbury Road- Zone A (FEMA Map#48439C0510)

The crossing at this location would involve lateral encroachment at the south terminus of the project where the proposed highway ties into the existing FM 1187. A new at grade elevation road would be constructed approximately 300 ft within the floodplain to the meet existing highway. No fill material is anticipated at this location.

5.16.4. Alternative D

Clear Fork of the Trinity River along Forest Park Boulevard south of Lancaster Avenue – Zone AE (FEMA Map #48439C0405)

The floodway impacts at this location would involve a longitudinal encroachment of approximately 3.7 ac for the construction of a new Forest Park Boulevard connector. Fill material would be necessary for the construction of the road.

Clear Fork of the Trinity River at University Drive south of the IH 30 – Zone AE (FEMA Map#48439C0405)

The crossing at this location would involve the construction of a new bridge, located approximately 1,300 ft within the Clear Fork of the Trinity River floodplain. The normal flow in the river would not be affected because bridges would span it. Limited fill material would be necessary for the bridge abutments.

Clear Fork of the Trinity River tributary south of the railroad tracks – Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge (lateral encroachment) at Hulen Street and the UPRR tracks. The proposed alignment would cross approximately 500 ft of floodplain of a tributary to the Clear Fork of the Trinity River.

Clear Fork of the Trinity River north of Bellaire Drive – Zone AE (FEMA Map#48439C0385)

The crossing at this location would involve the construction of a new bridge structure including main lanes and frontage roads (lateral encroachment) located approximately 300 ft within the Clear Fork of the Trinity River floodplain. The number of bents placed within the floodway would be kept to a minimum. The bridge would span the normal flow of the river and no fill material is anticipated within the floodway.

Clear Fork of the Trinity River unnamed tributary south of Overton Ridge –
Zone AE (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 500 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River. The number of bents placed within the floodway would be kept to a minimum. The bridge would span the normal flow of the tributary.

East of Benbrook Lake floodplain area north of Cleburne Street (Proposed Sycamore School Road)- Zone A (FEMA Map#48439C0395)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 900 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River. The number of bents placed within the floodway would be kept to a minimum. No fill material is anticipated within the floodway.

East of Benbrook Lake floodplain area south of Cleburne Street (Proposed Sycamore School Road) - Zone A (FEMA Map#48439C0510)

The crossing at this location would involve a new bridge (lateral encroachment), it would cross approximately 1,600 ft of floodplain of an unnamed tributary to the Clear Fork of the Trinity River. Filling operations might be required at this location.

East of Benbrook Lake floodplain area east of Old Granbury Road and south of proposed Risinger Road - Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 700 ft of the floodplain causing longitudinal encroachment. Proposed preliminary design includes two-nine ft x seven ft culvert boxes to provide for required floodplain relief. Filling operations would be required at this location.

East of Benbrook Lake floodplain area at Old Granbury Road and north of FM 1187 – Zone A (FEMA Map#48439C0510)

A new at grade elevation road would be constructed within approximately 400 ft of the floodplain causing longitudinal encroachment. Four-10 ft x seven ft culvert boxes would be located at the site to provide for required floodplain relief. Filling operations might be required at this location.

Unnamed tributary of Rock Creek at FM 1187 and Old Granbury Road – Zone A (FEMA Map#48439C0510)

The crossing at this location would involve lateral encroachment at the south terminus of the project where the proposed highway ties into the existing FM 1187. A new at grade elevation road would be constructed approximately 300 ft within the floodplain to meet the existing highway. No fill material is anticipated at this location.

5.16.5. No-Build Alternative

The No-Build alternative would have no impact on the existing streams, floodways or floodplains.

5.16.6. Floodplain and Floodway Impacts Summary

Construction of river crossings and roadways would involve placement of bents within the floodway, excavations and filling operations that might increase the downstream water surface. Preliminary studies indicate that stream crossings and stormwater runoff from the facility would not result in

exceeding the 100-year floodplain elevation. Detailed hydraulic studies would be performed during the Plans, Specifications and Estimates (PS&E) stages and would follow current NTTA, TxDOT, FHWA and City design criteria and standards. The facility would allow proper conveyance of the 100-year frequency flood (inundation of the roadway being acceptable) without causing substantial damage to the roadway, streams or other property.

5.16.7. Floodplain and Floodway Impacts Conclusion

The project is not anticipated to increase the 100-year base-flood elevation by more than one-foot. An increase of one-foot of elevation would violate the FEMA flood regulations and related Corridor Development Certificate requirements under the Trinity River Corridor common permit requirements. Coordination with FEMA would not be required if the proposed alignments do not raise the 100-year flood level by greater than one-foot in elevation. There would be no effect on the status of the National Flood Insurance Program (NFIP); therefore, no additional coordination with FEMA would be required.

At this stage of project development no major changes to streams and floodplains elevations are anticipated. The USACE and FEMA would be notified of any substantial change, when and if appropriate base hydraulic studies indicate a substantial change to the floodplain elevation.

5.17. Wild and Scenic Rivers Impacts

There are no wild or scenic rivers as designated by the National Park Service within the Build alternatives PSC or vicinity. The project would not impact any present, proposed, or potential unit of the National Wild and Scenic Rivers system.

5.18. Coastal Barriers and Coastal Zone Impacts

There are no coastal barriers or coastal zones located within the PSC or vicinity. There are no coastal barriers or coastal zones that would be impacted by this project.

5.19. Threatened or Endangered Species

5.19.1. Alternatives A, B, C, C/A and D

The proposed project is not likely to adversely affect the species listed in Table 5-25. Please refer to Chapter 4.5, Endangered/Threatened Species for details on this subject. No Federally or State designated endangered or threatened species were identified within the PSC during field visits. Rivers and stream crossings would be temporarily affected during construction. Sediment and erosion control measures would be implemented to minimize any negative impact on the stream environment.

5.19.2. No-Build Alternative

The No-Build alternative would have no affect on any threatened and endangered species or vegetation.

5.20. Trees, Vegetation and Wildlife Habitat

5.20.1. Alternatives A, B, C, C/A and D

Approximately 635 ac would be required for the proposed corridor. A total of 37 ac of trees, calculated through interpretation of aerial photography, might be removed for SH 121 construction.

This area represents less than six percent of the total area located within the ROW. Vegetation impacts were determined in accordance with accepted industry-wide practices based on field reconnaissance in the summer of 1999 and spring 2001, aerial photography and on design files. Tree surveys determined vegetation types of Texas and percent of tree sizes of diameter at breast height (dbh) greater than six inches within the PSC. Aerial photography and design files were utilized to determine the percent of the total acreage of trees located within the proposed ROW that would be impacted by the build-alternatives. Four zones of tree areas were identified. These zones are delineated as follows:

1) North of IH 30 (area east of Forest Park Boulevard, south of the Holly Water Treatment

Table 5-25 – Tarrant County Listed Endangered/Threatened Species SH121 Corridor

Species	Federal Status	State Status	Description of Suitable Habitat	Habitat Present	Species Effect	Pertinent Project Information
Birds						
Arctic Peregrine Falcon (*Falco peregrinus tundriu)s*	DL	T	Nests in tundra regions; migrates through Texas; winter inhabitant of coastlines and mountains from Florida to South America. Open areas, usually near water.	No	No	There are no open areas within the area of the proposed project. There is water within the proposed project area, but not the appropriate type of waterbody.
Bald Eagle (*Haliaeetus leucocephalus)*	LT-PDL	T	Nests and winters near rivers, lakes and along coasts; nests in tall trees or on cliffs near large bodies of water.	No	No	There are no tall trees or cliffs near large bodies of water within the area of the proposed project.
Henslow's Sparrow (*Ammodramus henslowii)*	—	—	Grasslands, weedy fields or cut-over areas; dense groundcover with lots of bunch grasses, vines and brambles; bare ground for running/walking.	No	No	There are no bunch grasses, vines, brambles, or bare ground in the area of the proposed project.
Interior Least Tern (*Sterna anitllarum athalassos)*	LE	E	Nests along sand and gravel bars within braided streams and rivers; also known to nest on man-made structures.	No	No	No barren or sparsely vegetated sandbars, sand or gravel pits or lake shorelines are available in the area of the proposed project.
Migrant Loggerhead Shrike *(Lanius ludovicanus migrans)*	—	—	Open and semi-open grassy areas, farmland with scattered trees and brush.	Yes	No	There is suitable habitat nearby, but the bird has not been seen in the area of the proposed project.
Western Burrowing Owl (*Anthene cunicularia hypugaea)*	—	—	Prairies, pastures, farmland areas, savannas, open areas, vacant lots near human habitation.	Yes	No	There is suitable habitat nearby, but the proposed project lies on the extreme eastern boundary of the owl's range and the bird has not been seen in the area of the proposed project.
White-faced Ibis *(Plegadis chihi)*	—	T	Prefers freshwater marshes, sloughs and irrigated rice fields, but will use brackish and saltwater habitat; nests in marshes, in low trees, on ground in bulrushes, reeds, or floating mats.	No	No	This is a migrant species, but there are no freshwater marshes, sloughs, irrigated rice fields, bulrushes, reeds, floating mats, brackish or saltwater habitat near the proposed project area.
Whooping Crane (*Grus American)*	LE	E	Estuaries, prairie marshes savannah, grasslands, croplands pastures- winter resident at Aransas NWR, Aransas and Matagorda.	No	No	Potential migrant in the winter. There are also no estuaries, prairie marshes in the area of the proposed project area.
Mammals						
Black-tailed Prairie Dog (*Cynomys ludovicianus)*	C	—	Shortgrass prairies, pastures and farmland areas. Form colonies.	Yes	No	There are no prairie dog colonies within the project area.
Plains Spotted Skunk *(Spliogale putorius interrupta)*	—	—	Open fields, prairies, croplands, fence rows, farmyards, forest edges and woodlands; prefers wooded, brushy areas and tallgrass prairie.	Yes	No	It is possible that the skunk may be present in the area, but none have been seen.
Reptiles						
Texas Garter Snake *(Thamnophis sirtalis annectens)*	—	—	Wet or moist microhabitats near streams, rivers, ditches, canals, marshes and ponds.	Yes	No	It is possible that garter snakes may be present in the area, but none have been seen.
Texas Horned Lizard (*Phrynosoma cornutum)*	—	T	Open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees; sandy to rocky soil.	No	No	There are no open, arid and semi-arid regions with sparse vegetation, including grass, cactus, scattered brush or scrubby trees within the proposed project area.
Timber/Canebrake Rattlesnake *Crotalus horridus*	—	T	Swamps, floodplains, upland woodlands, riparian zones, abandoned farmland; prefers dense ground cover, i.e., grapevines or palmetto.	Yes	No	The proposed project area contains riparian vegetation. Species not detected.
Vascular Plants						
Auriculate false foxglove *(Tomanthera auriculata)*	—	—	Found in degraded prairies floodplains, fallow fields and borders of upland sterile woods; Extirpated in Texas; known from late 1800s specimen labeled "Benbrook."	No	No	Extirpated in Texas.
Glen Rose Yucca *(Yucca necopina)*	—	—	Grasslands on sandy soils; also found in limestone bedrock, clayey soil on top of limestone and gravelly limestone alluvium. Flowering April-June.	No	No	There are no grasslands on sandy soils, limestone bedrock, clayey soil on top of limestone with gravelly limestone alluvium within the proposed project area.

LE, LT - Federally Listed Endangered/Threatened
PT, C - Federally Proposed Threatened, or Candidate Species
DL, PDL - Federally Delisted/Proposed Delisted

E, T - State Endangered/Threatened
"—" - Species of Concern, but with no regulatory listing status

Source: U.S. Fish and Wildlife Service, Texas Parks and Wildlife Department and survey of project area (Update 11/12/03).

Plant)
2) South of IH 30 (along Vickery Boulevard to Hulen Street)
3) Undeveloped property area (west of Hulen Street along the Clear Fork of the Trinity River and south to IH 20)
4) South of IH 20 to FM 1187

The first three zones, though mostly urbanized, do contain areas dominated by trees; the zone from IH 20 to FM 1187 is comprised of 95 percent mesquite and scrub bushes. In summary, the species of trees found along the project are: pecan, hackberry (*Celtis laevigata*), live oak, elm, cedar elm, cottonwood (*Populus deltoids*), hickory (*Carya cordiformis*), post oak (*Quercus stellata*), china-berry (*Melia azedarach*), black willow (*Salix nigra*), box elder (*Acer negundo*), mesquite, white mulberry (*Morus alba*) and bois d'arc (*Macura pomifera*). Ornamental trees include crape myrtle, sweetgum, live oak, holly, mimosa and common fig (*Ficus carica*).

A tree survey was performed in the areas north and south of IH 30. Table 5-26 depicts the results of the tree survey located within the ROW. The vast majority of trees in the north area are associated with fence lines and property lines. Understory consists mainly of Bermuda grass (*Cynodon dactylon*) and poison ivy (*Toxicodendron radicans*) with occasional samplings of the dominant tree species. Ornamental trees in this area include crape myrtle, sweetgum, live oak, holly, fig and mimosa.

South of IH 30, hackberry trees, pecan trees, cottonwood trees, live oak trees, elm trees, hickory trees and china-berry trees are present and some would be removed. Other trees present but uncommon were mesquite, fruitless mulberry, black willow and bois d'arc trees. Ornamental trees include: live oaks and crape myrtles.

For the undeveloped property area, the percent trees within the ROW were determined to be: 4.3 percent of bois d'arc, 6.9 percent of cottonwood, 16.4 percent of hackberry, 4.3 percent of hickory, 50 percent of elm, 11.2 percent of post oak and 6.9 percent pecan trees and may be affected. Ornamental trees include: red oaks, mimosa, crape myrtle and live oak trees. Right of Entry (ROE) has not been granted for this section so verification of species composition and attributes could not be

Table 5-26 – Predominant Tree Composition Along the Project Study Corridor

Species	% Of Canopy	Range of dbh (in)	Average dbh (in)	Height Range (ft)
North of IH 30				
Hackberry	59	<2 – 36	12	8 – 50
Pecan	15	4 – 30	10	12 – 60
Elm	11	<2 – 40	14	10 – 40
China-berry	11	<2 – 10	5	10 – 15
Live Oak	3	18 – 24	20	30 – 35
Box Elder	1		16	30
South of IH 30				
Hackberry	43	<2 – 32	12	20 - 30
Pecan	23	4 – 24	8	15 – 35
Cottonwood	12	8 – 14	10	15 – 30
Live Oak	8	8 – 24	12	15 – 30
Elm	6	4 – 14	8	10 – 25
Hickory	5	6 – 10	8	15 – 25
China-berry	3	6 – 10	8	10 – 20

conducted. The percent of canopy mentioned previous is based upon previous site surveys.

Each of the Build alternatives would affect each of the areas to a varying degree; however, the species dominance and characteristics would remain consistent for each alternative. During construction, the contractor would minimize the amount of native vegetation disturbed. During final project design mature woody vegetation and/or unusually large specimens might not require clearing if they are beyond the safety clear zone or in areas where guard fencing may be used. No habitat types requiring mitigation per the provision (4)(A)(ii) of the TxDOT – TPWD Memorandum of Understanding (MOU) would be impacted by the proposed project.

The Build alternatives would have minimal impact on the vegetation and trees along the PSC. The vegetation and trees within the PSC do not provide special habitat value for endangered or threaten species. No vegetation types exist in the PSC that fit the descriptions of rare vegetation series (S1, S2, or S3 series levels) as described by the TxDOT – TPWD MOU.

Construction activities would minimize the impact caused by the loss of vegetation by preserving as many trees as possible. In accordance with Provision (4)(A)(ii) of the MOU and at the Fort Worth

District's discretion, no mitigation for impacts to non-regulated habitat would be offered. NTTA and TxDOT anticipate that any impacts to riparian vegetation would be mitigated for as part of Section 404 mitigation requirements.

5.20.2. No-Build Alternative

The No-Build alternative would have no known effect on any habitat composition for any particular wildlife species.

5.21. Historic Resources Impacts

5.21.1. Regulatory Compliance

This project is undertaken in conformance with a Programmatic Agreement (PA) between the TxDOT, FHWA, the Advisory Council on Historic Preservation (ACHP) and the THC providing for procedures and processes to conform to Federal and State laws. Under Section 106 of the *National Historic Preservation Act* (NHPA) of 1966, Federal agencies are required to "take into account" the "effects" that an undertaking would have on "historic properties." Historic properties are those included in or eligible for inclusion in the NRHP.

Under 36 CFR 800.4 of the ACHP regulations pertaining to the protection of historic properties, Federal agencies are required to locate, evaluate and assess the effects an undertaking would have on such properties. In compliance with Federal regulations and on behalf of the Fort Worth District of the TxDOT and FHWA and in accordance with procedures established by the PA between the FHWA, ACHP, TxDOT and THC, this report focuses on the preliminary identification of potential historic properties within the PSC.

This project also must comply with the regulatory mandate of the TAC because it might involve archeological sites located "on land owned or controlled by the State of Texas or any city, county, or local municipality thereof." As the project would involve new ROW purchased by the State or municipal entity of the State, the destruction or alteration of extant historic properties would be

closely monitored by the THC, Division of Archeology under the regulations of the TAC. The TAC allows for all such properties to be considered for their eligibility to be nominated as SALs and requires that each be considered in terms of their possible significance. Significance standards are clearly described in Chapter 26 of the THC's *Rules of Practice and Procedure for the Antiquities Code of Texas.*

5.21.2. Archeological Surveys

An archeological survey of the PSC was conducted in March of 1999. Two archeological sites within the PSC were discovered. One is a prehistoric archeological site (41TR170) located near the crossing of the PSC with the Clear Fork of the Trinity River. Site 41TR171 is an historic archeological site located north of the Clear Fork of the Trinity River. The site was recommended as not eligible for the NRHP or as a SAL in the August 1999 Archeology Survey Report.

Approximately 95 percent of the PSC has been surveyed by a professional archeologist and only one prehistoric site (41TR170) is a concern at this time under Section 106. The only areas remaining to be surveyed for prehistoric sites are highly urbanized and located in the northern section of the project area near the crossing of the Clear Fork of the Trinity River. The survey of the remaining parcels would be completed following ROW acquisition. A total of five additional prehistoric archeological sites are known to be present in the project vicinity.

Two archeological sites would be directly impacted by the build alternatives at the project crossing of Clear Fork of the Trinity River (41TR170, 41TR171). site 41TR170 was recommended as eligible for the NHRP and as a SAL in the Section 106 Archeological survey report submitted to the ENV in August 1999. In a letter dated March 28, 2000, TxDOT requested THC concurrence that site 41TR170 warranted comprehensive testing to determine its NRHP eligibility. In a letter dated April 24, 2000, the THC concurred that site 41TR170 warranted testing. Formal testing of the site is on hold pending acquisition of ROW or ROE.

Site 41TR171 is located north of the Clear Fork of the Trinity River. The site was recommended as not eligible for the NRHP or as a SAL in the August 1999 archeology survey report. In a letter dated March 28, 2000, TxDOT requested THC concurrence that site 41TR171 was not eligible for inclusion on the NRHP or for listing as a SAL and that no further archeological work was necessary at the site. In a letter dated April 24, 2000, the THC concurred that the portion of site 41TR171 within the proposed ROW was not eligible for inclusion in the NRHP or for listing as a SAL and that no further archeological work was necessary at the site.

No other prehistoric archeological sites are known to be located within the direct impact zone of the project area. No known archeological sites in close proximity to the project would be affected. Should the proposed route change 0.25 mi toward the east, site 41TR137 might be affected and possible impacts to the site would then need to be investigated.

5.21.3. Historic Resources

This section documents potential impacts to architectural resources by the SH 121 tollroad alternatives and how they would be resolved. NEPA requires agencies of the Federal government to consider effects of their actions on "the human environment," which includes cultural as well as natural aspects of the environment. Cultural resources are defined as any prehistoric or historic district, building, structure, object or archeological site included in, or eligible for inclusion in the NRHP.

Under the Technical Advisory CFR 777 T.A.6640.8A of the FHWA, historic structures/archeological sites determined eligible for listing in NRHP by the THC which would be directly impacted by a FHWA funded project are subject to evaluation under Section 4(f) of the *DOT Act 1966* (23 CFR 771.135). Section 4(f) requires that the agency show that all planning to minimize harm to any NRHP property resulting from the proposed action was considered and that all feasible or prudent alternatives to avoid adverse impacts to the NRHP property have been explored.

In addition to Section 4(f) requirements, Section 106 (36 CFR 800) of the 1966 NHPA, as amended, also requires the agency to consult with the THC concerning the potential effects that a recommended project may have on NRHP properties located within the project's APE. The law requires that the agency show that project planners and engineers have "taken into account" the effects the project may have on NRHP properties and that a reasonable effort has been made to preserve the resource through avoidance or other means to minimize adverse impacts to the property and/or the historic resource.

The criteria for assessing effect are prescribed in 36 CFR 800.9. The law states: "An adverse effect is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property's location, design, setting, materials, workmanship, feeling, or association."

Examples of adverse effects on historic properties include, but are not limited to,

- Physical destruction or damage to all or part of the property;
- Change of the character of the property's use or of physical features within the property's setting that contributes to its historic significance;
- Introduction of visual, atmospheric or audible elements that diminish the integrity of the property's relevant historic features.

All remaining identification, assessment and treatment of historic properties, whether archeological or architectural in nature, shall be completed in accordance with the PA between TxDOT, FHWA, ACHP and the THC. The remainder of this section describes the historic buildings and archeological resources that may be impacted by the individual alignment alternatives including the recommended alternative C/A.

A total of 13 listed and/or potentially NRHP eligible architectural sites (buildings, objects and districts, etc.) were identified within the APE during a historic building reconnaissance survey of the PSC. The APE, as designated by the ENV guidelines for historic building reconnaissance and

documentation, consists of 0.25 mi on either side of new location ROW and 500 ft on either side of roadway expansion projects.

Of the sites surveyed, the City of Fort Worth Holly Water Treatment Plant (site No. 256) and the Lancaster Street bridge (site No. 257) are the only two eligible NRHP sites that are a concern. The Holly Water plant is divided into two separate pieces of property, North Holly and South Holly. North Holly is a historic property with its earliest building, the pump building, dating from 1891-92. Incorporating elements of Romanesque Revival and Mission Revival styling, the simple rectangular block buildings represent municipal design ideology of the early twentieth century and are eligible for NRHP listing under Criterion A and C.

The property on which South Holly Water Treatment Plant is located was developed separately from North Holly Water Treatment Plant. It was acquired by the City in 1956 and opened for operation in 1958. Prior to the City's acquisition of the property it was undeveloped and not used for water filtration or treatment. The buildings do not meet the 50-year age requirement established by the anticipated construction date of the SH 121 project and therefore, South Holly Water Treatment Plant is not eligible for the NRHP. The Lancaster bridge is located in close proximity to the PSC. The bridge is eligible for the NRHP under Criteria A and C.

The remaining 11 NRHP eligible properties include six houses (site Nos. 36, 37, 85, 117, 144 and 239), two railroad bridges (site Nos. 79 and 255), one historic district (site No. 80), one railroad yard (site No. 77) and one botanic garden (site No. 78). Other non-eligible NRHP historic properties/sites are also located within the PSC. Typically these include clusters of neighborhoods that are not located within the proposed ROW of any of the alternatives.

One registered THL, the Cobb-Burney House (site No. 239) is located within 0.25 mi of the proposed SH 121. In addition, four cemeteries were identified within the PSC, but would not be affected by construction of the project. Two of the cemeteries, the Burke Cemetery and the Willburne Cemetery are registered THLs (Chapter 8.0, Summary of Mitigation Measures).

THC consultation resulted in concurrence on historic property eligibility and effects. Please see Appendix F for copies of correspondence.

5.21.4. Build Alternative Impacts

Alternative A

No direct impacts to NRHP eligible resources would occur as a result of construction of Alternative A. Construction of this alternative would impact 11 NRHP eligible properties including six houses, one historic district, one railyard, one botanic garden and one railroad bridge. Evaluation of adverse effects has been concluded and coordination with THC has determined that no adverse effect to any historic resources would occur because of Alternative A.

The first two houses that would be indirectly impacted by Alternative A are in the central portion of the PSC and include the Deats Duplex (site No. 36) and the Graham-Merchant House (site No. 37). The Deats Duplex is at 3930-32 Lisbon Street. The house is approximately 700 ft west of the proposed ROW, in the Factory Place Neighborhood. The Graham-Merchant House is at 3504 Lovell Avenue near the center of the project area. It stands approximately 450 ft west of the projected ROW in the Brooklyn Heights Neighborhood.

Three houses that would be indirectly impacted by Alternative A are in the Mistletoe Heights Neighborhood just east of the Trinity River and south of the proposed SH 121. The Agee-Renfro-Vandervoort House (site No. 85) is at 1200 Mistletoe Drive and approximately 650 ft southeast of the proposed ROW; the Boyd House (site No. 117) is at 1138 Clara Street and approximately 750 ft southeast of the proposed ROW; and the Klar House (site No. 144) is at 2400 Mistletoe Boulevard and approximately 1,000 ft southeast of the proposed ROW. All of the houses are contributing members of the Forest Park Conservation District.

The Mistletoe Heights Neighborhood is recommended eligible for NRHP listing as a historic district, Mistletoe Heights Historic District (site No. 80) and also stands to be indirectly impacted by the construction of Alternative A. The indirect impacts are in reference to THC's concern (August 9,

2002 letter) over traffic, noise and light pollution on historic properties. It is one of nine subdivisions comprising the Forest Park Conservation District. The district is approximately 300 to 1,325 ft southeast of the proposed ROW.

The Cobb-Burney House (site No. 239) is at 1598 Sunset Terrace near the northeast termini of the PSC. The house is designated by a THM and situated in the Quality Hill Neighborhood. It is approximately 1,100 ft east of the Alternative A proposed ROW.

The Centennial Yards, also known as Texas and Pacific Lancaster Railyards (site No. 77) are just south of the 3900 Block of Vickery Boulevard. They are slightly south of the center of the project area, immediately adjacent to the proposed new location tollroad. The Municipal Rose Gardens/Fort Worth Botanic Garden (site No. 78) is slightly north of the center of the project area at 2200 Botanic Garden Drive 147. The gardens start approximately 800 ft north of the projected ROW and extend to the north. The Texas and Pacific Railroad bridge (site No. 79) is at the 2000 Block of Vickery Boulevard. The bridge is approximately 75 ft southeast of the projected Alternative A proposed ROW.

Alternative B

Alternative B may directly impact one potential NRHP eligible property and indirectly impact six potential NRHP eligible properties. These include one water treatment plant, two houses, two bridges, one botanic garden and one railyard.

The City of Fort Worth Holly Water Treatment Plant (site No. 256) consists of two separate pieces of property, North Holly and South Holly. North Holly's simple rectangular block buildings incorporate elements of Romanesque Revival and Mission Revival styling and represent municipal design ideology of the early twentieth century. North Holly is eligible for NRHP listing under Criteria A and C; however, there would be no direct taking is proposed by the project of any building or part of the site that is the North Holly Water Plant and therefore, no 4(f) evaluation would be required.

South Holly is the modern portion of the facility constructed between 1956 and 1958. While South Holly does maintain a sense of continuity with North Holly in terms of form, context and architecture, it is not eligible for the NRHP because it does not meet the 50-year age requirement established by the construction date of the SH 121 project.

The Deats Duplex (site No. 36) at 3930-32 Lisbon Street. The house is approximately 700 ft west of the proposed ROW, in the Factory Place Neighborhood. The second house, the Graham-Merchant House (site No. 37) is at 3504 Lovell Avenue near the center of the project area. It stands approximately 450 ft west of the projected ROW in the Brooklyn Heights Neighborhood.

The Centennial Yards, also known as Texas and Pacific Lancaster Railyards (site No. 77) are just south of the 3900 Block of Vickery Boulevard. They are slightly south of the center of the project area, immediately adjacent to the proposed new location tollroad. The Municipal Rose Gardens/Fort Worth Botanic Garden (site No. 78) is slightly north of the center of the project area at 2200 Botanic Garden Drive. The gardens start approximately 800 ft north of the projected ROW and extend to the north. The St. Louis-San Francisco Railway bridge (site No. 255) is at the 2200 Block of West 7th Street, the St. Louis-San Francisco bridge is approximately 1,200 ft west of the projected ROW.

The West Lancaster bridge (site No. 257) is located in close proximity to the proposed project area and is eligible for the NRHP under Criteria A and C. The SH 121 facility is currently proposed to lower to ground level approximately 200 ft south of the bridge and then exist at grade and pass under the bridge. Indirect impacts in the form of visual obstruction may alter the integrity of setting of the bridge and have the potential to be adverse. Therefore, indirect impacts to the bridge have the potential to represent a constructive-use 4(f) issue according to the ENV, who would consult with the THC to seek ways to minimize any potential adverse effects on the bridge. The current preliminary design suggests that no direct impacts would occur to the bridge. Should the preliminary design be altered resulting in direct impacts, the ENV would consult with the THC to seek ways to minimize any adverse effects on the bridge.

Alternative C and C/A

Alternative C/A is the recommended alternative for proposed SH 121. No direct impacts to NRHP eligible resources would occur as a result of construction of Alternative C or C/A. Construction of this alternative would indirectly impact 11 NRHP eligible properties including six houses, one historic district, one railyard, one botanic garden and one railroad bridge. Evaluation of adverse effects has been concluded and coordination with THC has determined that no adverse effect to any historic resources would occur because of Alternative C or C/A.

Three houses that would be indirectly impacted by these alternatives are in the Mistletoe Heights Neighborhood just east of the Clear Fork of the Trinity River and south of the proposed SH 121. The Agee-Renfro-Vandervoort House (site No. 85) is at 1200 Mistletoe Drive and approximately 650 ft southeast of the proposed ROW; the Boyd House (site No. 117) is at 1138 Clara Street and approximately 750 ft southeast of the proposed ROW; and the Klar House (site No. 144) is at 2400 Mistletoe Boulevard and approximately 1,000 ft southeast of the proposed ROW. All of the houses are contributing members of the Forest Park Conservation District.

The Mistletoe Heights Neighborhood is recommended eligible for NRHP listing as a historic district, Mistletoe Heights Historic District (site No. 80) and also stands to be indirectly impacted by the construction of these alternatives. It is one of nine subdivisions comprising the Forest Park Conservation District. The district is approximately 300 to 1,325 ft southeast of the proposed ROW.

The Cobb-Burney House (site No. 239) is located at 1598 Sunset Terrace near the northeast termini of the PSC. The THC has concluded that although sites 233 through 239 at Sunset Terrace comprise a potential historic district, the project as proposed will have no visual impact on historic resources. The Cobb-Burney House is designated by a THM and situated in the Quality Hill Neighborhood. It is approximately 1,100 ft east of the Alternative C/A proposed ROW.

The Centennial Yards, also known as Texas and Pacific Lancaster Railyards (site No. 77) are just south of the 3900 Block of Vickery Boulevard. They are slightly south of the center of the project

area, immediately adjacent to the proposed new location tollroad. The Municipal Rose Gardens/Fort Worth Botanic Garden (site No. 78) is slightly north of the center of the project area at 2200 Botanic Garden Drive. The gardens start approximately 800 ft north of the projected ROW and extend to the north. The Texas and Pacific Railroad bridge (site No. 79) is at the 2000 Block of Vickery Boulevard. The bridge is approximately 75 ft southeast of the projected Alternative C/A proposed ROW.

Alternative D

Alternative D may directly impact one potential NRHP eligible property and indirectly impact six potential NRHP eligible properties. They include one water treatment plant, two houses, two bridges, one botanic garden and one railyard. Alternative D is considered the "original" alignment and the following effect recommendations are a result of a previous review and consultation with ENV in February 2000 ("D" was the alternative presented to the public at the initial public meeting held in June, 1998).

The City of Fort Worth Holly Water Treatment Plant (site No. 256) consists of two separate pieces of property, North Holly and South Holly. North Holly's simple rectangular block buildings incorporate elements of Romanesque Revival and Mission Revival styling and represent municipal design ideology of the early twentieth century. North Holly is eligible for NRHP listing under Criteria A and C; however, no direct taking is proposed by the project of any building or part of the site that is the North Holly Water Plant and therefore, no 4(f) evaluation would be required.

South Holly is the modern portion of the facility constructed between 1956 and 1958. While South Holly does maintain a sense of continuity with North Holly in terms of form, context and architecture, it is not eligible for the NRHP because it does not meet the 50-year age requirement established by the construction date of the SH 121 project.

The Deats Duplex (site No. 36) at 3930-32 Lisbon Street. The house is approximately 700 ft west of the proposed ROW in the Factory Place Neighborhood. The second house, the Graham-Merchant

House (site No. 37) is at 3504 Lovell Avenue near the center of the project area. It stands approximately 450 ft west of the projected ROW in the Brooklyn Heights Neighborhood.

The Centennial Yards, also known as Texas and Pacific Lancaster Railyards (site No. 77) are just south of the 3900 Block of Vickery Boulevard. They are slightly south of the center of the project area, immediately adjacent to the proposed new location tollroad. The Municipal Rose Gardens/Fort Worth Botanic Garden (site No. 78) is slightly north of the center of the project area at 2200 Botanic Garden Drive. The gardens start approximately 800 ft north of the projected ROW and extend to the north. The Saint Louis and San Francisco Railroad bridge (site No. 255) is at the 2200 Block of West 7th Street, the Saint Louis and San Francisco bridge is approximately 1,200 ft west of the projected ROW.

The West Lancaster bridge (site No. 257) is located in close proximity to the project area and is eligible for the NRHP under Criteria A and C. The SH 121 facility is currently proposed to be lowered to ground level approximately 200 ft south of the bridge and then exist at grade and pass under the bridge. Indirect impacts in the form of visual obstruction may alter the integrity of setting of the bridge and have the potential to be adverse.

Therefore, indirect impacts to the bridge have the potential to represent a constructive-use 4(f) issue, according to the ENV, who would consult with the THC to seek ways to minimize any potential adverse effects on the bridge. The current preliminary design suggests that no direct impacts would occur to the bridge. Should the preliminary design be altered resulting in direct impacts, the ENV would consult with the THC to seek ways to minimize any adverse effects on the bridge.

5.21.5. No-Build Alternative

Implementation of the No-Build alternative would result in no effects on prehistoric or historic cultural resources.

5.21.6. Recommendations

Formal testing of the site 41TR170 is on hold pending ROE to the property or ROW acquisition. Subsequent to the testing phase, if the site is determined eligible for the NRHP and if the project poses an adverse effect to the site, any adverse effects would be resolved through mitigation measures such as data recovery. Survey data suggests that 41TR170 is not a potential 4(f) issue, as there are no discovered burials or archeological deposits of such extreme importance that would warrant preservation in place. Site 41TR171 is an historic archeological site which has been determined not eligible for the NRHP or as a SAL by the THC.

TxDOT archeologists completed an archeological survey in 1994 involving the entire length of the project except the north end. There should therefore be no need for additional work on those portions of the project previously surveyed. The only areas remaining to be surveyed for prehistoric sites are highly urbanized and located in the northern section of the project area adjacent to University Drive and the crossing of the Clear Fork of the Trinity River. The survey of the remaining parcels and formal testing of 41TR170 would be completed following ROW acquisition (Appendix F, THC coordination letter). The results of the latest survey suggest that no additional prehistoric sites exist within the PSC, much of which is disturbed by historic fill.

Coordination with the THC has resulted in a finding of No Adverse Effect on historic resources in the project vicinity on the condition that NTTA and TxDOT consider minimizing or avoiding increases in traffic, noise and light pollution in the designated historic areas. Please see THC coordination letters dated August 9, 2002 and October 6, 2004 as well as TxDOT September 9, 2002 response letter in Appendix F.

TxDOT consultation with the THC focused on the segment between Hulen Street and IH 30 of the project corridor because of the lack of historic resources elsewhere in the APE (Appendix F). All historic properties have been identified within an APE of 0.25 mi beyond the proposed ROW (refer to Section 5.21.3, Historic Resources). Potential effects on historic properties have been identified for each alternative under consideration.

THC has concurred that Alternatives A, C and C/A would have no adverse effect on the historic properties. This is because the taking of property at the Holly Water Plant is eliminated, the visual intrusion on the Lancaster bridge is eliminated and the visual intrusion that the direct connection to Forest Park Boulevard may have had on the Mistletoe Heights Neighborhood Historic District or the Sunset Terrace neighborhoods is eliminated. Alternatives A and C were developed to avoid impacts, such as the visual impacts to neighboring residential areas and historic resources, that were identified through the public involvement process.

Alternatives B and D have been identified as having potential impacts at the Holly Water Plant, Lancaster bridge and the Mistletoe Heights Neighborhood Historic District as either direct takes or indirect impacts. Those impacts would lead to a Section 4(f) evaluation.

St. Paul Lutheran Church was listed under the Publicly Oriented Facilities section as a church near the PSC. Because this church was built nearly 50 years ago it was not included in the first round of historic structures surveys. An "Intensive Survey Report" for St. Paul Lutheran Church was accomplished in order to determine NRHP eligibility. The St. Paul Lutheran Church (built in 1954 at the end of the period to be evaluated for Section 106) at 1800 West Freeway lies within the APE. Given the late construction date, lack of historical associations between the congregation and this site and the alterations and additions to the property since the end of the historic period, THC has concurred with a determination that the property is not NRHP-eligible.

Consultation with THC has been finalized for all alternatives. If an alternative is chosen that creates an adverse effect, NTTA and TxDOT would resolve this effect by continuing consultation with the THC during the final design process

5.22. Hazardous Waste Sites

5.22.1. Alternative A

Two VCP sites are located within the potential ROW (Table 5-20). These sites are located at Forest Park and Vickery Boulevard and at 2400 West Freeway and North Forest Park. The first site was

previously designated as a metals processing facility and was found to have elevated levels of metals in the soil. The VCP applicant is the Federal Deposit Insurance Corporation (FDIC) and as of July 2004 the VCP database indicates the case is in the withdrawal phase. The second site is a municipal solid waste landfill facility. Soil and groundwater contamination from metals and petroleum hydrocarbons has been identified at this site. According to the TCEQ VCP Database, as of July 2004, the site is currently in the remediation phase. High levels of methane have been detected, which represents a hazard if construction activities should take place in the area.

Four RCRA sites within the potential ROW store and/or generate hazmat/waste as either a small quantity or large quantity generator.

Six LPST sites are located within the potential ROW. Records show that the LPSTs at these facilities have been removed from the ground and the sites have all been issued closure by the TCEQ.

Ten PST sites are registered within the potential ROW. Within these sites, there are twenty-nine UST's and six ASTs.

Three potential sites that would require further investigation as show in Table 5-20 (H30, H31 and H32) represent commercial enterprises that potentially generate hazardous wastes and are not currently carried in any regulatory database. These sites are shown on Exhibit 5.2 through Exhibit 5.5 and are located along Vickery Boulevard.

5.22.2. Alternative B

One VCP site is located within the potential ROW for Alternative B (Table 5-21). This site is also within the potential ROW for Alternative A and is located at Forest Park and Vickery Boulevard. The site was previously designated as a metals processing facility and was found to have elevated levels of metals in the soil. The VCP applicant is the FDIC and as of July 2004 the VCP database indicates the case is in the withdrawal phase.

Four RCRA sites within the potential ROW store and/or generate hazmat/waste as either a small quantity or large quantity generator.

Seven LPST sites are located within the potential ROW. Records show that the LPSTs at six of the facilities have been removed from the ground and the sites have been issued closure by the TCEQ. The remaining LPST facility, City of Fort Worth Water Service Center at 2201 West Daggett Street, was issued closure from TCEQ on May 23, 2003.

Eleven PST sites are registered within the potential ROW. Within these sites, there are thirty-six UST's and six AST's.

Three potential sites that would require further investigation as show in Table 5-21 (H30, H31 and H32) represent commercial enterprises that potentially generate hazardous wastes and are not currently carried in any regulatory database. These sites are shown on Exhibit 5.2 through Exhibit 5.6 and are located along Vickery Boulevard.

5.22.3. Alternative C and C/A

One VCP site is located within the potential ROW for Alternative C and Alternative C/A (Table 5-22). This site is located at is located at Forest Park and Vickery Boulevard. The site was previously designated as a metals processing facility and was found to have elevated levels of metals in the soil. The VCP applicant is the TDIC and as of July 2004 the VCP database indicates the case in the withdrawal phase.

Four RCRA sites within the potential ROW store and/or generate hazmat/waste as either a small quantity or large quantity generator.

Six LPST sites are located within the potential ROW. Records show that the LPSTs at these facilities have been removed from the ground and the sites have all been issued closure by the TCEQ.

10 PST sites are registered within the potential ROW. Within these sites, there are twenty-nine UST's and six AST's.

Three potential sites that would require further investigation as show in Table 5-22 (H30, H31 and H32) represent commercial enterprises that potentially generate hazardous wastes and are not currently carried in any regulatory database. These sites are shown on Exhibit 5.2 through Exhibit 5.5 and are located along Vickery Boulevard.

5.22.4. Alternative D

Two VCP sites are located within the potential ROW (Table 5-23). These sites are located at Forest Park and Vickery Boulevard and at 2400 West Freeway and North Forest Park. The first site was previously designated as a metals processing facility and was found to have elevated levels of metals in the soil. The VCP applicant is the FDIC and as of July 2004 the VCP database indicates the case is in the withdrawal phase. The second site was a municipal solid waste landfill facility. Soil and groundwater contamination from metals and petroleum hydrocarbons has been identified at this site. The VCP applicant is the FDIC and as of July 2004 the VCP database indicates the case is in the withdrawal phase. High levels of methane have been detected, which represents a hazard if construction activities should take place in the area.

Eight RCRA sites within the potential ROW store and/or generate hazmat/waste as either a small quantity or large quantity generator.

10 LPST sites are located within the potential ROW. Records show that the LPSTs at eight of the facilities have been removed from the ground and the sites have been issued closure by the TCEQ. Of the two remaining LPST sites, the North Holly Water Treatment Plant at 1120 Fournier Street was issued closure from TCEQ in May 2004, pending documentation of well plugging. The City of Fort Worth Water Service Center at 2201 West Daggett Street was issued closure from TCEQ on May 23, 2003.

18 PST sites are registered within the potential ROW. Within these sites, there are forty-seven UST's and six AST's.

Three potential sites that would require further investigation, H30, H31 and H32, represent commercial enterprises that potentially generate hazardous wastes and are not currently carried in any regulatory database. These sites are shown on Exhibit 5.2 through Exhibit 5.5 and are located along Vickery Boulevard.

It is not anticipated that any of the sites described would impact the development of the proposed facility. There would be no change to the environment along the project corridor related to hazardous waste conditions or established sites. Precautions and remediation measures would be necessary during the construction phase to ensure that all means are utilized to identify and remove any hazardous waste encountered while work is proceeding. If hazardous substances/wastes are encountered unexpectedly during construction, appropriate measures for proper management of the contamination will be initiated in accordance with all applicable Federal, State and local regulations.

5.22.5. No-Build Alternative

The No-Build alternative would have no impact on hazmat sites found in the PSC.

5.23. Visual Impacts

Aesthetic values are determined by the highly variable and subjective responses of individuals to physical objects in their environment. The development of public facilities, particularly those including major transportation elements, would have an impact on the aesthetic quality of the environment and, therefore, whether positive or negative, can alter the values which individuals ascribe to specific objects or areas.

This section addresses the visual and aesthetic impacts of the alternatives. The visual quality assessment determines if the recommended project would be compatible with the visual character of

the setting into which it would be introduced. Visual impacts are discussed in terms of the effect of the new physical elements associated with the project:

- Landform Quality - The existing natural or man-made landform.
- Visual Resources -The physical resources, including native vegetation, introduced landscaping and the built environment, that make up the character of the area.
- Visual Intrusion/Privacy - The creation of direct views from the tollroad into previously private spaces or the introduction of a new visual element (the tollroad) into views from private spaces.

There are no specific Federal or State visual regulatory requirements that apply to properties that are not designated historic and/or eligible for listing in the NRHP, or parkland.

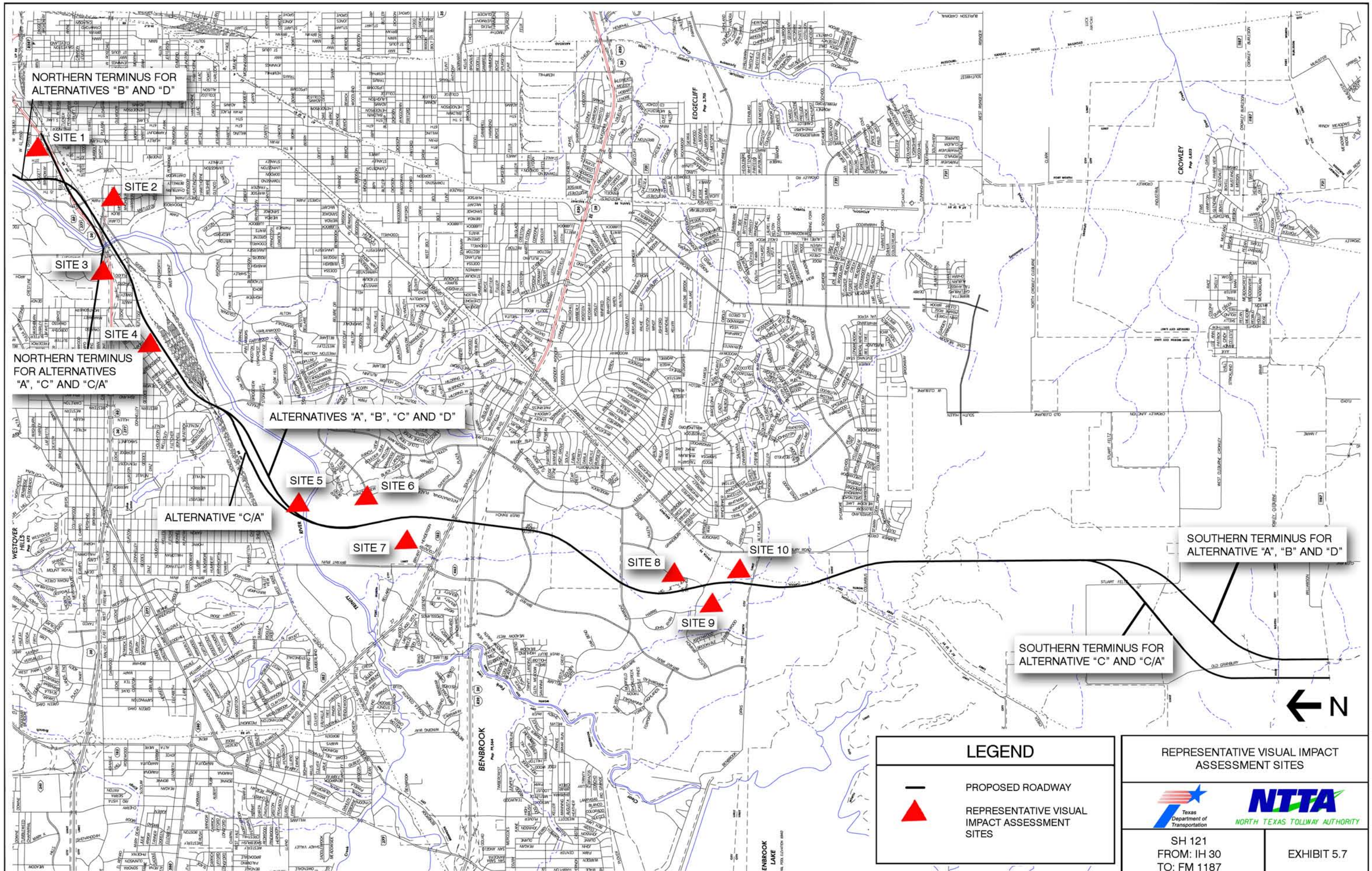
5.23.1. Representative Assessment Sites

Visual intrusion or privacy impacts of the project on adjacent properties were assessed using several criteria: horizontal elevation, existing screening and distance. Each representative area was assessed to determine which project characteristics would potentially have an impact. The characteristics of the project that could have a visual/aesthetic impact on the resource include toll plaza areas, elevated structures/bridges and other vertical elements such as signs and light standards.

Representative visual impact assessment sites were assessed based upon proximity to the tollroad, surrounding land use and features that would obstruct views. These factors were evaluated to determine anticipated viewsheds to the tollroad at eyelevel locations in the limits of existing IH 30 (Exhibit 5.7).

5.23.2. Sunset Terrace Neighborhood

The Sunset Terrace Neighborhood is located approximately 300 ft northwest of the proposed SH 121. The surrounding land use of the Sunset Terrace area is primarily comprised of commercial offices, retail offices and industrial uses. Each alternative at this general location would not cause a visual impact from the visual perspective of Sunset Terrace primarily due to the depressed vertical alignment at this location.


NORTHERN TERMINUS FOR ALTERNATIVES "B" AND "D"
SITE 1
SITE 2
SITE 3
SITE 4
NORTHERN TERMINUS FOR ALTERNATIVES "A", "C" AND "C/A"
ALTERNATIVES "A", "B", "C" AND "D"
SITE 5
SITE 6
ALTERNATIVE "C/A"
SITE 7
SITE 8
SITE 9
SITE 10
SOUTHERN TERMINUS FOR ALTERNATIVE "A", "B" AND "D"
SOUTHERN TERMINUS FOR ALTERNATIVE "C" AND "C/A"
N
LEGEND
PROPOSED ROADWAY
REPRESENTATIVE VISUAL IMPACT ASSESSMENT SITES
REPRESENTATIVE VISUAL IMPACT ASSESSMENT SITES
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH 30
TO: FM 1187
EXHIBIT 5.7

Views are further obstructed by existing buildings,foliage and privacy fences along the ROW limits of existing IH 30.

Table 5-27 – Representative Assessment Sites Along the Corridor

#	Location	Approximate Distance From Tollroad
1	Sunset Terrace Neighborhood	300 ft Northwest of alignment
2	Mistletoe Heights Neighborhood	300 ft southeast of alignment
3	Botanic Garden	800 ft northwest of alignment
4	Vickery Street Business Area	Adjacent to alignment
5	Trinity River Crossing (near Stonegate Boulevard)	Adjacent to alignment
6	Overton Woods	1,500 ft east of alignment
7	Fort Worth Country Day School	300 ft west of alignment
8	Hulen Bend Estates	300 ft east of alignment
9	Quail Ridge Neighborhood	1,800 ft west of alignment
10	Park Palisades Neighborhood	300 ft east of alignment

5.23.3. Mistletoe Heights/Berkeley Place Neighborhood

The Mistletoe Heights/Berkeley Place Neighborhood is located approximately 300 ft southeast of the proposed SH 121. The surrounding land use of the Mistletoe Heights area is primarily comprised of commercial offices, city streets, retail offices, industrial uses and recreational areas. Each alternative at this general location would not cause a visual impact from the visual perspective of Mistletoe Heights neighborhood primarily due to the vertical alignment at this location. The vertical alignment would be similar to the existing rail alignment at this general location. Views of the railroad alignment are well obstructed from the general neighborhood views. Similarly, views of the highway alignment would be well obstructed from the general neighborhood views.

5.23.4. Botanic Garden

The Botanic Garden is located approximately 800 ft northwest of the proposed SH 121. The surrounding land use of the Botanic Garden area is primarily comprised of commercial and recreational uses. Views of the proposed SH 121 from this location would be completely obstructed by the existing IH 30 and buildings between IH 30 and Vickery Boulevard west of University Drive.

5.23.5. Vickery Boulevard Business Area

The Vickery Business area is located adjacent to the proposed SH 121. The surrounding land use of the Vickery Business area is primarily comprised of commercial offices, city streets, retail offices and industrial uses. Each alternative at this general location would cause a visual impact from the visual perspective of Vickery Business area.

The proposed SH 121 would introduce new visual elements, including a toll plaza and tollroad that would be at-grade but depressed for the majority of this area (except at the approach of Hulen Street). In addition to these new built elements, light standards would introduce more nighttime lighting.

5.23.6. Trinity River Crossing (near Stonegate Boulevard)

The Trinity River Crossing is located adjacent to the proposed SH 121 near Stonegate Boulevard. The surrounding land use of the Trinity River crossing area is primarily comprised of recreational, as well as large portions of undeveloped land. Each alternative at this general location would cause a visual impact from the visual perspective of Trinity River Crossing (near Stonegate Boulevard). The alternative would introduce a new visual element to recreational users of the trails as well as indirect nighttime lighting from the proposed bridge lighting. Development of the area can be expected whether or not the project would be built, so visual elements of the trails would change over time.

5.23.7. Overton Woods

Overton Woods is located approximately 1,500 ft east of the proposed SH 121. The surrounding land use of the Overton Woods area is primarily comprised of low-density residential uses, as well as portions of undeveloped land. Each alternative at this general location would not cause a visual impact from the visual perspective of Overton Woods primarily due to the horizontal distance of site at this location. Existing buildings and foliage further obstruct views.

5.23.8. Fort Worth Country Day School

The Fort Worth Country Day School is located approximately 300 ft west of the proposed SH 121. The surrounding land use of the Fort Worth Country Day School area is primarily comprised of community facilities as well as portions of undeveloped land. The recommended alternative is more depressed than other alternatives at this location. The recommended alternative at this general location would not cause a visual impact from the visual perspective of Fort Worth Country Day School primarily due to the depressed vertical alignment at this location. Foliage and a proposed noise wall along the ROW line further obstruct views.

5.23.9. Hulen Bend Estates

The Hulen Bend Estates is located approximately 300 ft east of the proposed SH 121. The surrounding land use of the Hulen Bend Estates area is primarily comprised of low- and high-density residential, commercial uses, as well as portions of undeveloped land. Each alternative at this general location would cause a visual impact from the visual perspective of Hulen Bend Estates at locations near the project corridor. The homes adjacent to the alignment areas do not face the proposed SH 121. Furthermore, existing privacy fences and existing vegetation would serve as visual barriers between the residential housing and the proposed SH 121. The majority of the homes at this location would be located where the view of the tollroad is fully obstructed.

5.23.10. Quail Ridge Neighborhood

The Quail Ridge Neighborhood is located approximately 1,800 ft west of the proposed SH 121. The surrounding land use of the Hulen Bend Estates area is primarily comprised of low- and high-density residential, commercial uses, as well as portions of undeveloped land. Each alternative at this general location would not cause a visual impact from the visual perspective of Quail Ridge Neighborhood primarily due to the horizontal distance of site from the neighborhood.

5.23.11. Park Palisades

The Park Palisades Neighborhood is located approximately 300 ft east of the proposed SH 121. The surrounding land use of the Park Palisades area is primarily comprised of low- and high-density residential, commercial uses, as well as portions of undeveloped land. Each alternative at this general location would cause a visual impact from the visual perspective of Park Palisades at locations very near the corridor. The homes adjacent to the alignment areas do not face the proposed SH 121. Furthermore, existing privacy fences and existing vegetation would serve as visual barriers between the residential housing and the tollroad.

5.23.12. Visual Impact Mitigation

To help minimize visual impacts caused by the tollroad, the NTTA has developed design guidelines to provide consistency throughout the system. The NTTA System-Wide Design Guidelines provides guidance for landscaping, toll plaza, signage and structures to ensure consistent treatment in both the view to and from the driver's point of view. The guidelines include a landscaping program that is well designed and sustainable.

Additional information on Visual Impact Mitigation is located in Chapter 8.1, Visual Impacts/Context-Sensitive Design.

5.24. Light Impacts

Lighting of the main lanes, lighting of toll plazas, lighting of intersection and interchange areas and partial lighting of frontage roads is proposed for SH 121. As part of the environmental and public participation process for the project, NTTA and TxDOT have considered minimizing potential increases in light intrusion to designated historic areas. Roadway illumination is provided on transportation facilities to enhance safety for the traveling public. Lighting, in general, can be expected to reduce night crashes by about 30 percent. Convenience, security and the aesthetic value of roadway lighting are additional benefits. Light levels for roadways are developed in accordance with guidelines published by the American Association of State Highway and Transportation

Officials (AASHTO) and may be obtained through the use of either conventional or high mast lighting. Adequate lighting of main lanes, at-grade ramps, frontage roads, at-grade intersections, two-level interchanges and toll plazas can usually be provided using conventional lighting, while multiple level interchanges, some elevated ramps and roadways with high ADT counts may require the use of high mast lighting. In determining the placement of illumination poles and the configuration of high mast facilities, consideration would be given to the nature of adjacent development. In response to neighborhood concerns over lighting levels elsewhere on our system, NTTA performed some lighting studies resulting in more cutoff and minimal-glare fixture use throughout the project in accordance with *Texas Health and Safety Code*, Chapter 425. Spill light would be limited in areas where it is considered undesirable. Full consideration would be given to energy conservation, reducing glare, minimizing light intrusion and preserving the natural night environment.

The design of the project would follow the *Highway Illumination Manual*, which provides procedures, guidelines and information concerning highway illumination. The design of the project would make every effort to apply the Manual's design criteria to select proper lighting (either continuous or safety lighting) for the project. As defined in the Manual, continuous lighting is defined as lighting that provides relatively uniform light on all main lanes, direct connections and complete interchange lighting of all interchanges. Frontage roads are not normally continuously lighted. The lighting units may be conventional luminares but no high mast lighting would be used within 1,000 ft of SH 121/IH 30 interchange. In accordance to TxDOT's *Traffic Operations Manual*, safety lighting may be installed at any interchange, highway intersection, or other decision-making point or points of nighttime hazard. Safety elements may be used to the extent necessary to provide for safety enhancement and the orderly movement of traffic.

With regard to the proposed SH 121 construction connection near Summit Avenue, the existing high-mast lighting is proposed to be replaced with low-mast lighting.

5.25. Railroad Impacts

5.25.1. Alternatives A, B, C, C/A and D

The Build alternatives of the project would have impacts to two railroads at areas of specific alignments. The impacts would require main lane crossovers at the following locations:

UPRR: UPRR operates the Centennial Railroad Yard located at the intersection of proposed SH 121 and Hulen Street. The alignment at Hulen Street would intersect the UPRR Centennial Yard. The railroad yard would be crossed over by the main lanes of SH 121.

FWWRR (old South Orient Railroad): FWWRR operates a north-south track that would require a crossover west of Old Granbury Road and south of Altamesa/Dirks Road. The alignment would intersect the FWWRR east of Forest Park Boulevard. It is not anticipated that track realignment would be necessary.

5.25.2. No-Build Alternative

The No-Build alternative would not impact the UPRR Yard or the FWWRR track line.

5.26. Relationship Between Local Short Term Uses of Man's Environment and the Maintenance and Enhancement of Long-term Productivity

The SH 121 project is a vital component of a much larger transportation system serving the DFW area. If constructed, it would offer a faster, safer and more efficient transportation system serving the southwest portion of Fort Worth and Tarrant County and the northern part of Johnson County. It would become an essential part of the overall transportation network in Tarrant County.

Highway construction is classified as a long-term productive facility. The goal of the SH 121 project is to create a facility that fulfills the need for transportation service and is compatible with today's land use and enhances future development in the area. The long-term mission of the project would

be to provide the most beneficial means of serving those wishing to use the system with the least amount of funds disbursed for continued maintenance and enhancement.

While there is no fixed timetable to distinguish the short-term effects from the long-term effects, a local short-term use of the environment is generally defined as a direct consequence of a project in its immediate vicinity. Short term effects, which in most cases are not considered to be permanent effects, include localized disruptions, higher noise levels, increased air pollution from construction equipment and the rerouting of traffic during the construction period, though these impacts might be relatively inconsequential in the long-term. Long-term effects, however, are related to direct and/or indirect results of the facility, which in most cases are considered to be permanent effects. In general, the short-term effects, which include the majority of the costs and inconveniences, are borne during or shortly after construction, while the long-term benefits are shared by both present and future generations. The economic costs of designing and building the facility would be supported in the near future.

The project based on State, regional and local comprehensive planning has taken into account future population growth, existing and future land usage as existing and future transportation needs. The proposed Build alternatives, whether freeway or toll facility, would have similar local short-term impacts and long-term benefits. Based on comprehensive planning efforts for the project, implementation of the project, including the local short-term impacts and use of resources, is consistent with the maintenance and enhancement of the long-term productivity for the local area and the State.

5.27. Secondary and Cumulative Effects Analysis

The President's CEQ wrote, in 1997, "the continuing challenge of Secondary and Cumulative Effects Analysis (SCEA) is to focus on important cumulative issues, recognizing that a better decision, rather than a perfect SCEA, is the goal of the NEPA and environmental impact assessment professionals." "Counting what counts" is based on and influenced by existing data, community input and professional judgment.

Secondary effects are those that are "caused by an action and are later in time or farther removed in distance but are still reasonably foreseeable" (40 CFR 1508.8). Generally, these effects are induced by the initial action. They comprise a wide variety of secondary effects such as, changes in land use, water quality, economic vitality and population density.

Cumulative effects are those that result from the incremental consequences of an action when added to other past and reasonably foreseeable future-actions (40 CFR 1508.7). These effects are less defined than secondary effects. The cumulative effects of an action may be undetectable when viewed in the individual context of direct and even secondary effects, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change.

The following combinations of the direct, secondary and/or cumulative effects of an alternative on a resource may be encountered in transportation projects:

- Direct only
- Direct, secondary and cumulative effects
- Direct and cumulative effects only
- Secondary and cumulative effects only

If project alternatives do not result in either direct or secondary effects on a resource, then no further analysis of that resource is required. Cumulative effects cannot exist if there are no direct or secondary effects.

The scope and methodology for this study are based on the process recommended in the CEQ handbook Considering Secondary and Cumulative Effects Under the NEPA, FHWA's Interim Guidance: Questions and Answers Regarding Indirect and Cumulative Impact Considerations in the NEPA Process and FHWA's Technical Advisory T6640.8A. This process includes the identification, through research and consultations, of Federal, non-Federal and private actions with possible effects that would be coincident with those of the proposed action on resources, ecosystems and human communities. Coincident effects would be possible if the geographic and time boundaries for the effects of the proposed action and past, present and reasonably future actions

overlap. Table 5-28 shows the 11-step approach to evaluate secondary and cumulative effects developed by CEQ.

Table 5-28 – Cumulative Effects Evaluations

EIS Component	Steps in the Cumulative Effects Analysis
Scoping	1. Identify the substantial secondary and cumulative effects issues associated with the proposed action and define the assessment goals. 2. Establish the geographic scope for the analysis. 3. Establish the time period for the analysis. 4. Identify other actions affecting the resources, ecosystems and human communities of concern.
Describing the Affected Environment	5. Characterize the resources, ecosystems and human communities identified in scoping in terms of their response to change and capacity to withstand stresses. 6. Characterize the stresses affecting these resources, ecosystems and human communities and their relation to regulatory thresholds. 7. Define a baseline condition for the resources, ecosystems and human communities.
Determining the Environmental Consequences	8. Identify important cause-and-effect relationships between human activities and resources, ecosystems and human communities. 9. Determine the magnitude and significance of secondary and cumulative effects. 10. Modify or add alternatives to avoid, minimize, or mitigate substantial secondary and cumulative effects. 11. Monitor the secondary and cumulative effects of the selected alternative and adapt management.

5.27.1. Methodology and Scoping

Methodological approaches used in this study included trends analysis, the use of overlays and matrices.

- Trends Analysis – The primary methodology used for the assessment of cumulative effects was trends analysis, the qualitative discussion of effects to a resource over time. Past and current developmental effects within the region allow an informed projection of likely future effects due to SH 121. If available data indicated that a resource was at a certain number/level in the past and has been reduced or enhanced over time due to development, then this serves as a quantitative trends analysis. In such cases, historic aerial photography, topographic maps and historic maps assisted in developing historic quantities of a resource, such as wetland acreage, floodplain storage, etc.

- Overlays – This method involved overlaying present and future land use maps over the existing environmental resources and quantitatively or qualitatively describing the effects to the resources. For example, overlaying a future land use map on National Wetland Inventory (NWI) maps can reveal the approximate acreage of wetlands that could be affected with future proposed development.
- Matrices – With this method, a table was used to compare effects to a resource over time. This is a useful tool to display clearly the results of a trends analysis or overlay processes.

Coordination with local, State and Federal agencies has been completed for the SCEA. In addition to meetings and discussions, formal letters were sent to resource agencies requesting input regarding the potentially affected resources and potential effects to these resources. Appendix F contains letters to resource agencies and responses received.

Geographic Boundaries and Time Periods

The identified subjects potentially encompass a varying range of geographic areas and time periods when considered from the perspective of secondary and cumulative effects. Identified geographic boundaries and timeframes used for the issues are identified in Table 5-29. For the secondary and cumulative effects of proposed SH 121 the spatial limits are selectively expanded beyond the established project area to consider possible effects on the wider region.

The timeframe for future secondary and cumulative effects assessed in this document is the period from 2004 to 2025, consistent with the timeframe for the effects analyses presented elsewhere in the FEIS. The timeframe for cumulative effects has been varied during the assessment process, depending upon availability of information. If data was not available for the exact geographic area or timeframe, as initially proposed, professional judgment was used to determine how available data could be used. No new fieldwork was undertaken nor was new data developed for the SCEA.

Table 5-29 – Geographic Boundaries and Time Periods

Topic	Proposed Study Area	Time
Land Use	Southwest Tarrant County and Northwest Johnson County	1940s to 2025
Cultural Impacts • Historic • Archeological	Southwest Tarrant County and Northwest Johnson County	1960s to 2025
Transportation • Traffic • Transit • Access	DFW Transportation Management Area Boundary	1850s to 2025
Water Resources Impacts • Wetlands • Waters of the United States • Floodplains • Water Quality	Clear Fork of the Trinity River Watershed focused in Southwest Tarrant County and Northwest Johnson County and general vicinity of the project	1945s to 2025
Biological Impacts	Tarrant and Johnson County project area	1940s to 2025
Park, Open Space, Recreation Impacts	Southwest Tarrant County and Northwest Johnson County	1940s to 2025
Air Quality	DFW Metroplex	1960s to 2025
Noise	PSC	1960s to 2025

Other Actions Affecting the Resources, Ecosystems and Human Communities of Concern

The City's southwest quadrant is experiencing rapid growth south of West Vickery Boulevard and the UPRR. As a result, roadway improvements are currently planned for the area.

The City of Fort Worth Master Thoroughfare Plan was developed based on the following criteria:

- The *City of Fort Worth's 2000 Comprehensive Plan*
- Future traffic capacity needs
- Adequate parkways for utilities, sidewalks, landscaping, etc.
- Environmental issues (floodplain, drainage, topographic features, etc.)
- Safe utilization by pedestrians, bicyclists, buses and truck traffic
- Existing and planned neighborhoods
- Existing roadways
- Construction feasibility
- Anticipated land uses within the City and Fort Worth's Extraterritorial Jurisdiction (ETJ)
- Coordination with *Mobility 2025-2004 Update* and with adjacent cities' plans

Property owners, in cooperation with the City, have preserved the portion of the proposed SH 121 area bounded by Hulen Street, West Vickery Boulevard, Bryant Irvin Road and Altamesa/Dirks Road as a future transportation corridor. This preservation has been in coordination with the City's thoroughfare plans, dating from 1973. The surrounding area has grown with intensive housing and commercial developments. Along with SH 121, developmental roadways have been proposed that would provide east-west connection across the now vacant land. General locations and description of the proposed roadways are shown on

Exhibit 3.2 through Exhibit 3.6 and Table 5-30. These improvements are not dependent on the proposed SH 121 and would be constructed without SH 121 to provide additional transportation options for expected growth within the southwest region of Tarrant County. All of the proposed roadways are in the *Fort Worth Master Thoroughfare Plan.*

Table 5-30 – Proposed New Roads

Proposed New Roads Listed in Fort Worth Adopted 2004 Comprehensive Plan	**From**	**To**
Stonegate Boulevard	End of existing Stonegate Boulevard	Bryant Irvin Road
Arborlawn Drive Extension	End of existing Arborlawn Drive	Bryant Irvin Road
Oakbend Drive extension	Existing end of Oakbend Drive	Ends near proposed SH 121
Bryant Irvin Road extension	Altamesa/Dirks Road	FM 1187
South Hulen Street extension	Altamesa/Dirks Road	FM 1187
Sycamore School Road extension	End of existing Sycamore School Road	Future Bryant Irvin Road extension
Risinger Road	Current end of Risinger Road	Future unnamed road
McPherson Road	End of future South Hulen Street Extension	Future Bryant Irvin Road extension
Stuart-Feltz Road extension	Future Bryant Irvin Road extension	Future Granbury Road extension
Cleburne-Crowley Road	Future South Hulen Road extension	Future Bryant Irvin Road extension
Granbury Road extension	Altamesa/Dirks Road	South of FM 1187
SH 121	FM 1187	US 67 N of Cleburne

In addition, the regional plan, *Mobility 2025 – 2004 Update*, proposes new rail, freeway and bicycle and pedestrian facilities in the southwest quadrant of Tarrant County. Exhibit 2.7, Exhibit 2.8 and Exhibit 4.6 show plans for these types of facilities. Transit service buses serve the project area from downtown to the southwestern quadrant at Sycamore School Road. Future service would be expected to follow development to the southwest.

The City of Fort Worth Neighborhood and Community Park Dedication Policy ensures "the provision of adequate park and recreational areas with needed facilities in the form of Neighborhood Parks and Community Parks." The policy provides that specific acres of park be available when the neighborhood is built. The amount of required park acreage depends on the population density in a given subdivision or apartment complex.

Preliminary plats, filed with the City before March 2004, show proposed development and parks adjacent to the proposed SH 121 ROW. Both preliminary plats and proposed parks are shown in Exhibit 5.8 and in Table 5-31.

Table 5-31 – Proposed Parks near the Project Study Corridor

Map ID	Future Parks	Distance To PSC	Location	Use
1	Ridgeview Addition	Approximately 4,000 ft east of PSC	South of Altamesa/Dirks Road between Granbury Road and Old Granbury Road	Neighborhood Park
2	Ridgeview Addition	Approximately 1,500 ft east of PSC	Immediately southwest of #1 Ridgeview Addition	Neighborhood Park
3	Villages of Sunset Pointe	Immediately adjacent to PSC	West of Granbury Road, north of future Risinger Road	Neighborhood Park
4	Summer Creek South	Approximately 2,000 ft east of PSC	West of Granbury Road, north of future Risinger Road	Neighborhood Park
5	Stone Meadow	Approximately 4,000 ft east of PSC	East of Granbury Road, north of future Risinger Road	Neighborhood Park

5.27.2. Existing Secondary and Cumulative Effects Analysis Environment

The existing environment for SCEA consideration contains diverse densities. The land use varies from the urban development on the north end of the recommended project to the open rangeland on the south.

Economic Effects

The project area from IH 30 to Hulen Street is an established transportation corridor that has its origin in the history of railroads in the City. The transportation corridor began as the westward extension of the railroad in the 1870s, slightly north of its current location downtown, but in its present location along West Vickery Boulevard. Roadways followed the railroad and businesses built along the roads and north of the railroad yard.

Development in the southern part of the recommended project area, from West Vickery Boulevard southward, did not begin until the 1960s. Several factors contributed to the slow development southwest of the City. Until Lake Benbrook was filled in 1952 and the levee system was reconstructed in the 1950s, flooding was more common. There were no major crossings of the Clear Fork of the Trinity River west of University Drive prior to the 1950s. Residential growth that began in downtown had moved slowly to the west from University Drive and north of the UPRR. Hulen Street was extended southward, over the Clear Fork of the Trinity River in 1964 to its current intersection with Granbury Road, south of IH 20 and provided better access to the southwest quadrant of the City.

While major roadwork was occurring in the southwest quadrant of the City, plans were also being made to extend Bellaire Drive and Horne Street southward past IH 20. Instead, Bryant Irvin Road became a major crossing of the Clear Fork of the Trinity River and plans for Bellaire Drive and Horne Street were dropped from consideration.

Once transportation facilities were in place, the southwest quadrant of the City developed rapidly. Between West Vickery Boulevard and SH 183, houses and neighborhood commercial establishments

were built. South of SH 183 to Altamesa/Dirks Road has developed into a mixed-use area with general commercial, including a regional mall at Hulen Street and IH 20. Large single-family and multi-family housing developments are also included in this area.

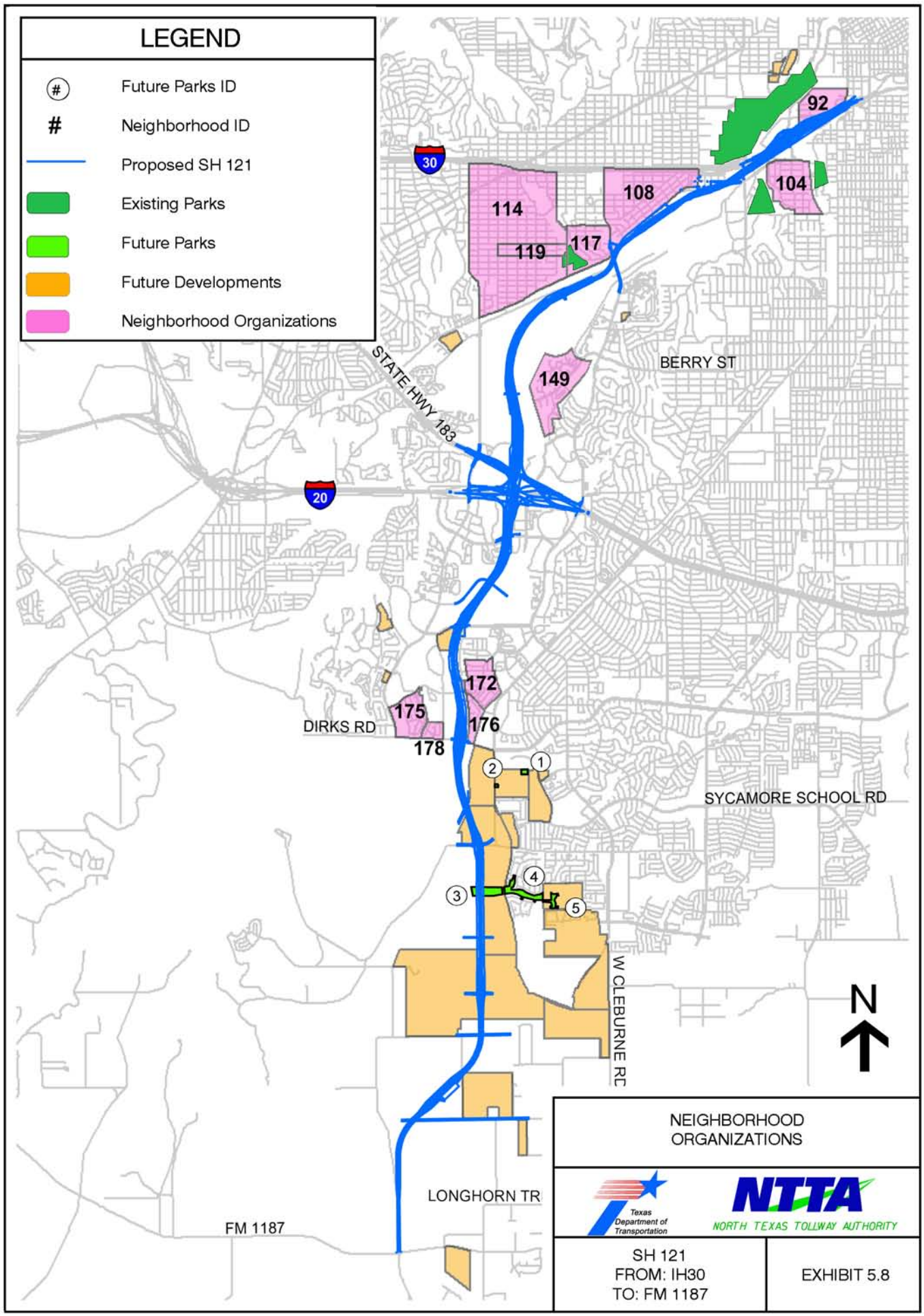
Social

Neighborhood organizations represent neighborhoods adjacent to the recommended project. Exhibit 5.8 shows the location of each neighborhood in the vicinity of the project. Their names are shown in Table 5-32. Because of their historic importance, the Sunset Terrace and Mistletoe Heights neighborhoods are discussed under historic resources.

Table 5-32 – Neighborhoods Adjacent to Proposed SH 121

Neighborhood Map ID Number	Neighborhood Name
92	Sunset Terrace
104	Mistletoe Heights
108	Alamo Heights
114	Como
117	Sunset Heights South
119	East Libbey
149	Overton Woods
172	Hulen Bend Estates
175	Quail Ridge Estates
176	Park Palisades
178	Quail Ridge Estates II

Neighborhoods north of West Vickery Boulevard, including Sunset Heights South, Alamo Heights, Como and East Libbey, share a common physical relationship to the proposed SH 121 because they are all located north of the traditional transportation corridor defined by the UPRR and West Vickery Boulevard. They also share a common history. These neighborhoods, constructed in the early to mid-20th century, developed in response to the construction of the railroad, the relocation of the UPRR yard to its current location south of West Vickery Boulevard and the westward growth of the City north of the railroad. Except for gradual commercial growth along Vickery Boulevard, the neighborhoods have changed little, physically, in the intervening decades.


LEGEND
Future Parks ID
Neighborhood ID
Proposed SH 121
Existing Parks
Future Parks
Future Developments
Neighborhood Organizations
30
20
92
104
108
114
117
119
149
172
175
176
178
STATE HWY 183
BERRY ST
DIRKS RD
SYCAMORE SCHOOL RD
W CLEBURNE RD
LONGHORN TR
FM 1187
1
2
3
4
5
N
NEIGHBORHOOD ORGANIZATIONS
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 5.8

- IH 30, West Vickery Boulevard, Hulen Street and Montgomery Street bound Alamo Heights. The houses and commercial buildings were, for the most part, constructed between the 1920s and 1950s.
- Fletcher Street, West Vickery Boulevard, Driskell Road and Hulen Street bound Sunset Heights South neighborhood. The houses and commercial buildings were constructed in the 1920s through the 1950s.
- Camp Bowie Boulevard, West Vickery Boulevard, Bryant Irvin Road and Neville Street/Como Park form the boundaries of the Como Neighborhood. The area has been designated an Enterprise Zone, which allows for special development incentive programs by the City plus sales and franchise tax rebates from the State. In this area, the UPRR occupies the land along the south side of West Vickery Boulevard. A few commercial buildings are present along the north side of West Vickery Boulevard. The houses were constructed between the 1920s and 1950s.
- Goodman Street, Blackmore Street, Horne Street and Neville Street bound the East Libbey neighborhood. The houses and commercial buildings were constructed between the 1930s and 1950s.

South of West Vickery Boulevard and the UPRR, the Overton Woods neighborhood is bounded by Clear Fork of the Trinity River, Bellaire Drive, undeveloped Cassco property (conforming with the ROW line for the proposed SH 121 shown in the Public Hearing held on May 2, 1973) and a drainage creek into the Clear Fork of the Trinity River. The neighborhood construction began in the 1970s.

Neighborhoods south of IH 20 also share common characteristics. They are representative of the trend toward “cul-de-sac” communities. In such communities, few exits and entrances to arterials are provided and there are virtually no transportation connections between such communities. These neighborhoods are also isolated from commercial development.

- Hulen Bend Estates - Spring Valley Road, Dutch Branch Road, Audubon Trail/High Brook Streets and LeBlanc Park/Greenbriar Drive bound Hulen Bend Estates. The neighborhood was constructed between 1997 and 2003.
- Park Palisades - Altamesa/Dirks Road, Lomo Alto Street, the FWWRR and Dutch Branch Road bound Park Palisades. Construction on the subdivision began in 1999.
- Quail Ridge Estates - Dutch Branch Road, Altamesa/Dirks Road, Bryant Irvin Road and Harris Parkway bound Quail Ridge Estates. Construction on the subdivision began in 1996.
- Quail Ridge Estates II – Deer Hollow Drive, Altamesa/Dirks Road, Axis Court and White Tail Trail bound Phase II. Construction on the subdivision began in 1998.

Land Use

In the 1940s, the most intensive development was in or near downtown Fort Worth. SH 550 was constructed in the late 1940s, later becoming IH 30. The surrounding downtown area was mostly commercial and residential. Land between the UPRR yards and West Vickery Boulevard was developing for both commercial and industrial use.

West Vickery Boulevard is shown on historic maps as being a paved road downtown and a dirt road from near Lamar Street to the southwest through Benbrook. By 1925, homes had been built north of West Vickery Boulevard, near the existing location of the UPRR Yard. At that time, the land south of West Vickery Boulevard, near the proposed SH 121, was undeveloped and maps show few houses in the area.

More housing is shown on maps from 1940 near the proposed SH 121 north of West Vickery Boulevard. South of West Vickery Boulevard, in the Clear Fork of the Trinity River floodplain, there was no development.

Following the 1949 flood in the Trinity River basin, the levee system was upgraded and the floodplain became, essentially, the area between the tops of either side of the levee. Development followed rapidly southwest of Fort Worth.

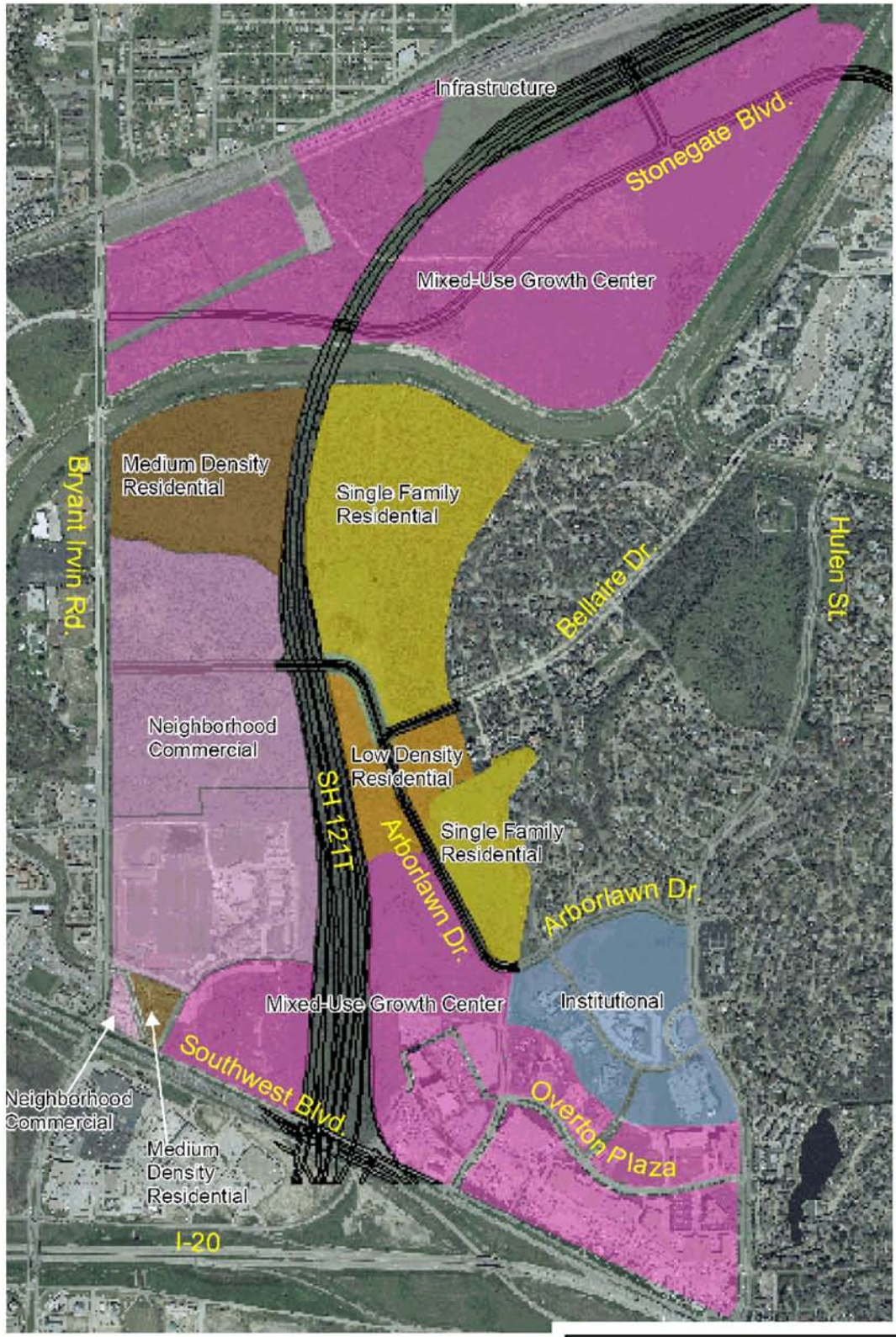
In the 1950s, SH 550 was brought into the Federal Interstate System (first as IH 20 and then IH 30) and SH 183/Loop 820 (now IH 20) was built from west Fort Worth, around the south of the City, to the east side of the City near Handley. Tarrant County maps from 1961 show the majority of the new development proceeding to the southeast of the City. Between West Vickery Boulevard and IH 20, along IH 20 and south of IH 20 development proceeded rapidly. Most of the development in the southwest quadrant of the City was single-family housing initially. In the late 1960s through 2004, however, high-density residential and general commercial uses have become more evident.

The City of Fort Worth Adopted *2004 Comprehensive Plan* consolidates current land uses and specifies future land uses for the City. SH 121 would pass through or would be adjacent to five Planning Sectors established by the City (Exhibit 5.9 and Exhibit 5.10).

- Sector 1 – Arlington Heights Planning Sector - Current land use in this sector is primarily single-family residential, with small pockets of neighborhood commercial; general commercial; and industrial (especially near West Vickery Boulevard and the railroad). The area between the UPRR and Clear Fork of the Trinity River is now vacant land. The Fort Worth Botanic Garden (FWBG) is located in this Planning Sector. It is the oldest botanic garden in Texas and was built in 1933 by the Federal Works Project Administration, an agency whose goal was to revitalize the U.S. economy during the Great Depression. The FWBG is composed of approximately 110 ac and is located north of IH 30 on the west side of University Drive.
- Sector 2 – Downtown Planning Sector - This sector currently contains mixed uses with office, retail, neighborhood commercial, high-density residential and some single-family residential.
- Sector 7 – Far Southwest Planning Sector - Current land use is primarily single-family residential, agricultural and light industrial to FM 1187. South of FM 1187, single-family residential subdivisions are under construction in areas planned for such growth and the remainder of the sector is in open space.
- Sector 14 – TCU/Westcliff Planning Sector - This area is primarily single-family residential with some high density residential and some commercial and industrial (near railroad tracks). Fort Worth Country Day School is located in this Planning Sector.
- Sector 15 – Wedgwood Planning Sector - The Wedgwood Sector is primarily single-family residential with neighborhood commercial, general commercial, light industrial and high density residential. A mixed-use area is bounded by Oakmont Boulevard, Hulen Street, SH 183 and Bryant Irvin Road.

Historic Impacts

The THC made a no-adverse effect finding with respect to historic properties (Chapter 8.0, Summary of Mitigation Measures). However, prior to that finding, THC inquired if there could be a "potential for additional traffic, noise and light intrusion near the historic districts, particularly at the Summit interchange near Sunset Terrace and at West Rosedale Street near Mistletoe Heights." Because of this inquiry secondary and cumulative effects are reviewed. In addition, an assessment has been made regarding the potential for secondary and/or cumulative effects to archaeological resources.



TCU/WESTCLIFFE PLANNING SECTOR
FUTURE LAND USE

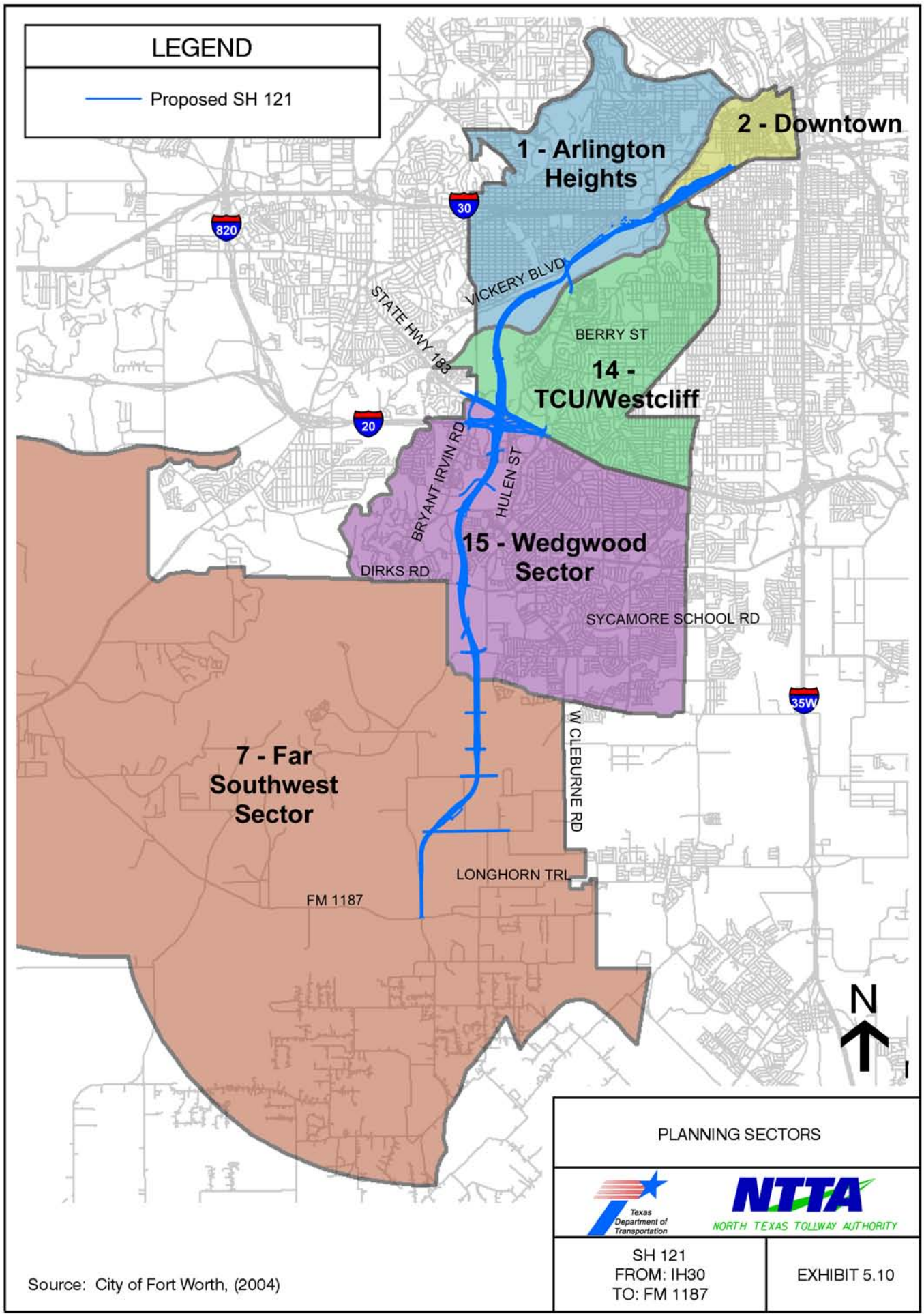
Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 5.9

Source: City of Fort Worth, (2004), accepted by City Council 02/11/04


LEGEND
Proposed SH 121
1 - Arlington Heights
2 - Downtown
14 - TCU/Westcliff
15 - Wedgwood Sector
7 - Far Southwest Sector
30
820
20
35W
VICKERY BLVD
STATE HWY 183
BERRY ST
BRYANT IRVIN RD
HULEN ST
DIRKS RD
SYCAMORE SCHOOL RD
W CLEBURNE RD
LONGHORN TRL
FM 1187
N
PLANNING SECTORS
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 5.10
Source: City of Fort Worth, (2004)

The City center of Fort Worth is located on bluffs overlooking the confluence of the Clear Fork of the Trinity River and West Fork of the Trinity River. Prior to the 1928 construction of the levee system along the Trinity River, the Clear Fork of the Trinity River floodplain was between one and three miles wide and therefore not conducive to settlement along much of its length.

The development of Fort Worth is linked to the history of transportation from the late 1800s until the present day. City founders aggressively sought railroads, which in turn spurred industrial development and attracted more rail carriers to link to Fort Worth. The railroad arrived in Fort Worth in 1876. Homes were located convenient to the first railroad to the City – the Texas and Pacific Railroad.

Following the arrival of the Texas and Pacific Railroad, Fort Worth's population and character underwent a steady alteration. The population grew from some 3,000 residents in 1876, to more than 23,000 in 1890. With seven railroads, the City was established as a major supply station for points west and as a center for cattle shipping to packing plants in the north and east.

Originally, the City was concentrated primarily along Commerce (formerly Rusk) Street, Weatherford Street, Houston Street and Main Street. At the time of the City's incorporation in the early 1870s, one-story brick and wood-frame buildings lined Commerce Street. Houses of the more prominent residents were set along the bluffs east of the Trinity River.

The proposed SH 121 roadway is located in an area that has historically held transportation facilities. Tarrant County and City transportation maps from 1890 to 1925 show that Lancaster Avenue and West Vickery Boulevard (formerly Granbury Street and Stove Foundry Road) were paved through downtown Fort Worth. About 1930, the UPRR tracks were moved southward slightly and the current Texas & Pacific Station on Lancaster Avenue was built. In 1949, SH 550 was constructed in this general area downtown and later upgraded and adopted into the interstate program in 1956 after the Eisenhower Interstate Program was signed into law. SH 550 is now known as IH 30.

St. Paul Lutheran Church was constructed in 1954 along SH 550 and its parking lot was built immediately south of the current Sunset Terrace neighborhood. During the reconstruction projects for IH 30, no property was acquired from St. Paul Lutheran Church, near the Sunset Terrace neighborhood, because at that time all added ROW is to the south side of IH 30.

Other changes in the area occurred with the reconstruction of IH 30. Rio Grande Place north of the interstate was realigned to "T" into a new section of frontage road that was built between Ballinger and Summit in 1987.

As a part of the IH 30/IH 35W reconstruction, which began in the late 1990s, Summit Avenue north of IH 30 was realigned to the east and additional frontage roads and road closures occurred. The Ballinger Street bridge over IH 30 was removed and access to the south and to the freeway was improved via the reconstructed Summit Avenue/Eighth Avenue interchange with IH 30.

The Quality Hill area developed in the 1890 to 1910 period. The entire area of housing development extended from the bluff over looking the Trinity River, in west downtown Fort Worth, to what is now the hospital district south of downtown. This development has been severely impacted by downtown and hospital development, urban decline and other projects over the past four decades.

The NRHP-eligible Sunset Terrace Historic District is located at the south westernmost edge of the Quality Hill area. The six houses between Daggett Avenue and Rio Grande Place were built between 1890 and 1910. Maps from the 1920s show that Sunset Terrace ended in a cul-de-sac and was referred to as Sunset Court. The lower (in elevation) lots, those closer to IH 30, never contained houses. The six NRHP-eligible historic houses sit well above IH 30, facing west and north, away from IH 30, amid trees that were probably planted when the homes were new.

Mistletoe Heights was one of the earliest subdivisions in Fort Worth. The now NRHP-eligible historic housing area was platted in 1890 and annexed to the City in 1909 and 1922. Building of houses in Mistletoe Heights began after World War I and by the late 1920s the area was densely developed. A stimulus to the growth of Mistletoe Heights and other early neighborhoods was a mass

transit system. Streetcar lines transecting the neighborhood connected such areas as TCU with the Fort Worth business district and caused the City to develop along a north south alignment of streetcar routes.

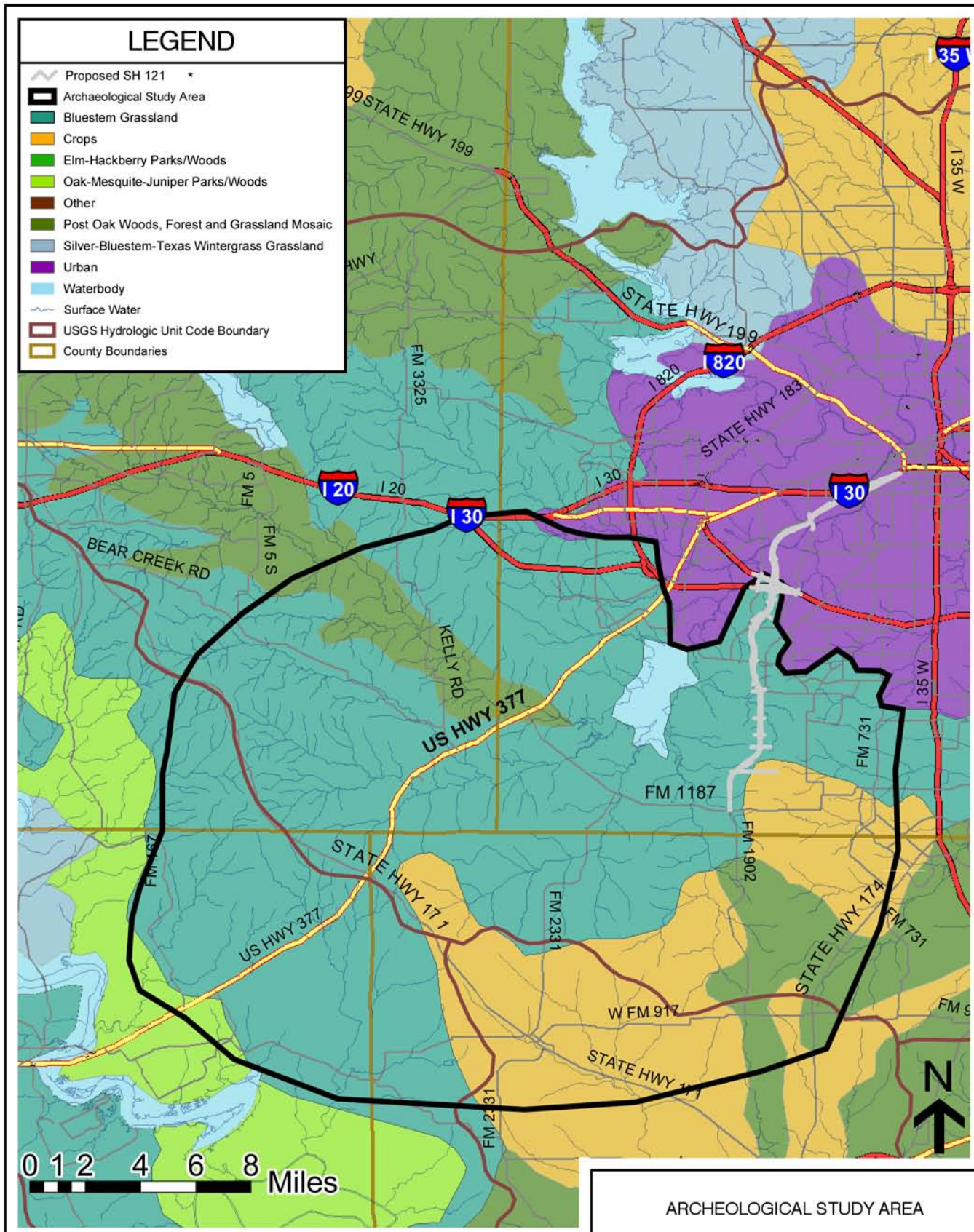
Mistletoe Heights is an example of near-downtown historic housing that survives intact today. The subdivision is located on both sides of Forest Park Boulevard, south of West Rosedale Street and the UPRR tracks. A small amount of neighborhood commercial development borders Mistletoe Heights to the north, at the intersection of West Rosedale Street and Forest Park Boulevard. Forest Park is a major thoroughfare and the fact that commercial development has not encroached along its length is a testament to the neighborhood cohesiveness of Mistletoe Heights.

Archeological Impacts

For the secondary and cumulative effects study, professional archaeologists identified large natural landforms to assist in establishing a study boundary. This process used vegetation regions as identified by Texas Parks and Wildlife Department's Vegetative Types of Texas.

The study area generally encompasses the middle part of the western Trinity Water Basin. The area is bordered on the north by urban Fort Worth and on the south by a line west of the Trinity/Brazos Water Basin boundary. The area encompasses the Silver bluestem-Texas wintergrass grassland in southwest Tarrant County (Exhibit 5.11).

Within this study area, all prehistoric archeological resources on file at the Texas Archeological Research Laboratory (TARL) were recorded by site type (lithic scatter, campsite, burned rock midden, etc.) and by spatial and temporal location. Many of the sites are not dateable due to a lack of diagnostic material. A site type review of prehistoric resources within the study area was accomplished based solely on the previously recorded information.



* STUDY AREA INCLUDES RESULTS OF RECORDS SEARCH OF PREVIOUSLY RECORDED SITES ONLY

Data Sources: Vegetation Area courtesy of Texas Parks & Wildlife Department; Hydrologic Unit Code Boundaries and Surface Water courtesy of United States Geological Survey; road network and political boundaries courtesy of Environmental Systems Research Institute (TM)

ARCHEOLOGICAL STUDY AREA

Texas Department of Transportation

NTTA NORTH TEXAS TOLLWAY AUTHORITY

SH 121
FROM: IH30
TO: FM 1187

EXHIBIT 5.11

Transportation

In the early 20th century, the electric interurban industry in Texas totaled nearly 500 mi, the second largest interurban mileage among the states west of the Mississippi River. The second line to be opened, in 1902, was operated by the Northern Texas Traction Company and ran 35 mi between Dallas and Fort Worth. Most of the Texas mileage was in place by 1913, as the industry grew rapidly during the early 1900s to fill the need for frequent passenger service between urban centers that could not be met by existing steam-railroad service. About 70 percent of the mileage was in the DFW area, where electric lines connected Fort Worth and Cleburne, Fort Worth and Dallas and Denison, Dallas, Corsicana and Waco. However, as the automobile became the favored mode of transportation, the interurban operations declined. By 1934, the DFW line was closed and by 1941 all lines in Texas had stopped operating.

Electric street railways played a central role in the development of Fort Worth. The streetcar was a visible part of the urban scene and during the age of electric traction, no city seemed complete without it. Until the family automobile became commonplace, the streetcar was an important mode of transportation. During the first half of the 20th century, electric street cars dominated the downtowns of the large Texas cities during rush hours. In Fort Worth, the radius of operation of the street railway governed the extent of urban development. Population growth followed the electric car lines.

The Federal Bureau of Public Roads was formed in 1916, recognizing the fact that the automobile was becoming increasingly important in the country and the Texas Highway Department was created in 1917. In November 1926, the American Association of SH Officials (AASHO) adopted the US highway numbered plan and the first official description of the approved US Highway 80 appeared in the US numbered log that AASHO printed in April 1927. US Highway 80 was designated through Fort Worth by AASHO as an important transcontinental highway. Thus, the City entered into the automobile era. Chapter 2.0, Purpose and Need provides additional historic information on transportation development in Fort Worth.

When SH 550 (the east-west expressway, later designated IH 20 and now IH 30) was constructed in the late 1940s and 1950s, it consisted of six lanes between University Drive and Henderson Street, three in each direction, with ramps and limited frontage roads. The following actions took place in subsequent years:

- In the mid–1970s, IH 30 was designated through downtown Fort Worth and IH 20 was re-routed across the south side of the Dallas–Fort Worth Metroplex to alleviate traffic congestion through the cities.
- In 1981, the FEIS was approved for the widening of IH 30 between IH 20 West and Summit Avenue. The project widened IH 30 from four to eight lanes between Camp Bowie Boulevard and University Drive and reconfigured ramps and roadway connections. The area from University Drive to IH 35W remained six lanes pending redesign from Summit Avenue to IH 35W.
- In 1991, the FEIS for the IH 30/IH 35W Interchange was approved. The project included the complete realignment of IH 30 to the south of the Old Post Office Building on West Lancaster Avenue. This realignment moved the roadway centerline a short distance farther south of the area of Sunset Terrace.

The DFW Metroplex is served by a system of trains, transit, highways and arterial streets. There are three major east-west highway connections – north, central and south of the region. In addition, commuter rail has been instituted between the cities with the Trinity Railway Express (TRE) and both Fort Worth and Dallas have transit systems.

The FWTA, known locally as “The T” began operations in 1984. FWTA currently schedules over 32 bus routes within the City and between Fort Worth and nearby cities.

Planning for the TRE began in 1984, when the assets of the bankrupt Rock Island Railroad were being sold. The cities of Dallas and Fort Worth bought 34 mi of Rock Island mainline between the two cities for $34 million (using 80 percent Federal funds, 13 percent State funds and seven percent City funds) with the long-term goal of starting a commuter service. The TRE project remained a low priority project until 1994, when the DART and FWTA began to work on intercity rail. The TRE links downtown Dallas’ Union Station with Fort Worth’s Texas and Pacific (T&P) Station via several intermediate suburban stations.

Automobile traffic has consistently increased in Fort Worth. Table 5-33 shows Annual Average Daily Traffic (AADT) counts near the recommended project since 1966, the first year for which data is available in TxDOT Fort Worth District records. All area roadways have continued to increase in traffic due to increases in population and the need for City expansion.

Table 5-33 – Annual Average Daily Traffic

Location	1966	1976	1986	1996	2004	Average Change per Year
IH 30 Downtown	55,890	82,830	102,000	118,000	136,000	6.24%
IH 30 at SH 183	27,690	45,230	61,000	76,000	96,000	8.89%
Southwest Blvd/SH 183	15,540	22,950	27,000	28,000	32,000	5.28%
IH 20 W of US 377	17,850	33,710	70,000	89,000	133,000	19.11%
IH 20 E of US 377*	N/A	N/A	35,000	61,000	77,000	11.58%
US 377 N of IH 20	12,700	16,830	17,600	15,300	15,300	3.09%
US 377 S of IH 20	4,240	8,090	15,900	21,000	28,000	16.93%
McCart Road S of IH 20	5,510	13,580	18,100	16,700	22,000	10.24%
IH 35W S of IH 30	26,350	46,730	76,000	125,000	133,000	12.94%

Source: TxDOT
***** *Data for 1986 is from first year open, 1982.*

Water Resources Impacts

The recommended project is located in the Clear Fork of the Trinity River watershed, which includes the Clear Fork of the Trinity River, Benbrook Lake and their associated tributaries. The City constructed the original levees along the Clear Fork of the Trinity River in 1928. According to the History of the Fort Worth District Corps of Engineers, 1950-1975, Benbrook Lake was under construction when the May 1949 flood hit, devastating downtown Fort Worth. Construction on the Benbrook Lake dam was completed in 1952, along with the downstream channel improvements and repairs to the levees along the Clear Fork of the Trinity River. Today, the Clear Fork of the Trinity River from IH 20 downstream to its confluence with the West Fork is an earthen trapezoidal channel. The 100-year floodplain is confined to this channel in most locations and is often referred to as the Trinity Floodway. The USACE considers the Trinity Floodway to be everything between the tops of the levees on either side of the river. Since 1954, the TRWD has maintained the Trinity Floodway for the USACE.

Waters of the United States were estimated remotely using current available data, which included 1995 aerial photographs, U.S. Department of the Interior, Fish and Wildlife Services (FWS) NWI maps and United States Geological Service (USGS) topographic maps, within a one-mile corridor along the proposed ROW for each alternative. Because of recent construction within the area south of West Vickery Boulevard, 2001 aerial photographs were used to estimate that these areas had not been filled.

Land use and its effects on wetlands and waters vary throughout the corridor. The proposed SH 121 roadway passes through developed land between Summit Avenue and Hulen Street. Between West Vickery Boulevard and Altamesa/Dirks Road, the proposed roadway area is an undeveloped corridor. On either side of the corridor, a substantial amount of commercial and residential development has been established since the mid 1960s. The area within the corridor has been left undisturbed in some areas and fill material has been stockpiled in others. Multiple wetland areas and streams are present in this area, all of which have been modified or indirectly impacted by previous development, erosion and sedimentation and/or land moving activities.

South of Altamesa/Dirks Road, the land is primarily rangeland where jurisdictional waters have not been as greatly modified as they have been in other areas. A well-developed system of streams and ponds exist within this area, the majority of which drain into Lake Benbrook. Unlike other areas within the roadway corridor, commercial and residential development is minimal. However, new housing developments have been built east of the proposed SH 121 ROW and the rate of development has been increasing.

The alignment of each alternative was overlaid on a scanned copy of the current effective Flood Insurance Rate Map (FIRM) for Tarrant County. Interviews were conducted with the City of Fort Worth Floodplain Management staff and the USACE Hydrology and Hydraulics staff. These two agencies maintain the latest information on the floodplain in the project area. It has been determined that there would be no encroachments of the Clear Fork of the Trinity River floodplain from the proposed SH 121 tollroad.

Biological Impacts

Species habitats were investigated within a one-mile corridor along the proposed ROW for SH 121 and are identified in Table 5-25. Habitat requirements vary greatly among species. All require food, water, cover and space, but not in the same amount or type. Many species are territorial and have genetically dependent predetermined spatial requirements for nesting or raising their young, seasonal food requirements or cover and water availability. As the habitat becomes fragmented or experiences degradation it may no longer provide these functions to support certain species. Those species would then be forced to find alternative and possibly less productive habitat or may be displaced to other areas. Species habitat exists in the project corridor for raccoon, beaver, coyote, nutria, ducks, opossum, eastern cottontail, skunk, copperhead, cottonmouth and rattlesnakes.

Park, Open Space and Recreation Impacts

In 1988, the NCTCOG and the USACE recognized that multiple requests for permits to develop in the Trinity River floodplain were being received. NCTCOG brought together member cities and counties to consider and pass the *Resolution for a Joint Corridor Development Certificate Process*. This process indicated recognition of the importance of the Trinity River floodplain and, among other things, led to the development of today's integrated and extensive system of trails and parks.

The Trinity River parks and trails system is a major facility in Fort Worth that was created partly with Federal transportation funds. Bicycle and pedestrian trails in the system link every quadrant of the City and are well used for both recreation and transportation. The trail system is a part of the veloweb, a bicycle transportation system.

Five roadway bridges currently cross the Clear Fork of the Trinity River between Trinity Park, adjacent to downtown Fort Worth and SH 183. Included are bridges of IH 30, University Drive, Rogers Road, Hulen Street and Bryant Irvin Road.

Air Quality

Discussions of direct air quality impacts are found in Section 5.10, Air Quality Impacts.

Noise

The traffic noise associated with the proposed action and all other noise sources associated with known past, present and reasonably foreseeable future actions were examined to determine their likely cumulative effects on the human environment in the study area.

An analysis of the study area indicated that traffic noise has been, is and would continue to be the primary/dominant source of noise in frequently used human outdoor activity areas.

The traffic noise analysis for the proposed action determined where noise impacts would occur and where noise abatement would likely be feasible and reasonable. The analysis included a prediction of future noise levels that were derived, in part, from future increases in traffic due to both existing land uses and future development likely to occur in the study area. No other known past, present or future actions are expected to substantially affect the overall noise environment. Traffic noise impacts are discussed in Section 5.11, Noise Impacts.

5.27.3. Anticipated Secondary and Cumulative Effects

It should be noted that this section discusses the anticipated secondary and cumulative effects of the proposed SH 121. For a discussion of direct impacts refer to Sections 5.1 through 5.24.

Secondary effects to the natural and cultural environment are those effects that are reasonably foreseeable and have a cause-and-effect relationship with a proposed action. Secondary effects can include changes in land use, water quality, economic vitality and population density.

Cumulative effects are the incremental consequences of the proposed action when considered along with other past and reasonably foreseeable future actions. The cumulative effects of an action may

be undetectable when viewed in the individual context of direct and even secondary effects, but nonetheless can add to other disturbances and eventually lead to a measurable environmental change.

In considering secondary and cumulative effects for proposed SH 121, it is important to recognize the following aspects of the project area.

- The northern portion of the project would be within a traditional transportation corridor: since the 1940s, the vicinity of IH 30 and West Vickery Boulevard has contained a major roadway and since the 1870s, the corridor has contained railroad track and facilities.
- The southern portion of the facility would be located in vacant land, some of which abuts land that developed relatively recently and is still developing. The Clear Fork of the Trinity River, the absence of transportation facilities to the area and the lack of sewage facilities combined to keep southwest Fort Worth from annexing and developing the area until the mid-1960s. Since transportation facilities made the area available, growth in the southwest quadrant of the City has been rapid.
- Other factors that have improved accessibility to the southwest quadrant of Fort Worth include the laying of sewerage pipes and major water projects, such as the construction of Lake Benbrook and the construction of the levee system.

Economic Effects

Continued urbanization of the proposed SH 121 area south of West Vickery Boulevard is anticipated, guided by the *Fort Worth Comprehensive Plan*. The secondary and cumulative effects from development within the corridor could be both beneficial and adverse. Beneficial effects include new economic opportunities, housing alternatives, employment, services, tax growth and recreational resources. As development occurs, the need for additional infrastructure and services (transportation, utilities, fire, police and emergency medical services) would increase. Efforts to minimize adverse effects of suburbanization, which are already well underway, are subject to the existing land use and development controls of the local jurisdictions, as well as State and Federal regulation, throughout the study area. Economic benefits as described in section 5.6 could offset the additional infrastructure costs due to development. Potentially adverse cumulative effects include the loss of habitat, the potential for water quality effects and the conversion of agricultural land associated with the continued suburbanization within the recommended project area. The proposed SH 121 corridor has been under consideration as a roadway for over 60 years.

Where existing businesses would not be displaced, accessibility and visibility should not be impaired by the proposed SH 121. Therefore, no cumulative or secondary effects are anticipated to commercial concerns. Discussions of direct economic impacts are found in Section 5.7, Economic Impacts.

Social Effects

The neighborhoods that would be adjacent or near the recommended project range from early 20th century homes that pre-date IH 30 (and its predecessor, SH 550), to subdivisions built since 1985. Exhibit 5.8 shows the locations of these neighborhoods. Discussions of direct social effects impacts are found in Section 5.4, Social Impacts.

Alamo Heights and Sunset Heights South Neighborhoods

The homes in these neighborhoods are located north of West Vickery Boulevard behind commercial property. The proposed SH 121 would displace a number of commercial buildings on the south side of West Vickery Boulevard but those on the north would remain in place. The only access points to West Vickery Boulevard from the proposed SH 121 would be at Montgomery Street and south of the railyards at Stonegate Boulevard and Hulen Street. Such indirect access would lessen the likelihood of secondary development along, or redevelopment of, West Vickery Boulevard. The neighborhoods would remain behind the row of commercial buildings between West Vickery Boulevard and IH 30, somewhat protected from the existing transportation corridor through which the proposed SH 121 would pass.

These two neighborhoods have been adjacent to a transportation corridor since they were built. Both the UPRR and West Vickery Boulevard have historically been adjacent to the neighborhoods. With the lack of direct access, no cumulative effects are anticipated to the neighborhoods.

Como Neighborhood

West Vickery Boulevard is the southern boundary for the Como neighborhood. In this area, there are no commercial buildings along the south side of the street and few on the north side. The proposed SH 121 would be located approximately 900 ft from the Como neighborhood, beyond the traditional transportation corridor formed by West Vickery Boulevard and the UPRR yard. There would be no access from proposed SH 121 near the neighborhood.

Because of the distance from and the lack of direct access to the proposed SH 121 and the intervening transportation corridor formed by West Vickery Boulevard and the UPRR yard, no secondary or cumulative effects are anticipated to the Como neighborhood.

Overton Woods Neighborhood

The vacant land that now provides the Overton Woods neighborhood's western border (adjacent to SH 121 proposed ROW) is zoned for future residential development. Fort Worth City-planned roadways in the area include Arborlawn Boulevard and Bellaire Drive extension. These roadways are proposed for construction with or without the proposed SH 121, to allow development of the now-vacant area. In addition, a buffer of approximately 80 ft is proposed for either side of the proposed facility in this area. Therefore, secondary effects to the neighborhood would not be attributable to the proposed SH 121 tollroad. Cumulative effects would consist of additional residential housing construction adjacent to the existing housing, which is consistent with past actions. The future zoning of the now-vacant land is the prerogative of the local government and was agreed upon by the City and neighborhood representatives on February 11, 2004 (Exhibit 5.8 and Exhibit 5.9) with independent utility.

Hulen Bend Estates, Park Palisades, Quail Ridge Estates and Quail Ridge Estates – Phase II Neighborhoods

These four neighborhood developments share similar characteristics and a similar history with respect to the proposed SH 121. All four neighborhoods were constructed during the time of City

planning and public meetings for SH 121. The NCTCOG's *Southwest Fort Worth Subarea Study: Evaluation of Transportation Alternatives* was completed in January 1984. Subsequently, the alignment and tentative ROW lines were created through this area by a cooperative effort of the Fort Worth Planning Department, TxDOT and planners for the abutting property owners. City Council meetings and Public Hearings/meetings have been held repeatedly on the recommended project since that time, always showing a freeway in the approximate location of the recommended project.

The proposed SH 121 would pass in a now-vacant area adjacent to all four neighborhoods. These neighborhoods were built after public knowledge of the proposed tollroad, as evidenced by the fact that they are oriented away from the project corridor and each neighborhood was developed "inward" from the edge of the recommended project's potential ROW line. Secondary and cumulative effects would consist of additional residential housing, with some commercial development nearest the project corridor. Such changes would be consistent with existing development, as represented by the four neighborhood developments.

Land Use

Future land use changes near the recommended project area would occur, for the most part, with or without construction of SH 121 and show a continuation of past trends, according to maps in the *Fort Worth Comprehensive Plan*. The now-vacant area between Bryant Irvin Road and Hulen Street would likely develop in the same manner as the remainder of the corridor has developed, with or without the construction of the proposed SH 121. The proposed SH 121 and roadways to be constructed by others were taken into consideration in the development of the *Fort Worth Comprehensive Plan.* Fort Worth planning sectors are used to describe future land use (Exhibit 5.10). Discussions of direct land use impacts are found in Section 5.1, Land Use Impacts.

Sector 1 – Arlington Heights Planning Sector

The area of Sector 1 between the railroad and Clear Fork of the Trinity River and now privately held vacant land, is proposed to be a Mixed-Use Growth Center. During the 2000 planning process of the *Fort Worth Comprehensive Plan*, participants expressed a strong preference for multiple growth

center development pattern. The multiple growth centers concept promotes compact urban land use within designated areas and lower intensities of land use elsewhere" in the City (Exhibit 5.12). Multiple growth centers have since formally been designated Mixed-Use Growth Centers. Stonegate Boulevard and the Bellaire Drive extension, to be built by others between Hulen Street and Bryant Irvin Road north of SH 183, would generate development even if the proposed SH 121 were not built. This would be a continuation of the existing trend near Hulen Street and Bryant Irvin Road where other cross streets have been constructed.

The previously mentioned FWBG is in the Arlington Heights Planning Sector. No secondary or cumulative effects to the FWBG could be attributed to the proposed SH 121 because:

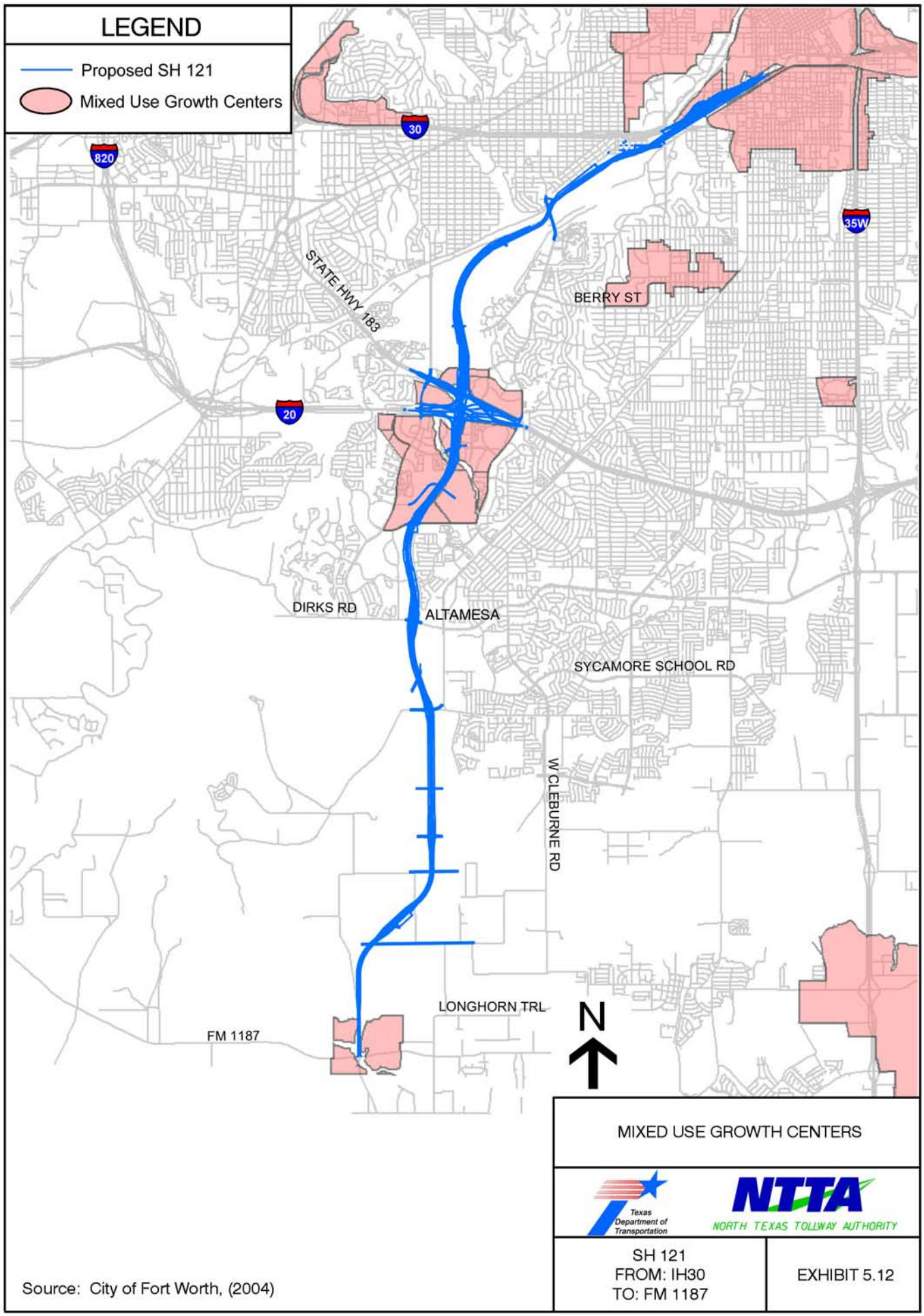
- IH 30 is immediately adjacent to the FWBG property and would be the only recognizable source of traffic noise, along with University Drive.
- IH 30 would act as a physical buffer between the FWBG and the proposed SH 121.
- The FWBG lies 650 ft from the proposed SH 121 with IH 30 and several multi-story buildings located between the proposed tollroad and IH 30.

Sector 2 – Downtown Planning Sector

There are no changes between current and proposed future land use for the Downtown Planning Sector. The area would remain primarily a Mixed-Use Growth Center. Currently, mixed-use development can be seen throughout the area, with a resurgence of downtown apartments and neighborhood commercial development. Therefore, the proposed SH 121 would have no secondary or cumulative effect on land use within this sector.

Sector 7 – Far Southwest Planning Sector

As stated previously, the City proposes a policy of promoting Mixed-Use Growth Centers. Such a commercial and high-density residential development is proposed at the intersection of the proposed SH 121 controlled-access tollroad and FM 1187. This Mixed-Use Growth Center might not be located at the specifically proposed location without the proposed SH 121, but would likely be built in the vicinity along FM 1187.


LEGEND
Proposed SH 121
Mixed Use Growth Centers
30
820
35W
20
STATE HWY 183
BERRY ST
DIRKS RD
ALTAMESA
SYCAMORE SCHOOL RD
W CLEBURNE RD
LONGHORN TRL
FM 1187
N
MIXED USE GROWTH CENTERS
Texas Department of Transportation
NTTA
NORTH TEXAS TOLLWAY AUTHORITY
SH 121
FROM: IH30
TO: FM 1187
EXHIBIT 5.12
Source: City of Fort Worth, (2004)

The City future land use policies for Sector 7 include:

- Promoting commercial and multifamily development within the SH 121/FM 1187 Mixed-Use Growth Center
- Encouraging orderly growth in the ETJ
- Acknowledging that any existing agricultural uses are subject to change when City utilities are available based on the City's expectations for rapid urban development
- Encouraging major employers, retail and high density residential to locate at or near proposed transit stops and entryways to SH 121
- Encouraging low-density development between entryways to SH 121

The SH 121 area in this sector, to FM 1187, is planned by the City to be a continuation of the existing trend of growth to the southwest. South of FM 1187, the proposed land use is residential and open space.

The growth north of FM 1187 can already be seen in new housing developments, primarily along north south streets south of Altamesa/Dirks Road and in preliminary development and park plats shown in Exhibit 4.6. The extension of Hulen Street and Bryant Irvin Road, south to FM 1187, is planned for implementation by the City. Cross streets are proposed in the *Fort Worth Thoroughfare Plan*, as shown in Exhibit 3.2 through Exhibit 3.5. South of FM 1187, the proposed SH 121 between FM 1187 and Cleburne would be constructed with or without the construction of SH 121 between IH 30 and FM 1187.

Just as the area between Bryant Irvin Road and Hulen Street has developed into a mixed-use area north of Altamesa/Dirks Road, so would the area south of Altamesa/Dirks Road develop. Therefore, the proposed SH 121 would have no secondary or cumulative effect on land use in this sector, north of FM 1187, with the exception of the location of the planned Mixed-Use Growth Center on FM 1187.

The planned construction of SH 121 south of FM 1187 is for a controlled access roadway with interchanges. This roadway, primarily in Johnson County, would produce planned development, primarily at the interchanges of local roads and SH 121, whether or not SH 121 in Tarrant County is built.

Sector 14 – TCU/Westcliff Planning Sector

The area of land bounded SH 183, the Arlington Heights Planning Sector, Bryant Irvin Road and Hulen Street is planned to develop as shown in Exhibit 5.9. Future land use for the area between West Vickery Boulevard and SH 183 has been the topic of discussion between the City and the Overton Woods Neighborhood Association and agreement has been reached regarding the matter. The City passed a new land use plan specifically for the now-vacant land adjacent to Overton Woods on February 11, 2004. Exhibit 5.9 shows these land use categories.

The proposed extensions of Bellaire Drive and/or Arborlawn Drive and of Stonegate Boulevard would allow for development of the now-vacant corridor between Bryant Irvin Road and Hulen Street without the construction of SH 121. This would be a continuation of the existing trend between Hulen Street and Bryant Irvin Road where other cross streets have been constructed in the Wedgewood Sector. Therefore, no cause and effect relationship exists between the proposed SH 121 and development by others and the proposed tollroad would have no cumulative or secondary effect on land use in this sector.

Potential secondary and cumulative effects were considered for Fort Worth Country Day School, located on Bryant Irvin Road. In terms of direct effects, the potential noise impacts would be abated by construction of a noise wall. Secondary and cumulative effects would be minimal because local roadways and commercial development, both existing and proposed, currently surround the campus.

Sector 15 – Wedgwood Planning Sector

The Wedgwood Sector was rated by the City as one of three sectors having the greatest population growth between 1990 and 2000. The future City land use plan calls for the continuation of this trend with an emphasis on continuing to promote commercial and multifamily development within the existing Hulen/Cityview Mixed-Use Growth Center, which is bounded by Bryant Irvin Road, SH 183, Hulen Street and Oakmont Boulevard. Single-family residential would remain the predominant land use, although a new area of general commercial and high density residential is planned for the proposed Sycamore School Road extension/SH 121 interchange. This development would be

relocated along another major north-south street, south of Altamesa/Dirks Road, if the proposed SH 121 project were not a part of the plan. The proposed SH 121 project was taken into consideration in the development of the current land use plan. For these reasons no secondary or cumulative effects are anticipated with the proposed construction of SH 121.

Historic Impacts

The NRHP-eligible Sunset Terrace and Mistletoe Heights Historic Districts are located at the northern end of the proposed SH 121. Both neighborhoods are adjacent to an existing transportation corridor. The corridor includes the UPRR, IH 30 and West Vickery Boulevard.

The NRHP-eligible Sunset Terrace Historic District, comprised of six houses, is bounded by non-historic development on all sides. Commercial development north of the park has gradually displaced single-family residences. Commercial development is directly east of the district. Parking lots and IH 30 are directly to the south. To the west is the edge of the bluff over the Trinity River floodplain. The NRHP-eligible Sunset Terrace Historic District is an isolated example of early 20th century housing that once dominated the bluff of the Trinity River floodplain.

Downtown expansion was the first element to separate the NRHP-eligible Sunset Terrace Historic District from other residential areas that once extended to the east, north and south. A railroad yard dominated the landscape to the east of the City and the older Stockyard area was located in the Trinity River floodplain to the north. Downtown therefore expanded west and south, along the bluff above the floodplain and eventually into the floodplain. Many of the old houses in the large area called Quality Hill were razed for expansion of the downtown area, which continues to this day.

A second intrusion into the NRHP-eligible Sunset Terrace Historic District area was the construction of SH 550 in the 1940s. The ROW that was needed for the roadway came from the southern end of Sunset Terrace, known as Sunset Court. Historic maps indicate that no homes had ever been constructed on Sunset Court.

Reconstruction of IH 30 in the 1990s was to the south of St. Paul Lutheran Church. The church and parking lot provided a buffer for the NRHP-eligible Sunset Terrace Historic District from encroachment by IH 30. IH 30 was widened between IH 820 West and University Drive and the IH 30/IH 35W interchange was reconstructed from IH 35W to Summit Avenue. In both cases, the property line of St. Paul Lutheran Church was held and construction occurred to the south and east of the NRHP-eligible Sunset Terrace Historic District.

Less intrusive elements adjacent to the NRHP-eligible Sunset Terrace Historic District include the previously mentioned church and the Indian Hill Apartments (circa [ca] 1980). St. Paul Lutheran Church and its parking lot, which is at the southern end of Sunset Terrace, were built in 1954 on sloping land south and southwest of the Sunset Terrace Historic District. The Indian Hill Apartments are located immediately south of and between the NRHP-eligible Sunset Terrace Historic District and the parking lot for St. Paul Lutheran Church. Daggett Avenue bounds the southernmost historic house on Sunset Terrace on the south. Across Daggett Avenue from that house is a parking lot, which has a short wall between Daggett Avenue and the parking lot.

With respect to the potential for secondary development, the proposed SH 121 would increase the number of highway and frontage road lanes in the vicinity of Sunset Terrace and would extend the IH 30 northern frontage road across the north-south FWWRR and connect to Forest Park Boulevard. Forest Park and Summit Avenue form a split diamond interchange on IH 30. ROW for the revised design would require a triangle 460 ft long by 27 ft at the base from St. Paul Lutheran Church parking lot. However, the small amount of ROW needed would only reduce the number of parking spaces by four and therefore would not compromise the continued viability of the church or the buffer provided to homes on Sunset Terrace and would not contribute to secondary and cumulative effects.

Future traffic numbers on IH 30 and the frontage road adjacent to St. Paul Lutheran Church are shown in Table 3-5. The frontage road would not end at the railroad track as it now does, but would rather bridge over the FWWRR to Forest Park Boulevard. The resulting split-diamond interchange with Summit Avenue would increase traffic on the frontage road.

Light intrusion and glare have increased for the houses on Sunset Terrace since the 1950s because of downtown expansion, development in the Clear Fork of the Trinity River floodplain and construction and widening of IH 30. Currently, there are two high-mast carousel luminares placed during the reconstruction of the IH 30/IH 35W interchange. These masts would be removed with project implementation and replaced with low-mast lighting. Directional hoods, or similar device, would be used to minimize light intrusion in to the surrounding area. No high-mast lamps would be used for the proposed SH 121. Therefore, the current situation would be improved with project implementation and no secondary or cumulative effects would be realized from light spill, light intrusion, or glare.

The original IH 30 was constructed to the north of the Mistletoe Heights Historic District. IH 30 is below the grade of and north of, the UPRR tracks, West Rosedale Street and West Vickery Boulevard. A separate project created flyover ramps to connect West Rosedale Street to IH 30. These ramps are above the grade of the UPRR and slightly northwest of the NRHP-eligible Mistletoe Heights Historic District. An earth berm was constructed and landscaped to shield the neighborhood from the noise and visual intrusion of the West Rosedale Street ramps, which would not be changed in location with the proposed roadway. This berm would continue to shield the majority of the adjacent houses from the proposed construction of SH 121. In addition, a noise wall was placed along West Rosedale Street to protect the houses nearest the street from increased traffic noise. The proposed SH 121 roadway would be at grade, below Mistletoe Heights and north of the UPRR.

Table 3-5 demonstrates that traffic along Forest Park Boulevard south of West Rosedale Street, through the NRHP-eligible Mistletoe Heights Historic District, would be lessened with implementation of SH 121. Daily traffic on Forest Park Boulevard would be less in future years with any of the SH 121 alternatives.

Cumulative adverse effects to the NRHP-eligible Mistletoe Heights Historic District would not result from streetlights, vehicle lights, or glare because:

- Virtually all of the NRHP-eligible Mistletoe Heights Historic District is now and would

continue to be well shielded from highway lighting because the proposed SH 121 is below the grade of the bluff.

- Lights from the shopping areas and restaurants on University Drive are the brightest lights in view.
- Virtually none of the houses in the district have a view of any transportation corridor now, nor would they if the proposed SH 121 is constructed.

The proposed development along IH 30 and SH 121 along with the placement of an electrical substation – both to the north and beyond the historic railroad track and below the grade of the subdivision, while contributing to light intrusion to one house within the NRHP-eligible historic district, would not contribute to glare. These elements would be considered intrusions if they were within the NRHP-eligible Mistletoe Heights Historic District. However, because they lie beyond the bluff and within a traditional transportation corridor, they simply serve as the historic northern boundary of the neighborhood. Discussions of direct historic impacts are found in Section 5.21, Historic Resources Impact.

Archaeological Impacts

The results of the archaeological study indicate that no uniquely substantial prehistoric settlement patterns are extant outside of the proposed ROW and within the study area for the SCEA, based on previously recorded information available. Most of the recorded sites consist of lithic scatters and open campsites with little, no, or undetermined depth. Therefore, potential secondary and cumulative effects of the subject project would not affect the archeological profile of the study area based on recorded information currently available.

Presumably, unrecorded archeological sites do exist within the study area. There are safeguards in place to help preserve archeological sites at the City, County, State and Federal levels. Current regulatory constraints would serve to evaluate unknown cultural resources that may be inadvertently affected by the SH 121 project. Discussions of direct archeological impacts are found in Chapter 5.21, Historic Resources Impact.

Transportation

The proposed SH 121 would alter travel patterns and volumes. An analysis of historic and current traffic and traffic projections for 2025 was performed to create a trend line. In this way, anticipated traffic increases can be assessed, as can the ripple effect of the traffic changes. Table 3-5 shows traffic forecasts for selected sites in southwest Fort Worth under each alternative scenario.

Future development, which is anticipated with or without the construction of SH 121, would further overburden major highways and arterials. Therefore, no secondary or cumulative effects due to traffic are anticipated with project implementation. Discussions of direct transportation impacts are found in Section 5.27.2, Existing Secondary and Cumulative Effects Analysis Environment

Water Resources Impacts

Water resources are renewable natural resources as long as human requirements are sustainable. When human requirements exceed the ability of the resource to renew, there could be shortage of water and devaluation of water resources functions. The City and the TRWD have worked to insure that planned growth is sustainable with respect to water resources. The proposed planned project and associated development, has been a part of this planning.

With respect to secondary and cumulative effects, proposed SH 121 could potentially affect surface waters of the State as the SH 121 would improve access to now-undeveloped land. As stated previously, development in the area of SH 121 would occur regardless of project implementation with the exception of the planned Mixed-Use Growth Center at the intersection of SH 121 and FM 1187.

The proposed SH 121 would also cross tributaries, south of IH 20 that drain into the eastern portion of Lake Benbrook. Soil erosion during tollroad construction and increased urban development could contribute to accelerated eutrophication of Lake Benbrook. Increased sediment and nutrient transport to the lake would likely result from the on-going private urbanization of the watershed. Urbanization of the watershed is likely even without the proposed SH 121 project.

The alignment of each alternative was overlaid on a scanned copy of the current effective FIRM for Tarrant County. Interviews were conducted with the City of Fort Worth Floodplain Management staff and the USACE Hydrology and Hydraulics staff. These two agencies maintain the latest information on the floodplain in the project area. As the local floodplain administrator for the entire PSC, the City determines whether a Conditional Letter of Map Revision (CLOMR) is required for each potential crossing by the proposed SH 121 and they would review and approve any CLOMR and Letter of Map Revision (LOMR) prior to sending them to FEMA, as well as Corridor Development Certificate (CDC) applications. There would be no encroachments of the Clear Fork of the Trinity River floodplain from the proposed SH 121 tollroad. Therefore, although it is possible that certain types of land use could potentially convert permeable land to non-permeable land, thus increasing runoff, it is anticipated that there would be no secondary or cumulative effects on floodplains from the implementation of SH 121.

A one-mile corridor, centered on the proposed SH 121 tollroad, was delineated for potential waters of the United States and wetland effects that might occur secondary to the proposed SH 121. Potential cumulative effects have also been assessed within this area. Any such cumulative effects could occur as the southwest area of Fort Worth grows, with or without the proposed SH 121. The *City of Fort Worth Thoroughfare Plan* indicates that local roadways, as shown in Exhibit 3.3 through Exhibit 3.6, would open the area to development, a trend that is already occurring elsewhere in this quadrant of Fort Worth.

Secondary effects to waters of the United States would potentially be greatest within the Far Southwest Planning Sector. With any loss in waters of the United States, primarily with functioning wetlands, there could be a loss in water quality and habitat that would be reflected downstream and within the watershed that may or may not be immediately noticeable. Trends in development to the north however indicate that this area would eventually be developed whether the proposed SH 121 is constructed or not. Current USACE regulations would apply to any development in waters of the United States and USACE policy requires “no net loss” of wetland acreage. In addition, with regard to new private construction, the City’s Neighborhood and Community Park Dedication Policy provides for the dedication of new parks in large developments. The current trend is for the

developer to provide this park around an existing creek or pond, land that is less usable for development. This policy would provide protection for existing wetlands and waters as the rural area develops. New plats on file with the City show such planned linear parks.

In summary, with respect to waters of the United States, cumulative and secondary effects that would have a distinct cause and effect relationship with proposed SH 121 would not occur if the project were implemented because the area is currently developing and would continue to develop without the proposed SH 121 and the USACE policy requires replacement of any wetlands or compensatory mitigation for loss of waters of the United States that might be impacted by public or private development. Discussions of direct water resources impacts are found in Section 5.12, Water Quality Impacts.

Biological Impacts

The habitat abutting could be suitable for brief use (i.e., feeding and resting) by migratory birds. It is unlikely that any of these species currently use the area for an extended period (i.e., nesting or lengthy roosting). The species within and surrounding the project area are primarily small generalist mammals, amphibians, reptiles and birds that adapt easily to human-altered or urban environments. A wide variety of birds including raptors, wading birds and songbirds utilize this area as both residents and migrantrs. These species are tolerant of the current conditions and would relocate to areas adjacent to the project area and within the larger area in southwest Tarrant County. Removal of wetland/waters of the United States within the habitat because of secondary development would reduce the number of brief use areas, but given the nature of the habitat and the infrequent use, the effect of the proposed SH 121 would not constitute a negative secondary or cumulative effect. Discussions of direct biological impacts are found in Section 5.20, Trees, Vegetation and Wildlife Habitat.

Park, Open Space and Recreation Impacts

The proposed SH 121 would cross the Clear Fork of the Trinity River on two separate bridges near University Drive. SH 121 eastbound and westbound vehicles would each cross the river on separate bridges and West Vickery Boulevard traffic would cross the river on another bridge.

The recommended project would also cross the Clear Fork of the Trinity River between Hulen Street and Bryant Irvin Road within an undeveloped area. The undeveloped area is currently held in private ownership, which would develop whether or not SH 121 is built. The area is zoned for future residential and commercial uses.

The Parks and Community Services department of the City manages the Trinity River system of trails and parks. The existing system of trails was constructed from 1988 to 1995 through downtown Fort Worth and its suburbs as an urban transportation and recreation facility, although parts of the system date much earlier. As such, the proposed SH 121 bridges over the Clear Fork of the Trinity River would not add cumulatively to effects to the system because the system was developed for an urban/suburban setting. Secondary effects are not anticipated because the trails are located on land controlled by the TRWD and are thus protected from development. Discussions of direct park, open space and recreation impacts are found in Section 5.9, Section 4(f) Impacts.

Air Quality

Population growth and growth in VMT affect air quality from non-point sources, such as automobiles. Cumulative effects, if any, would therefore be beneficial in that the tollroad would help in the region's attainment of the NAAQS. Discussions of direct air quality impacts are found in Section 5.10, Air Quality Impacts.

Noise

The highway traffic noise associated with the proposed action and all other noise sources associated with past, present and reasonably foreseeable future actions were examined to determine their likely cumulative effects on the human environment in the study area.

In this examination, primary consideration was given to the potential additive effects of the various sources of noise within the study area. This requires a basic understanding of the objective measurement of sound energy and the subjective human perception of sound energy.

Sound energy spans a large dynamic range and any associated calculations in units of pressure would involve cumbersome astronomical numbers. Therefore, in order to simplify the process, sound energy is commonly measured on a relative scale of sound pressure levels expressed in dB. However, because a dB is a simple representation of a much larger value of sound pressure, noise levels (dB) for various sources of sound energy cannot be added by simple mathematical methods.

For example: Please refer to Table 5-34, if two identical dishwashers which would produce 50 dB each were simply added together, one would anticipate the resulting noise level to be 100 dB. However, because sound energy does not accumulate arithmetically, the anticipated result is not correct -- two dishwashers would not produce sound energy equivalent to a pneumatic hammer or a subway train. The sound energy from these two dishwashers would actually combine to produce a noise level of only 53 dB. In fact, combining any two sources of equal sound energy/noise levels will increase the overall noise level by only 3 dB.

The term “loudness” is used to describe the human perception of sound energy/noise levels and is based on a subjective comparison of different sounds under controlled laboratory conditions. The “subjective” human perception of the loudness of noise levels is not directly related to the “objective” measurement of sound energy.

Table 5-34 – Common Sound/Noise Levels

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

For example: Although an increase of 3 dB equates to a doubling of the sound energy; in terms of loudness, an increase of 3 dB is only barely perceptible to the human ear. In fact, the total sound energy would have to increase by 10 dB before the human ear would perceive it as doubling the loudness.

A review of the study area indicated that highway traffic noise has been, is and would continue to be the primary/dominant source of noise in frequently used human activity areas. The traffic noise analysis for the proposed action determined where noise impacts would occur and where noise abatement would likely be feasible and reasonable. The analysis included a prediction of future noise levels that were derived, in part, from future increases in highway traffic due to both existing land uses and future development likely to occur in the study area. No other past, present or future actions in the study area would likely produce sound energy greater than that produced by highway traffic noise and, therefore, resultant/cumulative noise levels would not be expected to increase by more than 3 dB -- would not be expected to increase by more than a barely perceptible amount.

Discussions of direct noise impacts are found in Section 5.11, Noise Impacts.

5.27.4. Conclusions of the Secondary and Cumulative Effects Analysis

The proposed SH 121 is a new route emanating from a downtown area and the northern part of the SH 121 would be contained within a traditional transportation corridor. Rail and associated development came to the corridor in the late 1800s. Roadways, beginning with Stove Foundry Road (now West Vickery Boulevard), were located along the railroad in the same timeframe. SH 550 (now IH 30) displaced part of West Vickery Boulevard by 1952. This transportation corridor extends from Summit Avenue to the south side of the UPRR railyard.

In the same period that SH 550 was being constructed, Lake Benbrook was being completed and the levee system along the Clear Fork of the Trinity River was being improved. The Clear Fork of the Trinity River is contained within a channel. Floodplain that was once up to three miles wide has decreased to include only the area between the tops of the levee on each side of the river.

Along IH 30 near Summit Avenue to Hulen Street, secondary effects are not anticipated. The nature of the urban area would not change with project implementation. The traditional transportation corridor would be used to the greatest extent possible and virtually no vacant land exists within this corridor for development. Access and visibility to business establishments would remain the same, or could be improved with construction of the recommended project. Based on the FHWA approved noise model, the Build alternatives would result in a noise impact. Future developments, to the maximum extent possible, would need to be planned, designed and programmed in a manner that would avoid traffic noise impacts.

From Hulen Street to the project's southern terminus at FM 1187, the proposed SH 121 would pass through vacant land. Future land use plans show a continuation of the development trends of the past 40 years with mostly residential and commercial uses. The proposed SH 121 project would make the southwest section of Fort Worth and Tarrant County more accessible and would reduce traffic on most of existing streets in the southwest quadrant, relieving local arterial traffic congestion and improving air quality. These positive cumulative effects would benefit the southwest quadrant of the City and the county.

Waters of the United States and water quality would not be affected by secondary or cumulative effects because of existing protections for these resources and because of the current City policy regarding creation of parks and recreational areas near new developments.

Between the UPRR railyard and FM 1187, neighboring developed land is populated with apartments, homes and commercial establishments. The *Fort Worth Thoroughfare Plan* recognizes several roadways in the area between the Clear Fork of the Trinity River and FM 1187 are needed and would be constructed regardless of the recommended project. Therefore, no cause and effect relationship exists between the proposed SH 121 and secondary development. Such development would occur with or without SH 121 implementation.

5.28. Irreversible and Irretrievable Commitments of Resources Which Would Be Involved in the Proposed Action

Implementation of the proposed action involves a commitment of a range of natural, physical, human and fiscal resources. Land used for the construction of the proposed facility is considered an irreversible commitment during the time period that the land is used for transportation facility. Only in the most extreme case would the land be converted to another use. At present, there is no reason to believe such a conversion would ever be necessary, the development that such a facility would generate and which would be dependent on the facility, would make abandonment of the facility impractical.

Considerable amounts of fossil fuels, labor and construction materials such as cement, aggregate, asphalt, sand, fill materials, lime and steel would be expended. Additionally, large amounts of labor and natural resources are used in the fabrication and preparation of construction materials. These materials are generally not retrievable, though they are not in short supply and their use would not have an adverse impact upon continued availability of these resources. Any construction would also require a substantial one-time expenditure of City, NTTA, State and Federal funds that are not retrievable.

The commitment of these resources is based on the concept that residents in the immediate area, State and region would benefit by the improved quality of the overall transportation system. These benefits would consist of improved accessibility and safety; savings in time spent commuting and greater availability of quality services that are anticipated to outweigh the commitment of these resources.

There would be irretrievable and irreversible commitments of land, material and capital used in the construction of the SH 121 project. Labor and energy used in the construction of the facility would be indirectly recovered because of increased vehicle efficiency and ease of traffic movement resulting from the project.