TECHNICAL MEMO

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DATE: September 3, 2010

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SUBJECT: US 377 Cresson Mobility Project – Alternatives Analysis

1.0 OVERVIEW

The US 377 Cresson Mobility Project Alternatives Analysis provides the technical framework through which potential alternatives have been qualitatively and quantitatively analyzed. This analysis determines the potential impacts to local populations, the traveling public and the environment in relation to the purpose of the proposed project. The purpose of the US 377 Cresson Mobility Project is to provide a long-term solution to the excessive traffic delay at the existing US 377 and SH 171 intersection caused by the at grade Fort Worth & Western railroad (FWWR) crossing near the intersection, safety issues and a high volume of truck traffic through the intersection on a regular basis.

During the evaluation process, alternatives were compared to each other using an established set of evaluation criteria. The application of criteria and measures is intended to pinpoint the major differences between alternatives, help facilitate the decision of which alternative should be analyzed in the Environmental Assessment, and balance design standards, safety, transportation needs, costs, and social, economic, and environmental concerns.

2.0 IDENTIFICATION OF ALTERNATIVES

Draft alternatives for consideration were determined by identifying known community, environmental and physical constraints. The study area was identified as the area centered around the existing US 377 and SH 171 intersection with the northern, eastern, southern, and western boundaries located approximately one mile from the intersection. Identified constraints were mapped using Geographic Information Systems (GIS) and potential realignment corridors were identified. The following provides an explanation of each constraint.

2.1 Community Constraints

Community constraints are those resources that may not have economic or environmental value but that are important to the surrounding community and should be avoided. One cemetery is present in the study area. Cresson Cemetery is a large historic cemetery in the southeast corner. Additionally, Cresson School (Historical Marker No. 13144) is located near the center of the study area.

2.2 Environmental Constraints

The majority of the undeveloped land within the study area is either utilized for agricultural purposes or zoned for future planned developments. Fall Creek, Little Fall Creek, and their associated floodplains are present along the southern border of the study area, limiting alignment options in that area; however, no other major streams or large bodies of water are present in the study area. Fifteen hazardous materials sites are present in the study area and these could present specific environmental concerns related to soil and water contamination.

2.3 Physical Constraints

- Downtown Cresson, along with the residences and businesses adjacent to US 377 and SH 171
- Motorsport Ranch – South-central portion of the study area

- Proposed Development (Industrial Park) – Northwest portion of study area
- Fort Worth & Western Railroad, a single line traverses the study area with a switch yard centrally located. The line forks just east of Cresson and one line heads northeast and the other heads southeast.
- Industrial Development – Southeastern portion of study area
- Cresson Crossroads – West-central portion of study area
- Utility lines and natural gas wells located throughout the study area
- Fifteen hazardous materials sites

3.0 DEFINITION OF ALTERNATIVES

Using the constraints identified in Section 2.0, the design team developed five build alternatives in addition to the No Build alternative. Three of the Build alternatives (B1, B2, and C) are relief routes around Cresson; Alternatives B1 and B2 to the west and Alternative C to the east. Alternatives A and D pass through the City of Cresson. **Figure 1** presents the five Build alternatives.

Figure 1

3.1 No Build Alternative

The No Build Alternative assumes no major investments in transportation improvements in the corridor beyond those already programmed and funded by the City of Cresson, Hood and Johnson Counties, FWWR, TxDOT, or Federal entities by the Year 2030. These programmed and funded improvements are included in the approved Metropolitan Transportation Plan (Mobility 2030: The Metropolitan Transportation Plan for the Dallas-Fort Worth Area, 2009 Amendment), Capital Improvement Programs for Hood and Johnson Counties, and the *2008-2011 Transportation Improvement Program*. The No Build Alternative includes a range of strategies such as the Congestion Management System, Employer Trip Reduction programs, intersection and signal improvements, Advanced Transportation Management, bicycle and pedestrian improvements, transit rail improvements, and numerous roadway improvements.

The No Build Alternative would have no impacts to environmental justice communities, wildlife habitat, floodplain, commercial and residential properties, or jurisdictional waters.

3.2 Build Alternatives

The following generally describes the corridors for the five Build alternatives.

Alternative A

- Through town bridge along existing US 377.
- Begins approximately 3,900 feet south of the existing US 377 and SH 171 intersection in Cresson
- Ends approximately 2,200 feet north of the existing US 377 and SH 171 intersection in Cresson.
- Includes four lane elevated structure from approximately 2500 feet south of the existing US 377 and SH 171 intersection to approximately 800 feet north of the intersection.

Alternative B1

- Westernmost relief route along the west side of the City of Cresson.
- Begins approximately 6,300 feet south of the existing US 377 and SH 171 intersection near Old Granbury Road and ends approximately 6400' north of the intersection.
- An at-grade connection would be provided north of the US 377 and SH 171 intersection, allowing northbound traffic on existing US 377 from Cresson to access the relief route and southbound traffic on existing US 377 from Fort Worth to continue south onto existing US 377 into Cresson.
- At both the south end and north end of this alternative, a one lane access road would be provided along the existing US 377 in order to provide direct access for US 377 traffic heading to Cresson as well as access to adjacent properties.
- Includes grade separation over SH 171 and the FWWR, approximately 2,800 feet west of the existing US 377 and SH 171 intersection in Cresson.
- A ramp would be provided at the grade separation to allow access between SH 171 and the relief route.
- Access would be provided south of the existing US 377 and SH 171 intersection, allowing southbound traffic on existing US 377 from Cresson to access the relief route.

Alternative B2

- Western relief route along the west side of the City of Cresson.
- Begins approximately 4,600 feet south of the existing US 377 and SH 171 intersection, north of Old Granbury Road and ends approximately 5,700 feet north of the intersection in Cresson.
- An at-grade connection would be provided north of the US 377 and SH 171 intersection, allowing northbound traffic on existing US 377 from Cresson to access the relief route and southbound traffic from Fort Worth on existing US 377 to continue south on existing US 377 into Cresson.

- At both the south end and north end of this alternative, a one lane access road would be provided along the existing US 377 in order to provide direct access for US 377 traffic heading to Cresson as well as access to adjacent properties.
- Includes grade separation over SH 171 and the FWWR, approximately 2,800 feet west of the existing US 377 and SH 171 intersection in Cresson.
- A ramp would be provided at the grade separation to allow access between SH 171 and the relief route.
- Access would be provided south of the existing US 377 and SH 171 intersection, allowing southbound traffic on existing US 377 from Cresson to access the relief route.

Alternative C
- Eastern relief route along the east side of the City of Cresson.
- Begins approximately 9,000 feet south of the existing US 377 and SH 171 intersection and ends approximately 5,300 feet north of the intersection.
- An at-grade connection would be provided north of the US 377 and SH 171 intersection, at the north end of this alternative allowing northbound traffic on existing US 377 from Cresson to access the relief route and southbound traffic on existing US 377 from Fort Worth to continue south on existing US 377 into Cresson.
- The proposed relief route includes grade separation over CR 917, CR 918, CR 1000, two lines of the FWWR tracks, and SH 171. This grade separation would include a bridge structure approximately 4,300 feet in length.
- A ramp would be provided to allow access between SH 171 and the proposed relief route.
- An at-grade connection would be provided south of the US 377 and SH 171 intersection at the south end, allowing southbound traffic on US 377 from Cresson to access the relief route or continue south on the existing US 377 heading to Granbury.

Alternative D
- Through town tunnel along existing US 377 going under SH 171 and the FWWR.
- The proposed tunnel begins approximately 600 feet south of the existing US 377 and SH 171 intersection and ends approximately 300 feet north of the intersection.
- One lane would remain at-grade on either side of the tunnel to provide access to local streets and properties along existing US 377 and would include an at-grade intersection with SH 171.
- A U-wall depressed section would be provided to connect existing US 377 to the tunnel portals at both ends.

4.0 EVALUATION OF ALTERNATIVES

The evaluation criteria for the alternative analysis were organized into ten major categories: Mobility & Productivity, Safety, Innovative Finance, Environmental Stewardship and Streamlining (Built Environment), Environmental Stewardship and Streamlining (Natural Environment), Efficiency, Level of Public Support, Level of Agency Support, Regional and Local Connectivity, and Public Involvement Factor (PIF). These categories and criteria are based upon guidance from the National Environmental Policy Act, the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), and public and agency input. An explanation of these ten categories is provided in the Technical Memorandum dated March 24, 2010.

Based on the criteria presented in Section 2.0, the alternatives were evaluated by the Work Group at the second Work Group meeting held on March 25, 2010. The Draft Alternatives Analysis Evaluation Matrix was presented and discussed by the Work Group. Specific criteria, including safety, cost, impacted property owners and right-of-way width, were identified as most important to the public.

The Draft Alternatives Analysis Evaluation Matrix is presented below.

US 377 Cresson Mobility Project
Alternatives Analysis Evaluation Matrix

Criteria			No Build Alt	Alt A Bridge	Alt B1 West 1	Alt B2 West 2	Alt C East	Alt D Tunnel
Item	Unit	PIF						
Mobility & Productivity								
- Level of Service at Existing US 377/SH 171 Intersection	LOS		E	D	D	D	D	E
- Level of Service for Alternatives by Direction (NB/SB)	LOS		B/C	A/B	A/B	A/B	A/B	A/B
- Delay at US 377 due to FW&WR (min/max)	minutes		3/10	3/10	0	0	0	0
- Delay at the Existing SH 171 Intersection (per cycle)	seconds		79	40	36	36	36	56
- New Street Crossings	# of		0	0	3	2	5	0
- Identified Utility Crossings	# of		2	2	9	4	0	1
Safety								
- Grade Separated Railroad Crossings on US 377	# of		0	1	1	1	2	1
- At-Grade Railroad Crossings on US 377	# of		1	1	0	0	0	1
Innovative Finance								
- Est. Construction Cost (Inclusive of ROW Cost), 2010 dollars	$M		0	24.5	18.8	14.5	40.6	36.5
Environmental Stewardship and Streamlining (Built Environment)								
- Commercial/Industrial Land Use Impacts	acres		0	1.4	0	0	4.1	1.4
- Residential Impacts	acres		0	0	0.04	0.05	0.2	0
- Displacements	# of		0	2	0	0	0	5
- Consistency with Existing/Planned Development	y/n		N	Y	Y	Y	Y	Y
- Potential Noise Impacts	# of		0	1	0	0	0	5
- Historic Resources	# of		0	0	0	0	0	0
- Haz-mat sites within 300 feet	# of		5	5	1	1	2	5
- Economic Impact to Existing Businesses - Weekday Impact	* legend		o	-	--	--	--	-
- Economic Impact to Existing Businesses - Weekend Impact	* legend		o	-	-	-	-	-
Environmental Stewardship and Streamlining (Natural Environment)								
- Section 404 Jurisdictional Waters Impacts	# of		0	0	11	12	14	0
- 100-Year Floodplains (total area crossed)	acres		0	0.2	0.6	4	12.8	0
- Agricultural Land Use Impacts	acres		0	0.8	72.0	54.0	91.1	0
- Woodland Impacts	acres		0	0.5	0	0	2.9	0
Efficiency								
- Alignment Length	miles		2.0	1.4	2.7	2.1	3.5	0.7
- Construction Difficulty or Disruption	* legend		o	--	-	-	-	--
- Parcels/Property Owners Impacted	# of		0	23	7	6	14	18
- Right-of-Way Acreage (Additional)	acres		0	2.8	73.7	55.5	106.5	1.7
Level of Public Support	* legend		+	++	+	++	--	-
Level of Agency Support	* legend		--	+	++	++	--	+
Regional and Local Connectivity	* legend		--	++	++	++	++	++

NOTE: Data provided in this analysis is independent of other potential projects (e.g., the proposed SH 171 Couplet and the potential Fort Worth & Western Railroad switch yard relocation).

Public Input Factor (PIF)
High
Medium
Low

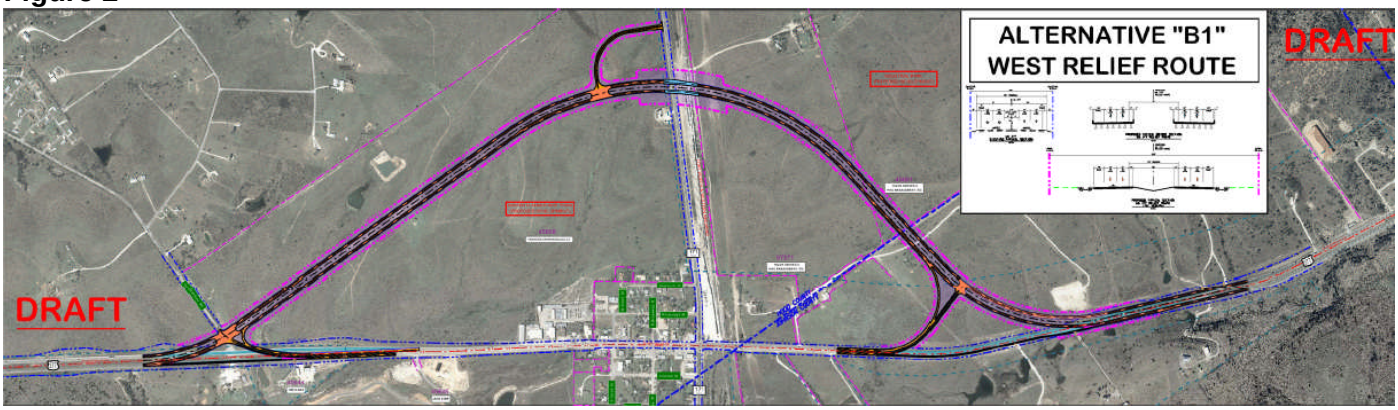
*Legend

Major Negative Effect	Some Negative Effect	No Effect, Neutral	Some Positive Effect	Major Positive Effect
--	-	o	+	++

5.0 ALTERNATIVE RECOMMENDED FOR FURTHER DEVELOPMENT AND EVALUATION

The five Build Alternatives and the Alternative Analysis Evaluation Matrix were presented to the Public at a Public Meeting held on May 13, 2010. Attendants were asked to fill out a survey explaining their preference of alternatives and provide comments on the five Build Alternatives and the No Build Alternative. All responses were analyzed and discussed in the Public Meeting Summary. After analyzing public input, it was determined that Alternative B2 was the alternative preferred by the public followed by Alternative A and Alternative B1. TxDOT compared and analyzed the design elements and identified impacts of the three alternatives and determined that Alternative B1 was the technically preferred alternative. Alternative A was removed from consideration because it is an urban solution for a rural area and would cause the highest level of construction impacts. Alternative B2 was removed from consideration because it does not provide room for ramp connections between US 377 and SH 171; would interfere with the potential couplet option along SH 171; and, would have disproportionate impacts to one property owner. Alternative B1 provides the best design and is supported by Hood County. It was determined that Alternative B1 would be carried forward for analysis as the preferred alternative. This alternative is shown in **Figure 2** below.

Figure 2



6.0 NEXT STEPS

The alternative presented in **Figure 2** will be analyzed in the Environmental Assessment (EA). The EA will also evaluate the effects of the No Build Alternative. Field surveys will be conducted to determine impacts to social, economic, and environmental resources along the proposed alternatives. The preparation and coordination of the Environmental Assessment is currently ongoing. Once the EA document is approved for further processing by the Federal Highway Administration, a Public Hearing will be held for the project.