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.

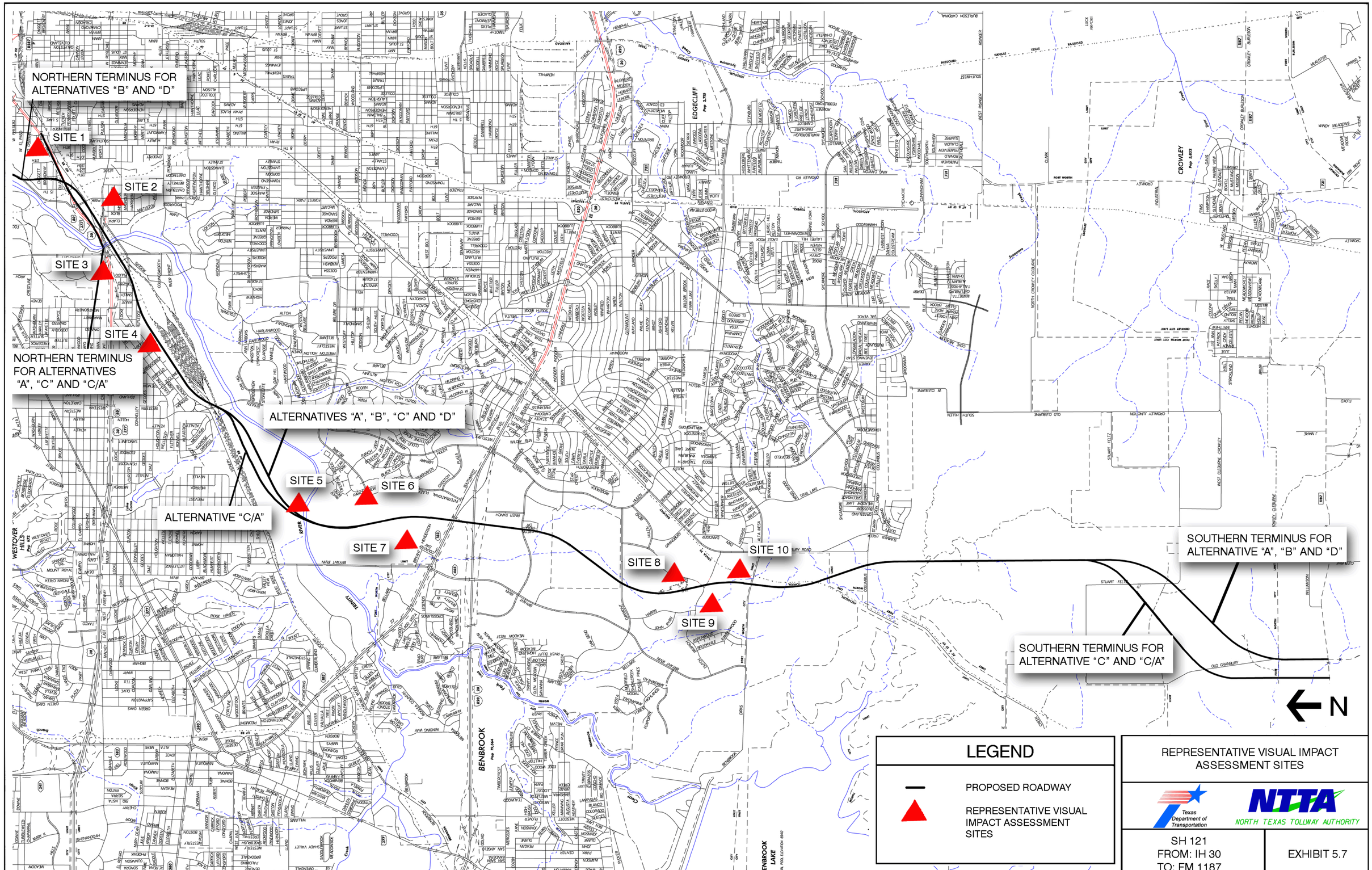
5.23.1. Representative Assessment Sites

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
EDGECLIFF
CROWLEY
BENBROOK
WESTOVER HILLS
ENBROOK LAKE
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.

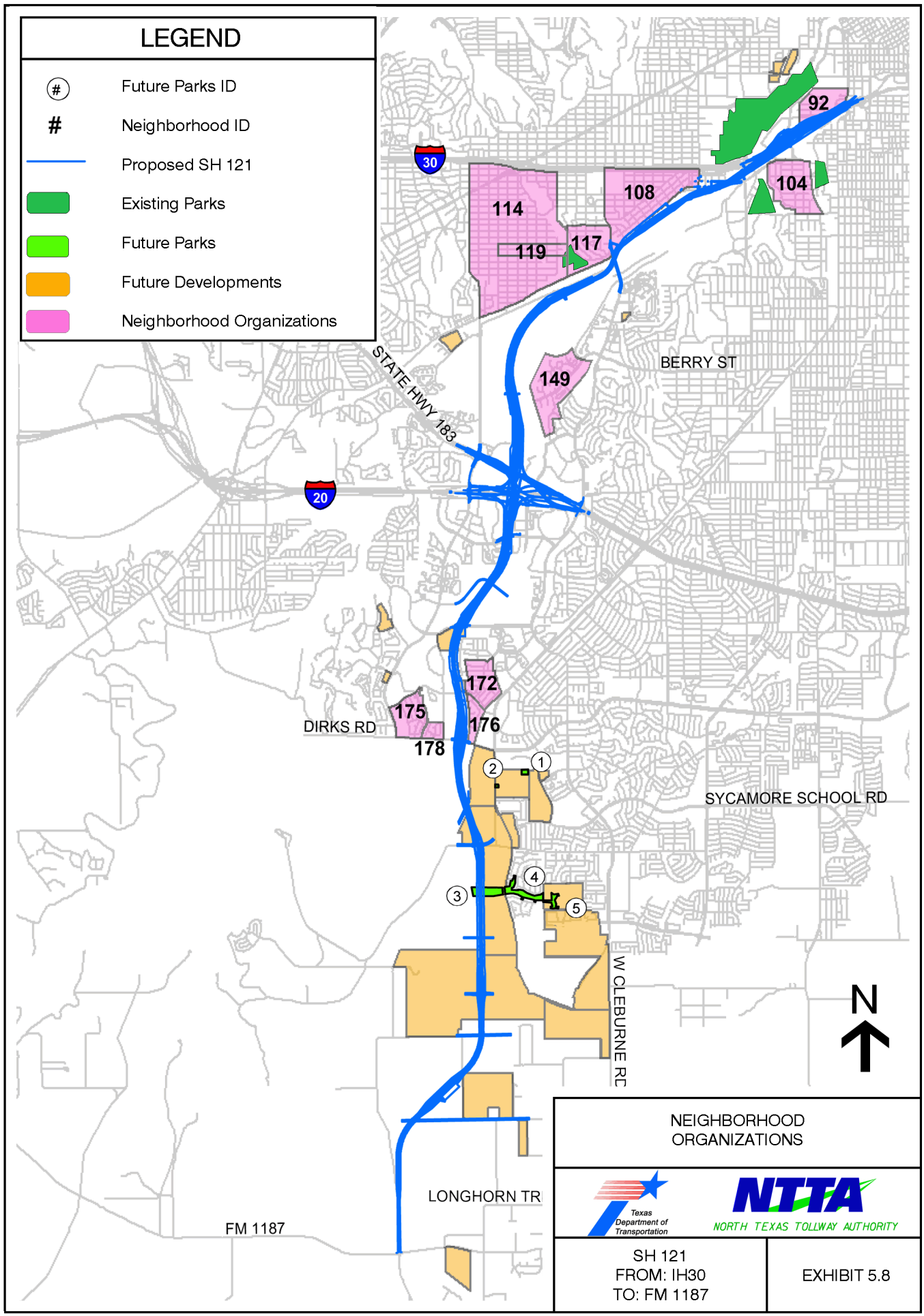
Social

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
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92
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172
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176
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BERRY ST
STATE HWY 183
DIRKS RD
SYCAMORE SCHOOL RD
W CLEBURNE RD
LONGHORN TR
FM 1187
1
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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.

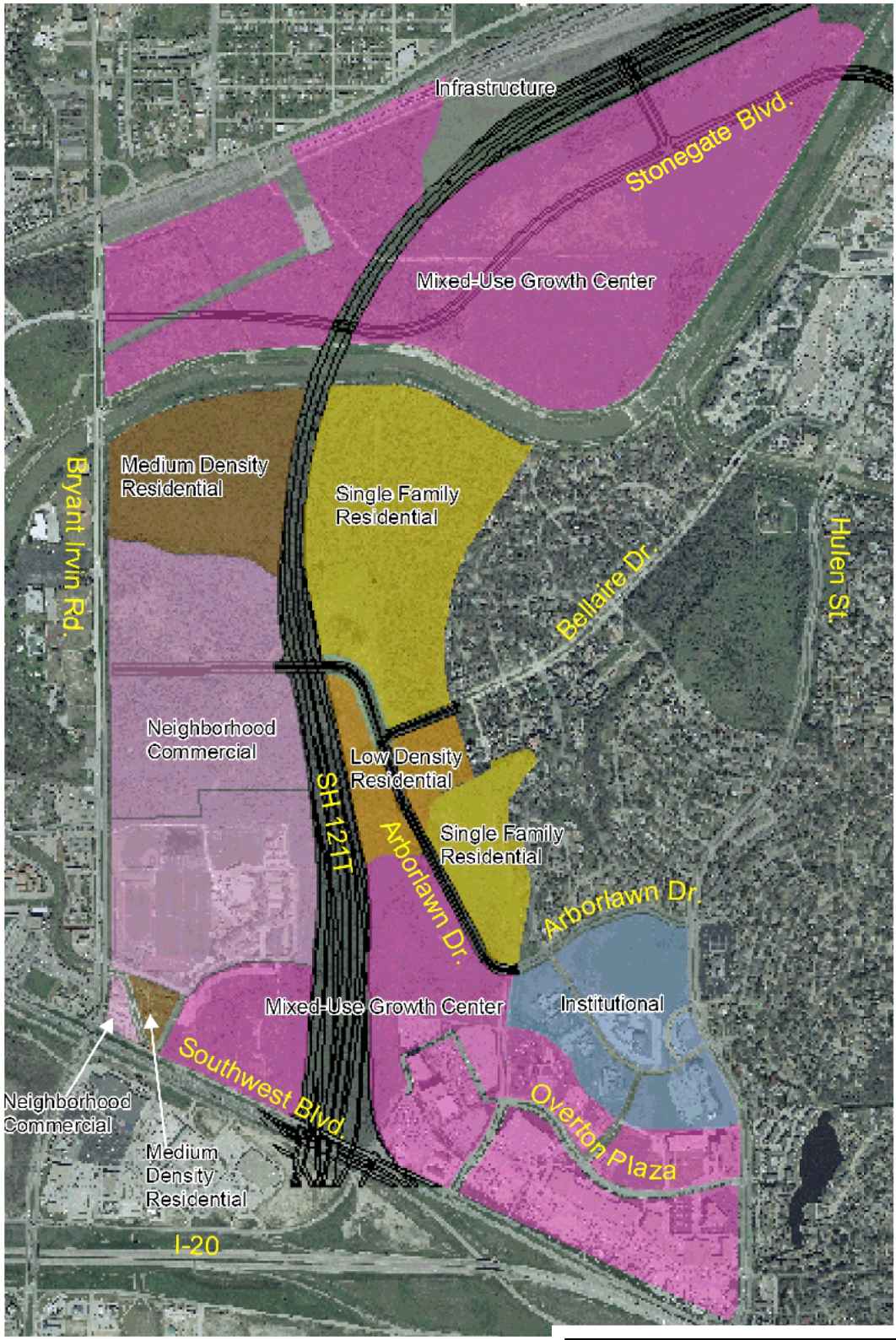
In the 1950s, SH 550 was brought into the Federal Interstate System (first as IH 20 and then IH 30) and SH 183/Loop 820 (now IH 20) was built from west Fort Worth, around the south of the City, to the east side of the City near Handley. Tarrant County maps from 1961 show the majority of the new development 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.



N

TCU/WESTCLIFFE PLANNING SECTOR
FUTURE LAND USE

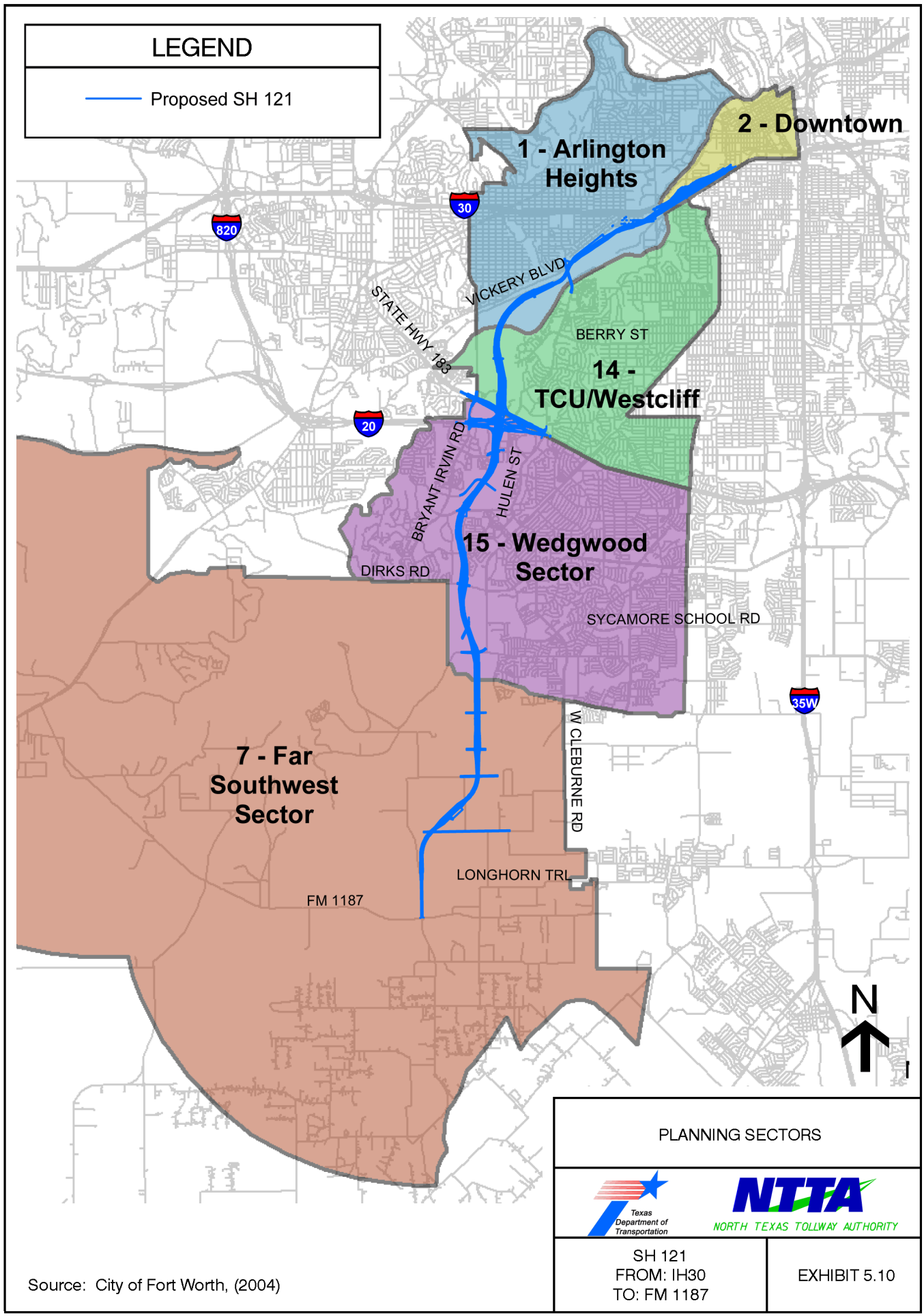
Texas Department of Transportation

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



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.

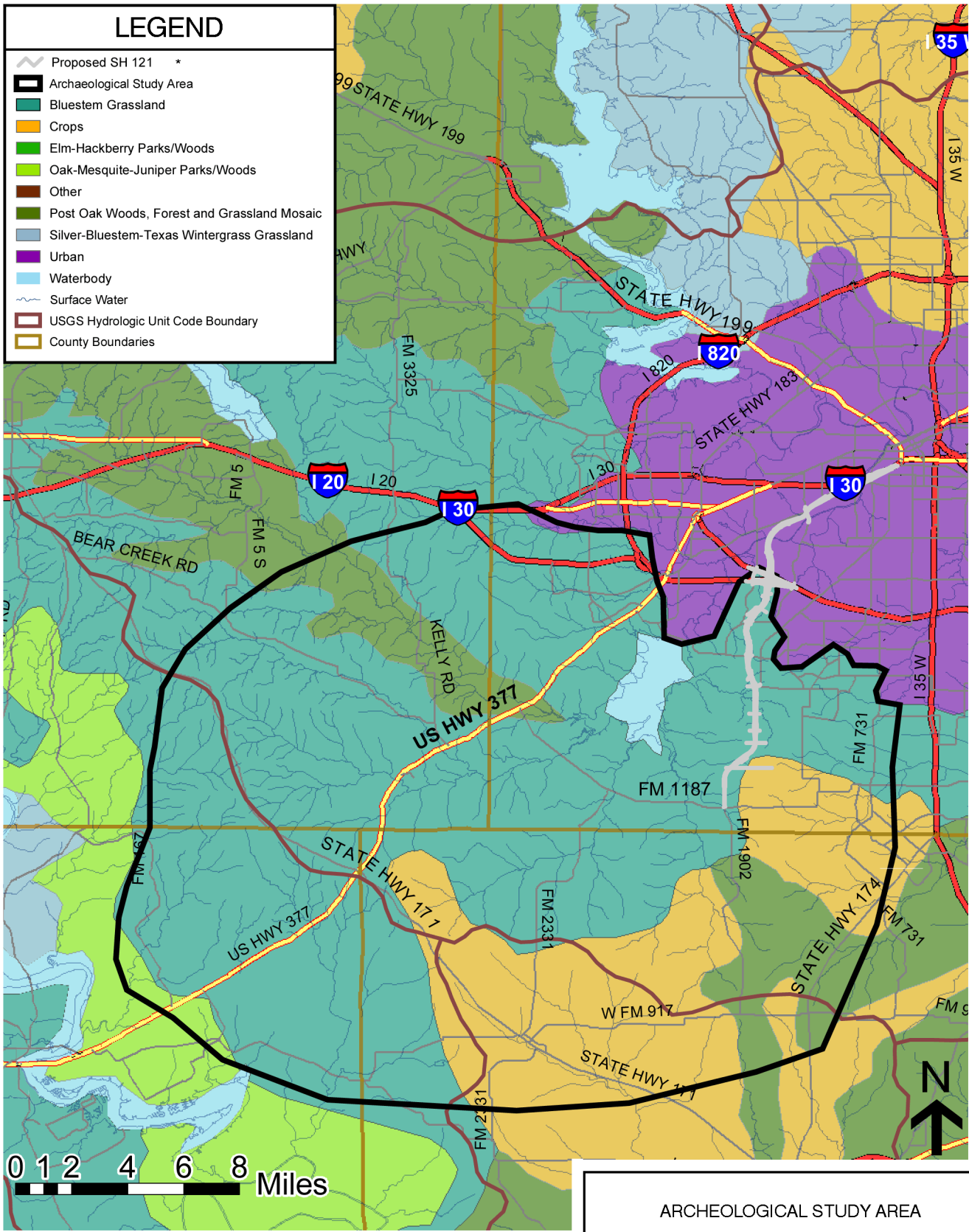
Mistletoe Heights is an example of near-downtown historic housing that survives intact today. The subdivision is located on both sides of Forest Park Boulevard, south of West Rosedale Street and the UPRR tracks. A small amount of neighborhood commercial development borders Mistletoe Heights to the north, 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:

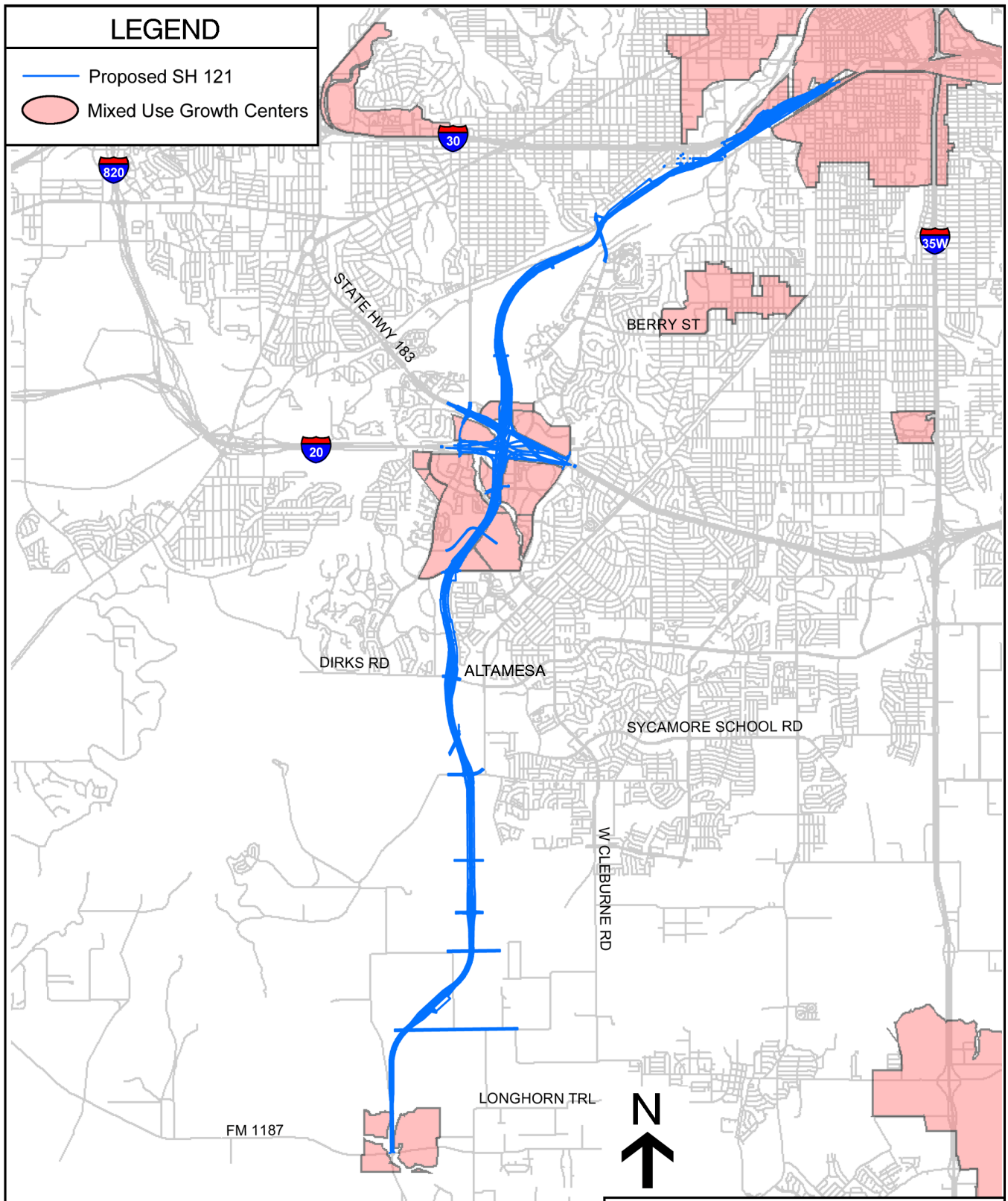
- IH 30 is immediately adjacent to the FWBG property and would be the only recognizable source of traffic noise, along with University Drive.
- IH 30 would act as a physical buffer between the FWBG and the proposed SH 121.
- The FWBG lies 650 ft from the proposed SH 121 with IH 30 and several multi-story 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.



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.