Executive Summary
Ports to Plains Feasibility Study

June 2001

Prepared For

Texas Department of Transportation
Oklahoma Department of Transportation
New Mexico Highway and Transportation Department
Colorado Department of Transportation

Prepared By

Wilbur Smith Associates Team

PORTS TO PLAINS
FEASIBILITY STUDY

STUDY BACKGROUND

In June 1998, the *Transportation Equity Act for the 21st Century (TEA-21)* was enacted and authorized highway, safety, transit and other surface transportation programs for the six-year period from 1998 to 2003. TEA-21 builds upon the *Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA)*, which was the previous federal legislation for surface transportation.

TEA-21 designated the Ports to Plains corridor as one of the 43 "High Priority Corridors" on the National Highway System (NHS). The Ports to Plains corridor is designated as Corridor 38 in *TEA-21*, which reads as follows: "*The Ports to Plains Corridor from the Mexican border via I-27 to Denver, Colorado*". As with other High Priority Corridors, the importance of the Ports to Plains corridor is related to its direct connection with the US/Mexico border and potential to serve international trade and promote economic development.

Ports to Plains (Corridor 38) Among "High Priority Corridors" on National Highway System

A principal reason for evaluating transportation improvement needs in the Ports to Plains corridor is related to the implementation of the North American Free Trade Agreement (NAFTA) in 1994, which created a free trade zone between the US, Mexico and Canada. This treaty has dramatically increased the volume and value of trade between these North American countries, with the majority of Mexico trade passing through the Texas ports of entry.

STUDY PURPOSE

The purpose of this *Ports to Plains Feasibility Study* is to determine the impacts and feasibility of a four-lane highway between the Texas/Mexico border and Denver, Colorado, via the existing IH 27 corridor between Amarillo and Lubbock, Texas. This study involved a comprehensive feasibility analysis of various alternative highway alignments considering the entire corridor limits. The methodology and procedures for this highway feasibility study are consistent with recent feasibility studies completed for other High Priority Corridors and follow appropriate federal and state regulations. This study included the following major elements:

- travel demand modeling/forecasting;
- consideration of NAFTA/international trade flow;
- economic feasibility analyses (travel efficiency and economic development benefits for the national, state and corridor perspectives);

Texas New Mexico Colorado Oklahoma Texas New Mexico Colorado Oklahoma Texas New Mexico Colorado Oklahoma Texas New Mexico Colorado

- evaluation of traffic, engineering/cost and potential environmental/ land use impacts; and,
- a public involvement/outreach program.

A total of three alternative alignments (with various options) between Lubbock and the Texas/Mexico border and two alternative alignments between Amarillo and Denver were evaluated in detail. This evaluation provides detailed technical information regarding the impacts and feasibility of the alternative alignments, which can be used by the State Departments of Transportation, Transportation Commissions and other involved agencies in selecting a preferred alternative in subsequent project development phases.

STUDY AREA

The study area for this project extends along the designated Ports to Plains corridor between the Texas/Mexico border and Denver, Colorado. The corridor study area traverses the States of Texas, New Mexico, Oklahoma and Colorado. The Ports to Plains study area is over 1,000 miles in length and its width varies from approximately 80 miles along the IH 27 alignment to as much as 180 to 200 miles along the remainder of the corridor.

The study area includes over 100 counties and 20 Metropolitan Planning Organizations/Councils of Governments. Cities/towns within the study area include: Pampa, Amarillo, Lubbock, Midland/Odessa, Abilene, San Angelo, Del Rio, Eagle Pass and Laredo, Texas; Raton and Clayton, New Mexico; Boise City, Oklahoma; and, Denver, Colorado Springs, Pueblo, Lamar, and Limon, Colorado. Total population within the study area is over 5 million persons, which includes approximately 2 million persons residing in the Denver metropolitan area.

STUDY COORDINATION AND DEVELOPMENT

This study was a joint undertaking of the Steering Committee established for this project and a Consultant Team led by Wilbur Smith Associates, an international transportation engineering and planning firm. The Steering Committee consists of representatives of the Texas Department of Transportation (TxDOT), New Mexico State Highway and Transportation Department (NMSHTD), Oklahoma Department of Transportation (ODOT), and Colorado Department of Transportation (CDOT). The Steering Committee provided technical support and input related to policy decisions regarding the project.

Additionally, input received from other corridor stakeholders and citizens through the study's extensive public outreach program was considered throughout the study.

Four State Departments of Transportation Comprised the Ports to Plains Steering Committee

PUBLIC INVOLVEMENT

The study's public involvement program utilized several communication tools to create public awareness of the project and to provide opportunities for meaningful public input regarding corridor issues and improvement needs. Public comments were considered in developing and evaluating improvement alternatives.

The study's public outreach program included the following:

- Two series of public meetings conducted in various communities along the study corridor in May 2000 and February 2001. An additional public meeting sponsored by the New Mexico State Highway and Transportation Department was also held in Raton, New Mexico on March 6, 2001;
- Development and distribution of a project video to interested agencies and organizations;
- Preparation and distribution of three newsletters to persons included on the study's extensive mailing list;
- Development of a project website (www.wilbursmith.com/portstoplains);
- An email address for obtaining public comments (portstoplains@wilbursmith.com);
- A project mailing address (P.O. Box 572537, Houston, Texas 77257-2537); and,
- A dedicated telephone line (1.800.463.8610).

Approximately 5,400 public comments were received through the above public outreach activities and communication tools. Of these total comments, approximately 57 percent came from persons residing in New Mexico, followed by Colorado with 22 percent, Texas 15 percent, Oklahoma 5 percent, and 1 percent from other states or unknown locations.

First Series of Public Meetings

The first series of public meetings were held during May 2000 in the following towns/cities within the Ports to Plains corridor: Del Rio, Texas; San Angelo, Texas; Lubbock, Texas; Clayton, New Mexico; Lamar Colorado; and Denver, Colorado. The purpose of these meetings was to present the project purpose and objectives, evaluation criteria and process, and to provide the public with an opportunity to identify alternative alignments to be considered for the project.

A majority of the respondents at the first series of public meetings proposed the following highway alignments:

North Study Area (Amarillo, Texas to Denver, Colorado)

- US 87 between Amarillo and Raton and IH 25 between Raton and Denver (Alternative N1); and,
- US 287 between Amarillo and Limon and IH 70 between Limon and Denver (Alternative N4).

South Study Area (Lubbock, Texas to Texas/Mexico Border)

- US 87 between Lubbock and San Angelo, US 277 between San Angelo and Carrizo Springs and US 83 between Carrizo Springs and Laredo (Alternative S7); and,
- US 87 between Lubbock and Eden and US 83 between Eden and Laredo (Alternative S8).

The most important criteria identified by the public in the order of ranking included:

1. Furthering Economic Development
2. Improving Safety for Motorists
3. Accommodating NAFTA Truck Traffic

Final Series of Public Meetings

The final series of public meetings were held in February 2001. The purpose of these meetings was to solicit public comments and present the alternative highway alignments selected for analysis; evaluation process and criteria; and preliminary results of the detailed evaluation. The final series of meetings were held in Boise City, Oklahoma; Limon and Colorado Springs, Colorado; and Amarillo, Big Spring, and Eagle Pass, Texas. An additional public meeting for this project was sponsored by the New Mexico Highway and Transportation Department, which was held in Raton, New Mexico on March 6, 2001. Approximately 700 persons attending the six public meetings held in February, with about 600 persons attending the Raton public meeting on March 6.

The public expressed significant support for Alternatives N1 and N4 in the north, and Alternative S7 (Option B) in the south.

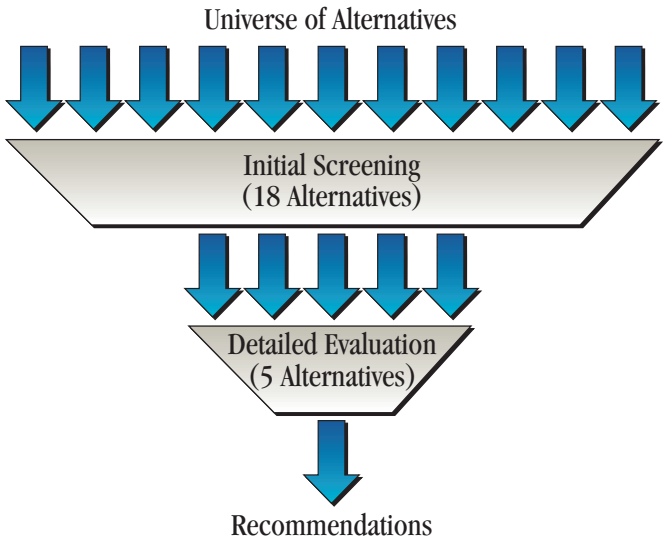
PROPOSED HIGHWAY IMPROVEMENT

The highway improvement considered for this study generally includes a four-lane divided principal arterial throughout the entire project limits. This highway improvement is consistent with the standard highway cross section of the Texas Trunk System. The proposed right-of-way width is 300 feet. This highway section is typical of the improvement assumed primarily in rural areas. Variations to the highway cross section were considered along interstate facilities and in areas with adjacent land use constraints such as within towns and cities traversed by the alternative alignments.

DEVELOPMENT AND EVALUATION OF ALTERNATIVES

A total of 18 alternative highway alignments were initially identified for evaluation within the designated Ports to Plains corridor. There were a total of 6 initial alternatives in the northern portion of the corridor between Amarillo, Texas and Denver, Colorado, and 12 alternatives in the southern study area between Lubbock, Texas and the Texas/Mexico border. These initial alternatives were identified from several sources including the Study Team, previous studies within the corridor, and those suggested by the public during the first series of public meetings held in May 2000.

Evaluation Process for Ports to Plains Alternatives



Considerations in Evaluating Ports to Plains Alternatives

The evaluation of alternatives followed a two-step process, including a screening evaluation of the initial alternatives followed by a detailed evaluation of the selected "candidate" alternatives.

The initial screening process narrowed the original 18 alternatives to two in the northern study area (from Amarillo to Denver) and three alternatives with various options in the southern study area (from Lubbock and the Texas/Mexico border). These selected candidate alternatives are described as follows:

Northern Candidate Alternatives (Between Amarillo and Denver)

- **Alternative N1** – Follows US 287/US 87 between Amarillo, Texas and Raton, New Mexico and IH 25 between Raton and Denver (approximately 445 miles in length)
- **Alternative N4** – Follows US 287 between Amarillo, Texas and Limon, Colorado and IH 70 between Limon and Denver (approximately 421 miles in length)

Southern Candidate Alternatives (Between Lubbock and Texas /Mexico Border)

- **Alternative S7**

  Option A – US 87 between Lubbock and San Angelo and US 277 between San Angelo and Del Rio (approximately 350 miles in length);

Option B – Option A plus US 277/US 83/IH 35 between Del Rio and Laredo (approximately 530 miles in length);

Option C – Same as Option B except following SH 349/SH 158 between Sterling City and Lamesa (approximately 570 miles in length)

- **Alternative S8**

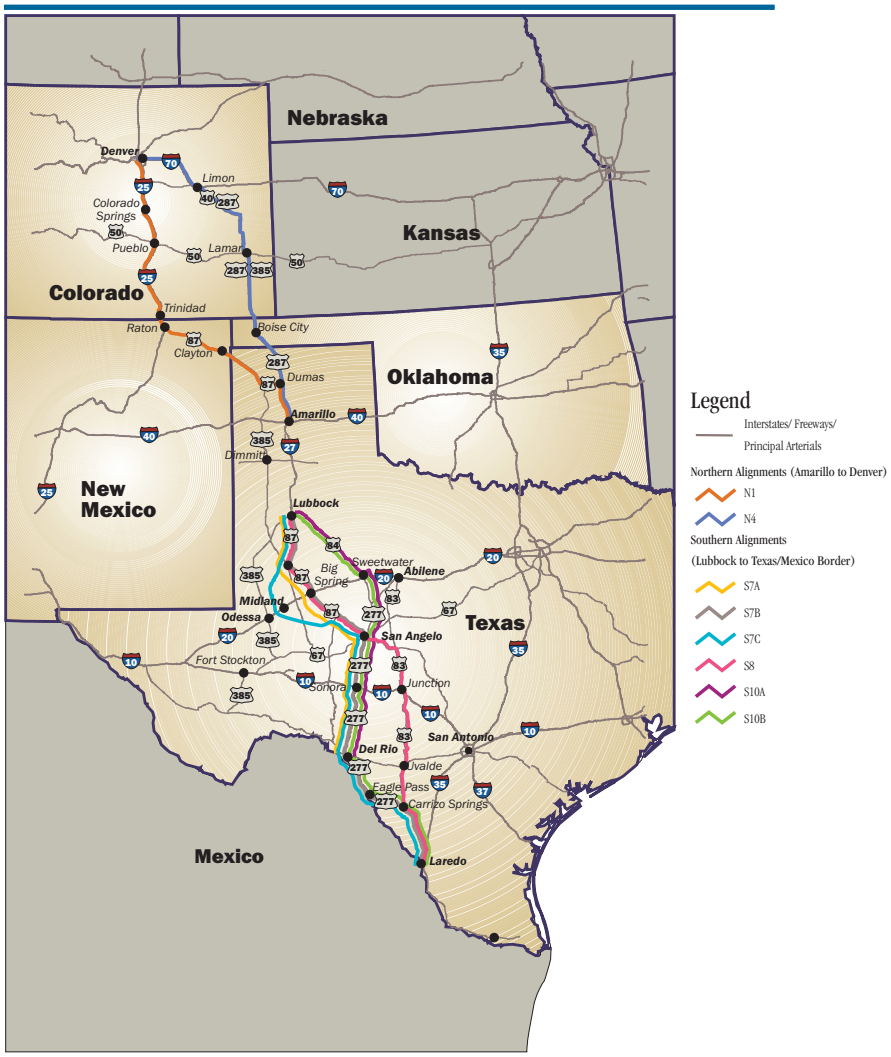
  US 87 between Lubbock and Eden and US 87/IH 35 between Eden and Laredo (approximately 520 miles in length)

- **Alternative S10**

  Option A – US 84 between Lubbock and Sweetwater and SH 70/US 277 between Sweetwater and Del Rio (approximately 346 miles in length)

  Option B – Option A plus US 277/US 83/IH 35 (approximately 526 miles in length)

North and South Alternatives Considered for Evaluation



Criteria used for the detailed evaluation of candidate alternatives included impacts related to: traffic/mobility, NAFTA/international trade, engineering/cost, environmental/socioeconomics, travel efficiency feasibility, economic development, and public input.

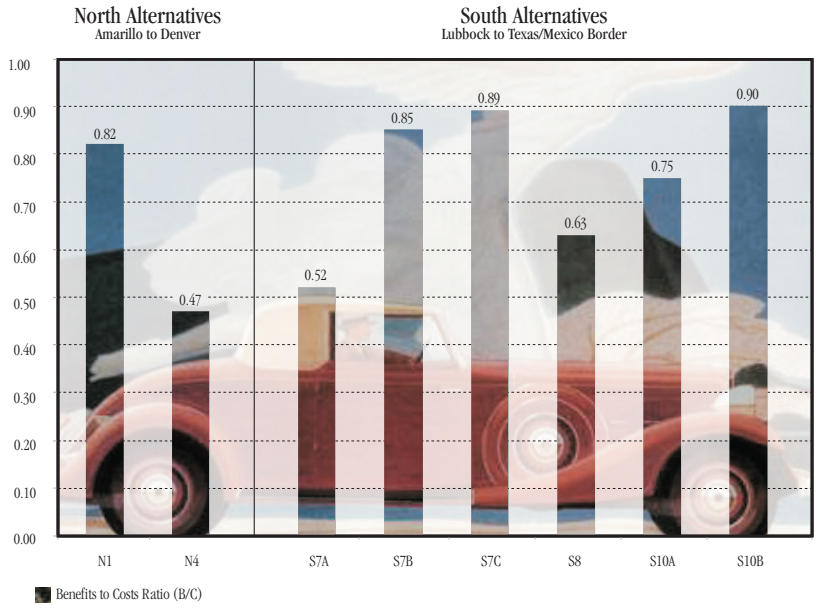
SUMMARY OF FINDINGS

Evaluation matrices include a relative rating of the candidate alternatives by each evaluation criterion, by major category and overall. Alternatives were rated as "most/very favorable", "neutral/favorable" or "least/not favorable". A summary of the important findings are as follows:

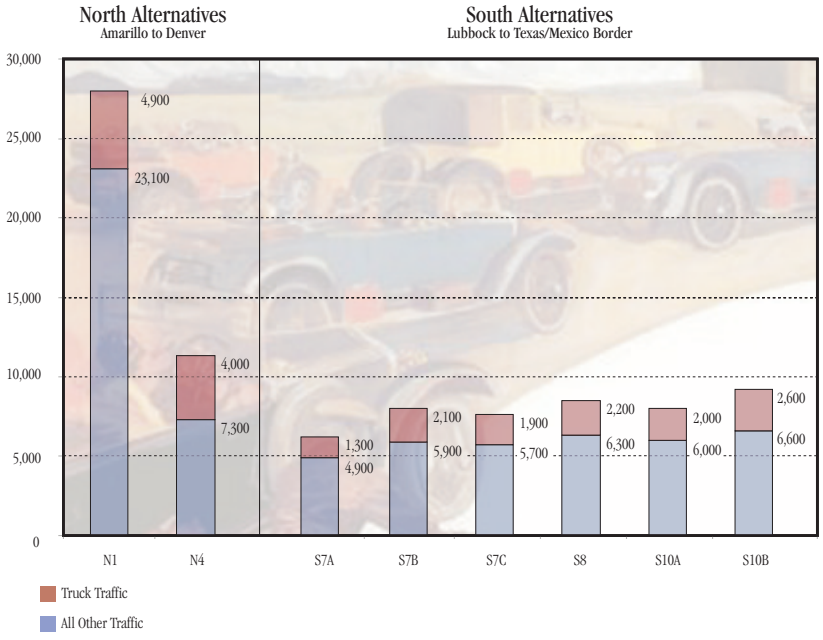
North Alternatives

- Overall, the impacts of the two northern alternatives are very similar and would result in "favorable" conditions considering all evaluation criteria;
- N1 and N4 were very similar with regards to their impacts related to each of the following major evaluation categories: traffic/mobility, NAFTA/trade, engineering and public input;
- N1 would result in more favorable impacts than N4 for the travel efficiency benefits/feasibility category. However, it should be noted that neither N1 nor N4 are considered feasible from a travel efficiency standpoint with benefit/cost (b/c) ratios of 0.82 and 0.47, respectively. Theoretically, the b/c ratios should be greater than 1.0 to be considered feasible;
- N4 would result in more favorable impacts than N1 for the environmental/socioeconomics and economic development categories;
- The average year 2025 traffic volume on N1 (28,000 vehicles per day) is projected to be approximately 2½ times greater than the traffic utilizing N4 (11,300 vehicles per day). These volumes reflect average demand over the entire limits of each alignment, including rural areas in which the volumes of vehicles are lower and urban areas in which the volumes are higher. Truck traffic volumes are projected to be more comparable along the northern alternatives with an average of 4,900 and 4,000 trucks per day on N1 and N4, respectively;

Travel Efficiency Feasibility



Average Daily Traffic Volume



- Approximately 70 percent of the N1 alignment is projected to operate at acceptable traffic flow (no or minimal delays) with or without the proposed four-lane improvement compared to 90 – 95 percent of the N4 alignment operating at acceptable levels-of-service;
- Total travel times along the entire N1 and N4 alignments are projected to decrease by approximately 30 and 20 minutes with the proposed improvement. However, N4 would continue to be the fastest route between Amarillo and Denver with and without the continuous four-lane widening;
- Improvement to either the N1 or N4 alignment would result in minimal traffic diversions from the other northern alternative;

North Alternatives Screening Criteria	Alternative	
	N1	N4
Traffic/Mobility		
Study Area Vehicles Miles of Travel		
Study Area Vehicles Hours of Travel		
Traffic Utilization (Average Traffic Volumes along Alternatives)		
Level-of-Service (LOS) along Alignment		
Travel Time between Project Termini		
Traffic Diverted from IH-35/Other Major Highways		
Consistency with Regional and Statewide Plans		
Improved Access/Connections to Highways/Intermodal Facilities		
Traffic/Mobility Average		
NAFTA/International Trade		
Efficiency Serving US/Mexico Ports of Entry		
Efficiency Serving Maquiladora Factories in Mexico		
Connections to Major Mexican Highway Corridors		
Potential for Developing NAFTA Value Added Manufacturing/Distribution		
Service Provided to Trade Truck Demand		
Value in Serving NAFTA Trade Related Manufacturers		
Potential for Developing NAFTA Inland Ports along Corridor		
Consistency with Mexican State and National Highway Plans		
Improved Access to Mexican Intermodal Facilities		
NAFTA/International Trade Average		
Engineering		
Corridor Length		
Project Cost		
Right Of Way Impacts (acres, displacements, utility conflicts)		
Relief Routes/Bypasses (number/length)		
Traffic Maintenance		
Topographic Consideration (terrain, obstructions, etc.)		
Engineering Average		

Legend
Most/Very Favorable
Neutral/Favorable
Least/Not Favorable

- Neither of the northern alternatives is projected to divert traffic from IH 35, which is another north-south "High Priority Corridor" located east of the Ports to Plains corridor;
- Approximately two thirds of the N1 alignment is currently a four-lane facility or programmed to be widened to four lanes, compared to about one third of the N4 alignment;
- N4 is estimated to require more than two times the amount of right-of-way acquisition to accommodate the continuous four-lane widening than N1;
- The proposed improvement along N1 could potentially require a displacement of 44 residential or commercial facilities compared to 122 with N4;

North Alternatives Screening Criteria	Alternative N1	Alternative N4
Environmental/Socioeconomics		
Historic/Archeological Sites Impacted		
Land Use Constraints		
CERCLA/Superfund Sites Impacted		
Population Served Within Corridor		
Employees Served Within Corridor		
Persons in Poverty Served Within Corridor		
Federally Listed T&E Species		
Major Rivers/Reservoirs Crossed		
Aquifers Crossed		
Major Floodplain Areas		
Major Wetland Features		
Upland Vegetation Impacted		
Riparian Corridors/Bottom Land Vegetation Impacted		
State-Federal Owned Lands Impacted		
Noise-Potential Barrier Miles Needed		
Environmental/Socioeconomics Average		
Travel Efficiency Benefits/Feasibility		
Vehicle Operating Cost Savings in Corridor		
Travel Time Savings in Corridor		
Accident Cost Reduction in Corridor		
Travel Efficiency Benefits/Costs (Cost Effectiveness)		
Travel Efficiency Benefits/Feasibility Average		
Economic Development		
Corridor/Statewide Jobs Added		
Corridor/Statewide Value Added		
Corridor/Statewide Wages Added		
Corridor/Statewide Economic Development Benefits/Costs		
Economic Development Average		
Public Input		
Public Support/Acceptance		
Public Input Average		
GRAND TOTAL AVERAGE (ALL CRITERIA)		

- The estimated construction cost (excluding annual operations and maintenance) for improving N1 and N4 is $925 million and 1.1 billion, respectively;
- N1 crosses 14 water features, with N4 crossing 10;
- The N1 corridor serves a population of nearly 2 million persons, with N4 serving 1.5 million; and,
- The total economic development benefits (through year 2041) associated with the proposed improvement is estimated to be $426 million with N1 and $498 million with N4.

South Alternatives Screening Criteria	Alternative					
	S7A	S7B	S7C	S8	S10A	S10B
Traffic/Mobility						
Study Area Vehicle Miles of Travel						
Study Area Vehicle Hours of Travel						
Traffic Utilization (Average Traffic Volumes along Alternatives)						
Level-of-Service (LOS) along Alignment						
Travel Time between Project Termini						
Traffic Diverted from IH-35/Other Major Highways						
Consistency with Regional and Statewide Plans						
Improved Access/Connections to Highways/Intermodal Facilities						
Traffic/Mobility Average						
NAFTA/International Trade						
Efficiency Serving US/Mexico Ports of Entry						
Efficiency Serving Maquiladora Factories in Mexico						
Connections to Major Mexican Highway Corridors						
Potential for Developing NAFTA Value Added Manufacturing/Distribution						
Service Provided to Trade Truck Demand						
Value in Serving NAFTA Trade Related Manufacturers						
Potential for Developing NAFTA Inland Ports along Corridor						
Consistency with Mexican State and National Highway Plans						
Improved Access to Mexican Intermodal Facilities						
NAFTA/International Trade Average						
Engineering						
Corridor Length						
Project Cost						
Right-Of-Way Impacts (acres, displacements, utility conflicts)						
Relief Routes/Bypasses (number/length)						
Traffic Maintenance						
Topographic Consideration (terrain, obstructions, etc.)						
Engineering Average						

Legend

Most/Very Favorable

Neutral/Favorable

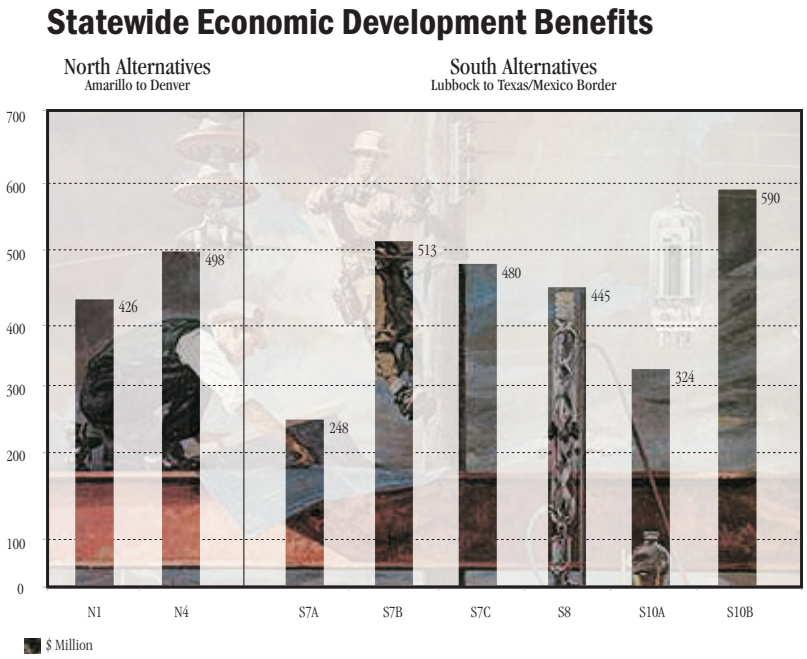
Least/Not Favorable

South Alternatives

- Overall, S7B, S7C and S10B would result in more favorable impacts than the other southern alternatives considering all evaluation criteria. The overall impacts for these most favorable alternatives are very similar;
- S7B, S8 and S10B were the most favorable alternatives with very similar impacts regarding traffic/mobility evaluation;
- S7B, S7C and S10B would result in the most favorable impacts related to the NAFTA/international category due to their direct connections to all three ports of entry in the study area (Del Rio, Eagle Pass and Laredo);

South Alternatives Screening Criteria	Alternative					
	S7A	S7B	S7C	S8	S10A	S10B
Environmental/Socioeconomics						
Historic/Archeological Sites Impacted						
Land Use Constraints						
CERCLA/Superfund Sites Impacted						
Population Served Within Corridor						
Employees Served Within Corridor						
Persons in Poverty Served Within Corridor						
Federally Listed T&E Species						
Major Rivers/Reservoirs Crossed						
Aquifers Crossed						
Major Floodplain Areas						
Major Wetland Features						
Upland Vegetation Impacted						
Riparian Corridors/Bottom Land Vegetation Impacted						
State-Federal Owned Lands Impacted						
Noise-Potential Barrier Miles Needed						
Environmental/Socioeconomics Average						
Travel Efficiency Benefits/Feasibility						
Vehicle Operating Cost Savings in Corridor						
Travel Time Savings in Corridor						
Accident Cost Reduction in Corridor						
Travel Efficiency Benefits/Costs (Cost Effectiveness)						
Travel Efficiency Benefits/Feasibility Average						
Economic Development						
Corridor/Statewide Jobs Added						
Corridor/Statewide Value Added						
Corridor/Statewide Wages Added						
Corridor/Statewide Economic Development Benefits/Costs						
Economic Development Average						
Public Input						
Public Support/Acceptance						
Public Input Average						
GRAND TOTAL AVERAGE (ALL CRITERIA)						

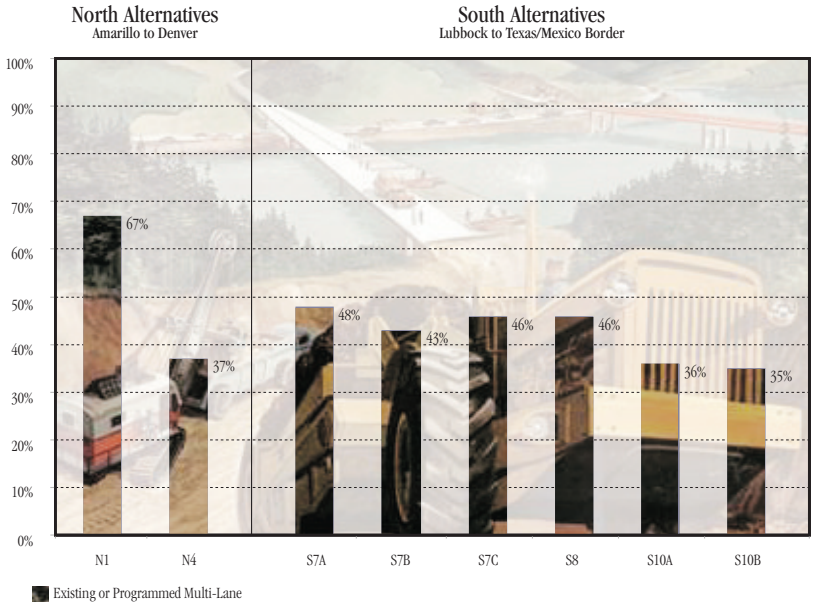
- S10A would result in the most favorable impacts from an engineering/cost standpoint, followed by S7A, S7C and S10B in no ranking order. However, S7A and S10A are shorter alternatives that only extend to Del Rio;
- S7A would result in the most favorable impacts with regards to the environmental/ socioeconomics category, followed by alternatives S7B, S7C and S10A in no ranking order;



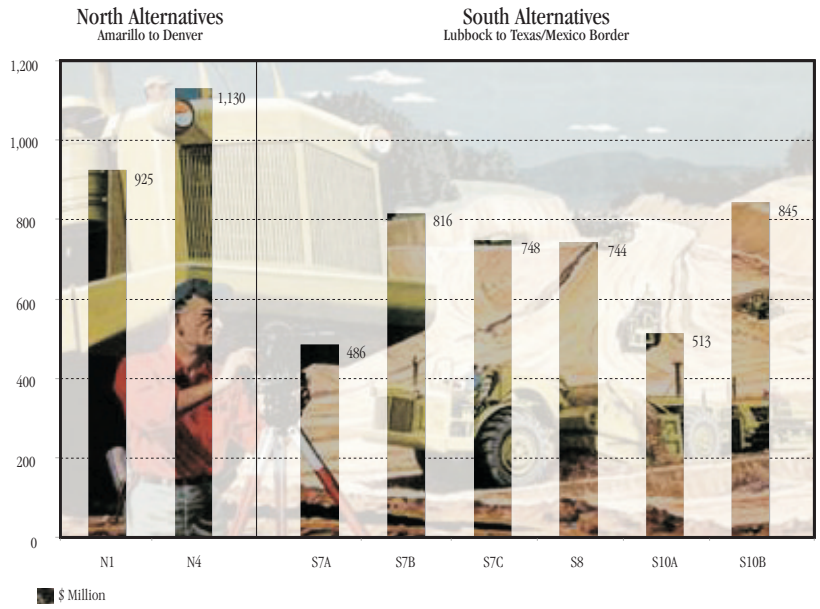
- S7B, S7C and S10B would result in the most favorable impacts for travel efficiency benefits/ feasibility. However, none of the southern alternatives are considered feasible from a travel efficiency standpoint with benefit/cost ratios ranging from 0.52 for S7A to 0.85 - 0.90 for S7B, S7C, and S10B;
- S7B, S7C, S8 and S10B would result in the most favorable economic development impacts;
- S7B and S7C were the most favorable and supported alternatives based on public input.
- The average year 2025 traffic volumes on the northern alternatives range from a low of 6,200 vehicles per day on S7A to more than 8,000 vehicles per day on S8 and S10B. Alternatives S7B, S8 and S10B are projected to experience the highest average truck traffic with each carrying over 2,000 trucks per day;
- Without the proposed four-lane improvement, 80 to 85 percent of all the southern alternative alignments are projected to operate at acceptable traffic flow (no or minimal delays). With the improvement, 95 percent of the southern alignments are projected to operate at acceptable levels-of-service;
- Travel times along the southern alternatives are projected to decrease with the proposed improvement from 20 to 25 minutes along S7A and S10A (which only extend to Del Rio) to approximately 35 to 40 minutes with S7B, S7C, S8 and S10B. Alternative S7B is projected to provide the fastest route between Lubbock and Laredo with and without the proposed four-lane widening;

- The southern alternatives extending to Laredo (S7B, S7C, S8, and S10B) have the greatest but minimal impacts on IH 35 traffic diversion;

Required Improvements



Project Cost



- Traffic volumes generally remain the same on the southern alternative alignments with and without the proposed improvement except for sections of US 87, SH 158, and SH 277/SH 70 with various alternatives;
- With the exception of S10A and S10B, 40 to 50 percent of the southern alternative alignments are currently four-lane facilities or are programmed to be widened to four lanes;
- The alternatives extending to Laredo would require the highest amount of right-of-way acquisition to accommodate the continuous four-lane widening, ranging from approximately 5,300 acres for S8 and 7,300 acres for S10B;
- The proposed improvement along the southern alternatives could potentially require displacements ranging from 16 residential or commercial facilities with S10A to 63 with S7B;
- The estimated construction cost (excluding annual operations and maintenance) for improving the alternatives extending to Laredo range from $744 million for S8 to $845 million for S10B;
- The alternatives extending to Laredo cross 16 (S7B and S7C) to 19 (S10B) water features, with the alternatives extending to Del Rio crossing 11 and 14;

- The S7C corridor serves the highest population with approximately 800,000 persons with other alternatives extending to Laredo serving 700,000 persons; and,
- Alternatives S7B and S10B are estimated to generate a total of approximately $513 billion and $590 billion in economic development benefits (through year 2041) respectively, which is more than the other southern alternatives.

RECOMMENDATIONS

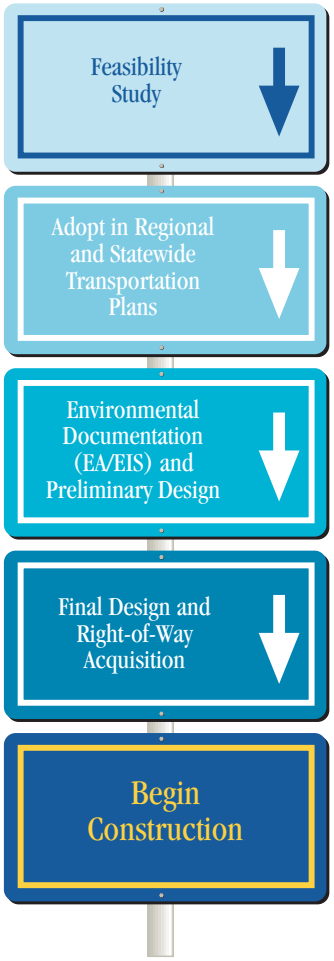
This study does not recommend a preferred alternative. However, the detailed evaluation results documented in this report should provide a wealth of technical information regarding the impacts and feasibility of alternative highway alignments that can be used by the State Departments of Transportation and their respective Transportation Commissions in selecting a preferred alternative and identifying other needed improvements. The Departments of Transportation/Transportation Commissions will supplement the detailed evaluation results of this study with other statewide policies and issues to determine the preferred alternative.

A continuous four-lane highway was not found to be feasible along the entire corridor limits between the Texas/Mexico border and Denver based on the travel efficiency feasibility analysis. Accordingly, this study identifies other potential highway improvements that should be considered for improving traffic operations and safety along the Ports to Plains corridor. These potential highway improvements include additional truck climbing lanes, intersection improvements, Intelligent Transportation System (ITS) measures, and consideration of relief routes in corridor towns/cities.

PROJECT DEVELOPMENT PROCESS

This *Ports to Plains Feasibility Study* and selection of the preferred alternative by the participating Departments of Transportation is the first phase in the overall project development and implementation process. The preferred alternative will need to be adopted in the appropriate Regional and Statewide Transportation Plans, followed by environmental documentation in accordance with NEPA regulations, preliminary and final design, right-of-way acquisition, and finally actual construction by smaller and logical segments than the entire Ports to Plains corridor. These future project development/implementation phases will be dependent upon the success of securing the required federal and/or state funds.

From Feasibility to Construction



ENGINEERS
PLANNERS
ECONOMISTS

Wilbur Smith Associates
TEAM

Texas New Mexico Colorado Oklahoma Texas New Mexico Colorado Oklahoma Texas New Mexico Colorado Oklahoma Texas New Mexico Colorado Oklahoma Texas New Mexico

PORTS TO PLAINS
FEASIBILITY STUDY