What is NCTCOG?

The North Central Texas Council of Governments is a voluntary association of cities, counties, school districts, and special districts which was established in January 1966 to assist local governments in planning for common needs, cooperating for mutual benefit, and coordinating for sound regional development.

It serves a 16-county metropolitan region centered around the two urban centers of Dallas and Fort Worth. Currently the Council has 229 members, including 16 counties, 162 cities, 23 independent school districts, and 28 special districts. The area of the region is approximately 12,800 square miles, which is larger than nine states, and the population of the region is over 5.5 million, which is larger than 30 states.

NCTCOG’s structure is relatively simple; each member government appoints a voting representative from the governing body. These voting representatives make up the General Assembly which annually elects a 15-member Executive Board. The Executive Board is supported by policy development, technical advisory, and study committees, as well as a professional staff of 208.

NCTCOG’s offices are located in Arlington in the Centerpoint Two Building at 616 Six Flags Drive (approximately one-half mile south of the main entrance to Six Flags Over Texas).

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NCTCOG’s Department of Transportation

Since 1974 NCTCOG has served as the Metropolitan Planning Organization (MPO) for transportation for the Dallas-Fort Worth area. NCTCOG’s Department of Transportation is responsible for the regional planning process for all modes of transportation. The department provides technical support and staff assistance to the Regional Transportation Council and its technical committees, which compose the MPO policy-making structure. In addition, the department provides technical assistance to the local governments of North Central Texas in planning, coordinating, and implementing transportation decisions.

Prepared in cooperation with the Texas Department of Transportation and the U. S. Department of Transportation, Federal Highway Administration, and Federal Transit Administration.

“The contents of this report reflect the views of the authors who are responsible for the opinions, findings, and conclusions presented herein. The contents do not necessarily reflect the views or policies of the Federal Highway Administration, the Federal Transit Administration, or the Texas Department of Transportation.”
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Interstate Highway 30/Tom Landry Freeway Managed Facility Operational Plan Proposal to Federal Highway Administration, Value Pricing Pilot Program Tea-21 Section 1216(A) Value Pricing Pilot Program Application
Executive Summary

1.1 PROJECT INITIATION

The North Central Texas Council of Governments (NCTCOG) has conducted a Regional Value Pricing Evaluation Study for the Dallas-Fort Worth Region. This project is the first of a three-phase study funded in part through a grant from the Federal Highway Administration’s (FHWA) Value Pricing Pilot Program in 2002. With this grant, a Regional Value Pricing Project Review Committee (PRC) was established to direct the pursuit of implementation strategies supporting managed facility concepts recommended in the region’s Metropolitan Transportation Plan as well as identify new implementation strategies. The PRC consists of representatives of the following agencies:

- Dallas Area Rapid Transit (DART)
- Denton County Transportation Authority (DCTA)
- Fort Worth Transportation Authority (FWTA)
- North Texas Tollway Authority (NTTA)
- North Central Texas Council of Governments (NCTCOG)
- Texas Department of Transportation (TxDOT)
- Texas Transportation Institute (TTI)
- Federal Highway Administration (FHWA).

Through the combined efforts of the PRC, the best approach was developed for selecting and applying pricing strategies to transportation projects in the North Central Texas region.

1.2 DEFINITION OF VALUE PRICING AND MANAGED LANES

FHWA describes value pricing, also known as congestion pricing or peak-period pricing, as a way of harnessing the power of the market and reducing the waste associated with congestion, using fees or tolls for road use, which vary with the level of congestion. Fees are typically assessed electronically to eliminate delays associated with manual toll collection facilities. This concept of assessing relatively higher prices for travel during peak periods is the same as that used in many other sectors of the economy to respond to peak-use demands. Airlines offer off-peak discounts and hotel rooms cost more during peak tourist seasons. Road-use charges that vary with the level of congestion provide incentives to shift some trips to off-peak times, less-congested routes, or alternative modes, or to cause some lower-valued trips to be combined with other trips, or to be eliminated. A shift in a relatively small proportion of peak-period trips can lead to substantial reductions in overall congestion. And, while congestion charges create incentives for more efficient use of existing capacity, they also provide improved indicators of the potential need for future capacity expansion. They also generate revenues that can be used to further enhance urban mobility (source: www.hhh.umn.edu/centers/slp/proects/conpric).

In the Dallas-Fort Worth Region, the term “managed lanes” encompasses all types of lane management strategies, including occupancy and price based lane or facility management (i.e., High Occupancy Vehicle [HOV] lanes or pricing by occupancy, time of day, congestion level, etc.).

1.3 MOBILITY IN THE DALLAS FORT-WORTH REGION

The Dallas-Fort Worth Region is experiencing ever-increasing traffic congestion. This is primarily due to the enormous growth
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According to recently published data by the Texas Transportation Institute, the Dallas-Fort Worth region has seen its population, cars, and traffic increase over the past 20 years. From 1982 to 2002, the area’s population increased by almost 70% (growing from 2.5 million in 1982 to 4.2 million in 2002). According to NCTCOG’s official demographic datasets, in 2005, there will be over 5.6 million persons in the Dallas-Fort Worth metropolitan planning area. At the same time, the annual delay (in person-hours) has increased by 950 percent (growing from 14,132 hours in 1982 to 147,000 hours in 2002). More importantly, the Dallas-Fort Worth Region’s traffic congestion has deteriorated at a faster pace than most other urban areas. In 1982, the region ranked #11 in person hours of delay at the national level. By 2002, the region ranked #5 in person hours of delay. Figure 1-1, which was included in the Texas Metropolitan Mobility Plan, shows areas of moderate and severe peak-period congestion as well as the severity of roadway capacity deficiencies in the region. The Texas Metropolitan Mobility Plan addresses a statewide initiative to quantify long-range needs within the larger metropolitan areas of the state and to develop a shorter range prioritized listing of projects aimed
Executive Summary

at improving mobility and managing traffic congestion and reducing air quality impacts. This Plan serves as a comprehensive, multimodal blueprint for transportation systems and services within the Dallas-Fort Worth region. It is not constrained by anticipated revenues. It recognizes the heightened awareness of the growing concerns for improved air quality, public acceptance of major transportation facilities, and the need for adequate financial resources for Plan implementation.

During this time period, both the roadway system and public transportation system have been expanded, with an increase in the region’s roadway network by 28 percent (total centerline miles have increased from 13,940 in 1982 to 17,780 in 2002). Similarly, the region’s public transit investments have increased the annual passenger miles of travel by over 300%.

It is apparent that even with the region’s investment in new roads and public transit, the region’s growth has outpaced its ability to accommodate its transportation demand.

1.4 POTENTIAL APPLICATION OF VALUE PRICING IN THE DALLAS-FORT WORTH REGION

In the Dallas-Fort Worth Region, pricing strategies could be used as a demand management strategy to avoid the need to add capacity, or to raise revenue for additional capacity on tollways or freeways, or a combination of both. Current active projects in California, Texas, Florida, and New York have shown that value pricing can be an effective technique for managing congestion and raising revenue on highway facilities. This study includes an overview of these existing projects and other pricing studies.

The existing highway system in the Dallas-Fort Worth Region is composed of three types of roadways: freeways, tollways, and HOV lanes. Figure 1-2 shows the Dallas-Fort Worth Region’s roadway system. These roadway types are owned, operated and maintained by separate agencies, each having a specific mission relating to the types of facilities under its control. TxDOT constructs and maintains the freeway network, which includes non-tolled, limited-access facilities. Tollways in this region are owned and operated by the NTTA, which are authorized to raise construction
capital through the issuance of bonds, and to collect tolls to repay those bonds and to operate and maintain the facility. The HOV lanes are operated by DART and are open to transit vehicles and HOVs, with the goal of improving transit travel times and encouraging ridesharing.

This regional study, which was conducted over a two-year period, resulted in the establishment of criteria, policies, and procedures to identify potential candidates for a short-term value pricing demonstration project. The study also included development of regional guidelines that can be used to identify potential managed facilities as part of the region’s metropolitan transportation planning.

1.5 STUDY METHODOLOGY AND STEPS

The goal of this study was to develop a methodology to identify potential facilities and corridors on which value pricing could be desirable.

This study included the review of a broad range of value pricing concepts, techniques, and information from other value pricing studies and roadway projects to establish the most appropriate value pricing screening criteria for this region. These screening criteria could be applied to all corridors to identify those corridors showing the highest potential for immediate action. The study consisted of the following tasks:

- Review Value Pricing corridors nationally and internationally
- Develop Regional Guidelines for Implementing Value Pricing
- Develop recommendations for short-term implementation of a demonstration project
- Identify a long-range mechanism for evaluating potential application for value pricing in the Dallas-Fort Worth Region.

The results of these tasks are described in detail in the following chapters:

- Chapter 2: Value Pricing History and Experience
- Chapter 3: Guide for Applying Value Pricing in the Dallas-Fort Worth Region
- Chapter 4: Application of Criteria to Select a Short-Term Demonstration Project
- Chapter 5: Application of the 10 Criteria for the Long-Term Consideration of Value Pricing
value pricing history and experience

Researching other agencies’ experiences with value pricing projects provides important lessons about project experiences, challenges, issues, and opportunities. The research for this study included collection and review of information on established projects and demonstration projects that are part of the FHWA Value Pricing Pilot Program.

The overall purpose of this portion of the study is to understand and apply the lessons learned from other studies, and not to create a comprehensive report on the general status of value pricing. Therefore, the information collected is being used to focus on the most relevant applications to facilities in the Dallas-Fort Worth Region so that the Project Review Committee can develop appropriate screening criteria to reach its short-term and long term goals. Some of the issues facing other agencies involved with value pricing have included:

- Travel Demand at different pricing levels
- Emission levels and air quality
- Operational and infrastructure requirements
- Equity
- Public and political acceptance
- Relative changes in transit
- Revenue and cost ratios
- HOV and carpool usage
- Congestion levels
- Institutional or Industry inhibitors (such as bond covenants)
- Time savings benefits
- Performance measures or measures of effectiveness
- Safety benefits
- Risk assessment.
- Technology
- Enforcement

Many of these issues will also be relevant to this study, and ultimately may be used to screen the freeway, tollway, and HOV corridors in the Dallas-Fort Worth Region to determine where value pricing applications may be appropriate, either as short-term pilot projects or for inclusion in the Metropolitan Transportation Plan. In addition, any future phases of planning or implementation of value pricing in the Dallas-Forth Worth region will be enhanced by the understanding of the successes (and challenges) of previous projects. To that end, contact information, including a project representative and an official website, have been included at the end of the descriptions of the ongoing projects so that members of the study team can contact agencies with questions that may arise after this study is completed.

2.1 HISTORY

In Clarkson Oglesby’s 3rd edition of Highway Engineering (1975) he wrote “…for a number of years, economists have proposed that more ‘economically efficient’ use could be made of highways … by imposing graduated user charges. These ‘efficiency tolls’ would be set at high levels during periods of high demand, so that only those willing to pay a high price would use the facilities. With volumes reduced, congestion and
resource consumption likewise would be reduced. Only on ‘congestion-free’ facilities would there be no charge at all.” Further, Oglesby states that “although road pricing would produce revenue for road improvement or other governmental uses, this is not its primary purpose; rather the income would be a desirable byproduct accompanying the main objective of more efficient road use. It can be argued that similar results might be obtained by subsidizing or even paying people to use mass transportation or to join car pools. The real world problem with this stratagem is that it would call for added spending by already financially pressed governmental agencies.”

In 1991, the U.S. Congress authorized the Congestion Pricing Pilot Program as part of the Intermodal Surface Transportation Efficiency Act (ISTEA) to encourage the testing and evaluation of value pricing concepts in a variety of locations nationwide. This program was designed to provide federal support to state and local governments or other public authorities to develop local road pricing programs; to plan, implement, monitor, and evaluate road pricing projects; and to study their effects. Due to the positive experience under the ISTEA legislation, this innovative program was reauthorized and expanded as the Value Pricing Pilot Program in the Transportation Equity Act for the 21st Century (TEA-21). The Federal Highway Administration (FHWA) and its project partners have now had over 14 years of experience with the pilot program, with dozens of projects currently funded, and nearly $30 million in federal funds provided to support these projects. The federal funding amounts have ranged from $150,000 to over $2,000,000 per project.

Established value pricing programs are currently operational in Orange County (SR-91) and San Diego (I-15), California; Houston, Texas (Katy Freeway and US 290); Lee County, Florida (the Leeway); Minnesota; and the Port Authority of New York and New Jersey. In addition, demonstration projects (projects that have been funded but have not begun, or have just begun operations) in California, Colorado, Florida, Georgia, Maryland, Massachusetts, New Jersey, North Carolina, Oregon, Pennsylvania, Texas, and Washington are now providing results from which the Dallas-Fort Worth Project Review Committee can learn valuable lessons.

In addition to projects in the United States, value pricing has been implemented, or at least considered, in a number of other countries. As early as 1975, for example, a peak-period charge for entry into a restricted downtown zone was instituted in Singapore. The fees, together with improved public transportation and bypass roads, have helped to control central area traffic over a long period of time. In 1998, Singapore introduced variable tolls on three principal motorways into the central area. Other locations with operational value pricing projects include Norway; the Netherlands; London; France; Germany; Seoul, South Korea; Hong Kong; and Toronto, Canada.

2.2 VALUE PRICING FACILITIES AND EXPERIENCE

Value pricing implementation strategies are developed according to the presence and type of facility that currently exists at that location. In general, value pricing projects fall into the following categories:

- Pricing HOV Lanes: Selling excess capacity on existing HOV facilities to create High-Occupancy/Toll (HOT) lanes
- Applying Value Pricing on Tollways: Implementing variable tolls (by time of day, vehicle classification, congestion level, etc.) on an existing toll facility or designing a new tollway with variable tolls
- Pricing Freeways: Adding new priced lanes to existing freeways or converting a freeway to a toll facility using value pricing.

Examining the common features of value pricing programs on these three types of facilities can give valuable insight into future projects.

2.2.1 State Route 91 (SR-91), Orange County, California

The State Route 91 (SR-91) Express Lanes opened in December 1995 as a buffer-separated toll facility in the median of a heavily congested 10-mile section of urban commuter freeway connecting the Riverside-Orange County line and the Newport-Costa Mesa Freeway (State Route 55). The SR-91 corridor is one of the most heavily traveled and congested routes in Orange County, California, carrying nearly 250,000 vehicles per day with typical reported peak period delays of 30-40 minutes.

The SR-91 project was funded totally by private sources through the California Private Transportation Company (CPTC) for approximately $126 million. The Express Lanes system is in operation at all times with tolls collected electronically using the FasTrakTM system at full highway speeds
value pricing history and experience

(see Figure 2-1). Toll collection is done entirely by electronic transponders that meet the California standard for seamless operation with electronic tolling systems statewide. The variable tolls range from $1.05 (off-peak) to $7.00 (highest-peak toll). In addition, there are several discount incentive plans offered to SR-91 customers. For example, for a $20/month fee, customers can belong to the “91 Express Club,” which offers a $1.00 discount on every trip.

The system is made up of four lanes, with two on either side of a median that divides the directions of travel (see Figure 2-2). The Express Lanes are physically separated from the same-direction general travel lanes by a painted buffer area and plastic pylons. The pylons are spaced so that vehicles cannot pass between them. To boost carpooling and to keep traffic moving on the new lanes, tolls are adjusted according to the time of day, and direction of travel, with a discount for HOV-3+ vehicles.

Throughout the project study and implementation stages, surveys were conducted to involve the public in the development of the Express Lanes system. Because the SR-91 Express Lanes provide a valuable opportunity to learn more about how travelers and travel conditions are affected by time-of-day road pricing, Caltrans and the

FHWA Value Pricing Pilot Program have sponsored a multi-year monitoring and evaluation study by California Polytechnic State University, San Luis Obispo. The purpose of the study is to compile data such as traffic volume, speed and occupancy measurements, origin-destination and public opinion surveys, accident records, and ridership on parallel public transit lines. The initial study of the operation of the Express Lanes has yielded a number of important observations:

Figure 2-1: Electronic Toll Collection along SR-91 and Separation of Express Lanes from General Use Lanes

Figure 2-2: Free Flow Express Lanes Adjacent To Congested General Use Lanes on SR-91
• Traffic on the Express Lanes continued to increase steadily through the first years of operation. During this period of traffic growth, price changes were successful in maintaining peak-hour traffic free flow.

• Travelers do not necessarily use the Express Lanes on a consistent basis. Half the customers use the lanes once a week or less. The observed proportions of traffic using the Express Lanes closely mirror the amount of delay avoided.

• The socio-economic profile of Express Lanes users is quite similar to that of the other travelers on the corridor. While the frequency of Express Lanes use is somewhat correlated to income, 25 percent of the lowest income group identified in the study state they are frequent Express Lanes users. Female commuters are significantly more likely than male commuters to be frequent Express Lanes users.

• About 75 percent of the commuting public expressed approval of virtually all aspects of the Express Lanes after eighteen months of operation. However, approval of variable tolls and private sector involvement was initially lower, increasing after about a year of experience with the operation.

• Behavioral studies have confirmed that users value time savings very highly and are willing to pay high prices to avoid congestion.

The CPTC has emphasized that a key element to successfully building the facility was public input and customer use. The customers played an important part in the decision process and planners feel that this public involvement was a major reason for its successful implementation. In addition, marketing was, and continues to be, an important component in making the value pricing program successful. The CPTC, along with local businesses, offers a variety of discounts to encourage the use of Express Lanes. Some of the incentives offered are discounts on the purchase of gasoline and $1,000 in tolls offered by homebuilders with the purchase of a new home.

In January 2003, the Orange County Transportation Authority (OCTA) purchased the SR-91 Express Lanes from the CPTC. The facility was originally constructed with a non-compete agreement that limited additional parallel highway capacity to protect private investors. The purpose of the acquisition was to eliminate this non-compete agreement and allow capacity improvements in the SR-91 corridor that benefit motorists not using the toll lanes. The public acquisition of the Express Lanes will redirect toll revenues to general toll road operating expenses and debt repayment, ongoing maintenance to the lanes, and improvements in the SR-91 corridor.

2.2.2 Interstate 15 (I-15), San Diego, California

The Interstate 15 (I-15) corridor is an eight mile segment located in San Diego, California. It is considered one of the most congested corridors in the San Diego, California, area. HOV-2+ lanes were implemented in the corridor in 1988, but were underutilized through the early 1990’s. Volumes of fewer than 1,000 vehicles per hour per lane, indicating a level of service A (LOS A), were measured. The San Diego Association of Governments (SANDAG) board members developed a solution aimed at increasing the use of the under-utilized facility by allowing solo drivers to pay to use the facility. In 1992, SANDAG received a Federal Transit Administration (FTA) grant to design alternative value pricing strategies to more effectively utilize the excess capacity observed in the HOV lane system. In 1995, SANDAG received a FHWA grant to further study and implement the FasTrakTM High Occupancy Toll (HOT) Lane system (the same system used on SR-91). The main goals of the I-15 project included:

• Maximizing the use of the I-15 express HOV Lanes that already existed
• Determining if allowing solo drivers to use the express HOV lanes relieved congestion on the general lanes
• Improving air quality
• Funding HOV improvements and new transit improvements
• Developing a market-based approach to set tolls for the express HOT Lanes.

In operation since December 1996, the I-15 FasTrakTM project has been successful in meeting its primary goals of maximizing the use of the excess capacity on the I-15 HOV lanes. The program is comprised of two reversible lanes throughout an eight-mile segment of I-15. Concrete barriers located in the median separate these lanes from the general use travel lanes. Access to the lanes is available at only
the two endpoints (see Figure 2-3). During the morning peak period (5:45 a.m. to 9:15 a.m.), the lanes only operate in the southbound direction. In the afternoon peak period (3:00 p.m. to 7:00 p.m.), this system is reversed and only accommodates northbound trips.

The FasTrakTM system boasts the first dynamic toll collection system in the world (see Figure 2-4). Dynamic tolls are fees that vary by time and level of observed congestion based on real-time conditions. Under State legislation signed into law in 1994, single occupancy vehicles were offered use of the FasTrakTM system for a fee. Also included in this legislation was a requirement that the HOT lanes be priced to ensure they operate at the preexisting level of service (LOS) prior to the addition of single occupancy vehicles (LOS C).

Carpools of two occupants or more continue to use the system for free, while solo drivers who wish to use the HOT lanes can obtain a transponder for a $40 deposit. This allows them to pay a toll to use the facility by using a pre-paid FasTrakTM account. The prices can vary from $0.50 to $4.00 (and possibly up to $8.00 in very severe congestion), depending on the time of travel and level of congestion. To ensure acceptable levels of service, the prices can vary dynamically in as little as every six minutes. In addition, transit service along I-15 has improved, with the establishment of a new express bus route funded from revenues from the project that were used to start a new express bus system called the Inland Breeze.

In 2000, the average weekday traffic using the I-15 express lanes was 16,900 vehicles per day (VPD). Of this total, 3,900 were comprised of single-occupancy vehicles (SOV’s), with the remaining 13,000 split among carpools of two occupants or greater (HOV-2+). By 2002, total express lane volumes had increased to 4,700 SOV’s and 14,800 HOV-2+ each day, which represent increases of approximately 13% and 15%, respectively. The most recent data from SANDAG indicate that this growth trend has continued, with 5,200 SOV’s and 16,100 HOV-2+ using the express lanes each day during March 2003.
violation rate for California has a “first offense” fine of $271. In October 1996, illegal SOV’s comprised 17 percent of total vehicles on the HOV lanes. Throughout the ExpressPass and FasTrakTM program phases, violation rates have ranged between three and five percent of total traffic, whereas typical HOV lane violation rates throughout California range between five and ten percent.

The I-15 Value Pricing Project is generally considered a success, so much so that in September 2001, Governor Gray Davis signed SB 313, which eliminated the sunset date on the project. In addition, building on the success of the I-15 Value Pricing Project, the I-15 Managed Lanes project will create a 20-mile managed lane facility in the median of I-15 to the north of the existing I-15 Value Pricing Project. When completed, this new facility will include a four-lane HOV facility with a movable barrier, multiple access points throughout the facility to the regular highway lanes, and a high frequency Bus Rapid Transit system that will operate in the managed lanes. A study funded with a $950,000 FHWA grant is currently underway to examine the feasibility of conducting value pricing on these managed lanes. Extensive public outreach has indicated that equity was not considered a major obstacle to implementing pricing on the managed lanes and that the majority of those surveyed felt that pricing the lanes was fair for travelers on the main lanes.

### 2.2.3 Interstate 10 (I-10) and US 290, Houston, Texas

The I-10 (Katy Freeway) corridor is a 13-mile-long HOV segment located in Houston, Texas, connecting Washington Avenue to State Highway 6 and serving commuters traveling from Brazos River to Downtown Houston. Originally an HOV-2 facility, Houston Metro (METRO) and the Texas Department of Transportation (TxDOT) decided at that time to reduce congestion in the lane by restricting peak hour use to vehicles with three or more occupants (HOV-3). The change reduced the number of vehicles by more than half and restored speeds to free flow. In the mid-1990’s, METRO, TxDOT, and the Texas Transportation Institute (TTI) began a study of strategies for value pricing the segment of the Katy Freeway between Washington Avenue and State Highway 6. The main goals of the project were to improve traffic operations on the under-utilized HOV facility in the corridor. Local planners predicted that the proper capacity could be achieved somewhere between HOV-2 and HOV-3, so another method of optimizing the use of these lanes that would not load them to failure was needed.

METRO began value pricing on the Katy Freeway by allowing HOV-2 vehicles to buy into the HOV-3 lanes. Likewise, in mid-1999, the HOV lanes on US 290 (Northwest Freeway), just to the north of I-10, were given a 3+ carpool requirement, and this facility was approved for the QuickRide program. QuickRide was implemented on US 290 in November 1999.

The lanes operate in the morning between 5:00 a.m. and 11:00 a.m., and in the afternoon between 2:00 p.m. and 8:00 p.m. and QuickRide allows two-person carpools to pay to use the HOV lane during peak hours (6:45 a.m. - 8:00 a.m. and 5:00 p.m. - 6:00 p.m.) for a fee of $2.00. Other HOV’s with three or more occupants are still permitted to use the facility for free as they could before, and two-person carpools may use it without charge any time other than peak hours. SOV’s are not allowed on the Katy HOV lane at any time. To assure that travel conditions remain optimal for all HOV’s, the target maximum number of QuickRide vehicles was established at 600 during each peak hour.

The program started at a relatively low cost, in large part because existing resources could be utilized inexpensively. For example, enforcement is economical because METRO Police are already present at HOV exit locations. Also, no new toll collection equipment was needed in the field because transponder readers were already in place. Today, peak hour travelers on the HOV lane save an average of 18 minutes compared to travelers on the non-priced lanes.

Daily use by HOV-2 paying participants has been between 150 and 200 vehicles for both peak periods combined. The vast majority of enrollees are occasional users of QuickRide. About 25 percent of transponders are used in a given week, and about five percent of transponders are used five or more times per week. Revenues from QuickRide cover the nominal operating costs associated with maintaining and servicing participant accounts (approximately $100,000 per year excluding capital, marketing, and start-up costs paid from the value pricing funds, and enforcement and enrollment services otherwise in place as part of other METRO programs). Start-up costs in Houston were much less than they would have been had existing systems not been in place.
Even though the QuickRide Program has proved rather successful, there is still under utilization of the HOV lane during operating times. In 2000, TxDOT and METRO received FHWA funds and initiated a new study to look at improving the QuickRide program while increasing the utilization of the HOV lane and giving direction for the management of future priced or managed lanes. The usage of the QuickRide program has been relatively low, despite a time savings of about 20 minutes per trip. The study indicates that the limited use could be related to the low value users place on travel time savings, and the inconvenience of forming a two-person carpool. Still, over half of QuickRide trips seem to come from previous SOV trips, though surveys show that most of these drivers have had prior experience with the HOV lane and are most likely not new HOV lane users.

The evaluations of the QuickRide program show that improvements are needed in the areas of pricing schemes, lane use and toll collection enforcement, toll collection and tag reader technology, and public understanding of the roles and objectives of the QuickRide program. The study suggests that TxDOT and METRO may wish to experiment with lower fees to encourage higher usage. One of the greatest challenges for TxDOT and METRO was educating and communicating to the public and policymakers the benefits of value pricing, and the report suggests that additional marketing, personal interviews, and focus groups might be helpful to determine the causes contributing to low demand and usage of the program.

2.2.4 LeeWay, Lee County, Florida

The LeeWay electronic toll collection system is made up of the Cape Coral and Midpoint Bridges, and the Sanibel Island Causeway/Bridge, in Lee County, Florida, and is operated by Lee County. Average weekday volume on the bridges varies between 60,000 and 65,000 vehicles. The primary goal of the value pricing project was to examine the effects of pricing on existing congestion, as well as install the technical infrastructure needed for future congestion management projects. The value pricing strategy was implemented in 1997 and included a variable toll rate for peak and “shoulder” peak periods. Because traffic congestion was not as severe during off-peak times, a reduced toll rate was implemented immediately during the shoulder peak times prior to and after the heaviest travel times. The shoulder periods, when there is a 50 percent discount on the peak period tolls, are from 6:30 a.m. to 7:00 a.m. and 9:00 a.m. to 11:00 a.m. and from 2:00 p.m.-4:00 p.m. and 6:30 p.m.-7:00 p.m.

Comparing pre- and post-value pricing implementation, data indicate that little change has occurred in the driving times of bridge travelers not eligible for variable pricing discounts. However, the travel pattern changes of patrons eligible for the variable pricing discount tolls reflect a significant shift of travel out of the peak on their bridges. Most half-hour time periods during discount hours experienced a significant increase in traffic, while traffic decreased significantly during peak periods. The data collected to date indicates that bridge travelers are responding to variable pricing as predicted, shifting their travel times from peak periods to discount (off-peak) shoulder periods. The data will be updated as the project continues and will be supplemented with telephone and travel survey data to determine why people altered their travel times and to examine the socio-economic characteristics of this group of bridge users.

As with other value pricing systems, Lee County officials have stressed the importance of gaining support from local politicians and the public. In addition, Lee County suggested that a system of collecting quality data and studying performance measures be established during the operation of the LeeWay program. These tools allow the research groups and the public to accurately measure the impacts and benefits of value pricing. Marketing of the LeeWay was and continues to be an important feature of its success. The LeeWay public outreach and education program focuses on informing customers that they are saving money instead of spending it.

Lee County is currently in the final phases of a new study to determine the feasibility and costs of constructing value priced queue jump facilities within the County. The LeeWay’s queue jumps would consist of elevated structures, similar to freeway entrance ramps, which would allow some traffic to bypass congested areas. The facilities would be equipped with electronic toll-collection, and tolls for use of the facility would vary by time of day or degree of congestion. Preliminary results from the study indicate the possibility that such queue jumps could pay for themselves over the twenty to thirty year lifespan of the structure.
2.2.5 Variable Tolls on the New Jersey Turnpike and River Crossings

The New Jersey Turnpike Authority operates a 148-mile, 28-interchange facility and is one of the most heavily congested roadway systems in the country, with average daily traffic exceeding 500,000 vehicles. The Turnpike charges tolls based on the length of travel, number of axles, vehicle type, and tare weight. With a FHWA grant of $477,000, the Turnpike Authority, in conjunction with the New Jersey Department of Transportation, is conducting a study to monitor the impacts of the Value Pricing Initiative that was implemented in October 2001. The research team is particularly interested in travel behavior changes resulting from value pricing.

Likewise, the Port Authority of New York and New Jersey (PANYNJ) oversees the maintenance and construction of several bridges and tunnels connecting New Jersey to New York. Several bridges and tunnels are priced for peak and off-peak periods by type of vehicle. In addition, commuters are given discounts for use of the EZPass on the George Washington Bridge, Lincoln Tunnel, Holland Tunnel, Goethals Bridge, Outerbridge Crossing, and Bayonne Bridge. As part of its initial study, funded with a $594,000 FHWA grant, PANYNJ emphasized the behavioral impacts of the value pricing initiative, monitoring the behavior of business and commercial vehicle operators, impacts on different socio-economic segments, media relations, and impacts to the traffic surrounding network. However, since the events of September 11, 2001, the demands on the PANYNJ facilities have changed. The project team continues to meet with focus groups made up of commercial vehicle and passenger car drivers to better understand how these drivers make transportation choices.

2.2.6 Value Pricing on Ten Corridors, Maryland

At the request of the Maryland General Assembly, Maryland’s Variable Pricing Feasibility Study was initiated in September 1999 through a $687,000 grant from the FHWA (plus $220,000 of matching state funds). The goals of Maryland’s study were to boost transportation efficiency and equity, expand travel choices, and reduce emissions. Maryland’s Variable Pricing Study included an investigation of value pricing strategies on ten transportation facilities in the Baltimore-Washington metropolitan area, including five highway (free) corridors and five toll facilities: I-270 from the Capital Beltway to Frederick County; I-495/I-95 (Maryland portion of the Capital Beltway); MD 210; US 50; I-95 (between the Baltimore and Washington beltways); the Fort McHenry Tunnel; the Baltimore Harbor Tunnel Thruway; the Francis Scott Key Bridge; the William Preston Lane, Jr. Memorial “Bay” Bridge; and I-95 between the Fort McHenry Tunnel and the Delaware State Line.

Phase I of the study included screening various strategies to determine which make the most sense in each corridor and which could be eliminated. Phase II included several technical studies, including travel demand modeling, pricing strategies, toll collection technology, enforcement, equity, legal issues, infrastructure requirements, and methods of lane separation. Maryland’s Study Team worked closely with a Stakeholder Committee and a Steering Committee to assess the interests of all road users in Maryland and guide the study. Through the 18-month study, several preliminary short-term (2-5 years) pilot projects and long-term recommendations were identified. A pilot program for converting the proposed HOV lanes on US 50 to HOT lanes was developed, but was ultimately removed from consideration when the Governor of Maryland determined that HOT lanes were not the appropriate solution for the US 50 corridor. The Governor’s decision to exclude new toll lanes as a method of reducing congestion and improving transit ridership in Maryland was based on the perceived inequity of linking an easier commute with a person’s ability to pay.

Some of the lessons learned from this initial value pricing experience included engaging the public early in the process and finding a political champion to promote the concept of value pricing on a particular facility. Other technical challenges encountered by the Maryland team included implementing toll collection on “free” highways, enforcement, and separation of HOT/HOV lanes from general use lanes on highways with closely spaced interchanges.

As of early 2004, several major highway projects and planning studies in Maryland have again formally incorporated HOT facilities in the planning process. Called Express Toll Lanes, new tolled lanes are being studied at some of the state’s most congested facilities including I-270 and I-495 (Capital Beltway) near Washington, D.C., and I-695 (Baltimore Beltway) and I-95 north of Baltimore. Since the lanes would be newly constructed instead of HOV lane conversions, it is likely
that all vehicles would pay a toll for access to these facilities.

### 2.2.7 Minneapolis, Minnesota

In March 1997, the Minnesota Department of Transportation (Mn/DOT) completed its study of region-wide, as well as specific facility focused value pricing applications in the Twin Cities of Minneapolis and St. Paul. Extensive modeling of impacts and innovative techniques to involve and educate the public were used to gather support for further study of pricing options. Planners utilized videos, meetings, and media outreach to maintain public awareness of the study. However, the public’s reaction to the study centered on notions that the present congestion levels were not critical enough to require immediate implementation and revenues should be spent on roadway improvements and maintenance. There were also concerns about diverting traffic to secondary roadways. Furthermore, a perceived lack of available alternatives raised concerns about adverse equity impacts. All of these concerns led to the consensus that regional value pricing was not yet a practical solution.

At the end of the study, recommendations included introduction of a HOT lane on the I-394 HOV facility spanning 13 miles. This plan to implement HOT lane congestion pricing in the Twin Cities was placed on hold, however, due to the perception of unfairness (“Lexus Lanes”) and resulting political concerns at the approaching election time in 1998.

A new attempt to incorporate value pricing in and around the Twin Cities Metropolitan area was begun in late 1999. The goals of this study were to manage current and future travel demand, reduce congestion, support smart growth initiatives, improve air quality and energy use, and provide a source of revenue. Various facilities, such as freeways, expressways, and other congested areas, were investigated for pricing options. A major focus of this study was public outreach and involvement. If variable pricing concepts were to be used on these facilities, SOV users would pay a toll, and HOV commuters would use the facility for free. The study proposed electronic toll collection for the facility to remove an unnecessary time delay in HOV lanes for the SOV users. Equipment would be placed on each customer’s car and gantries would be set up every half-mile.

After extensive study, researchers discovered that focus groups and special meetings of impacted groups must be an integral part of the planning process. Public input and acceptance are crucial for implementing a value pricing strategy. The study group also discovered that equity issues needed to be addressed in the early stages of the project to prevent questions that might arise later and cause problems for project implementation. Mn/DOT must also indicate to the public how the revenues collected from HOT lanes would be used. Improvements to transit have been deemed by the public to be a reasonable use of toll revenues, particularly if transit could be used to provide a reasonable travel alternative in that corridor. Other public concerns, such as the impact of traffic diversion on parallel arterial and collector roads, would also need to be addressed.

There controversy over whether the new HOV lanes should be converted to HOT lanes or opened to all users for a fee continued. One reason for the lack of public support was the unfamiliarity with the concept of road pricing and its benefits because there are no toll roads in the metro area. Based on their experience, the Mn/DOT project team believes that a political champion is essential to the development and implementation of a value pricing project. The lack of support from a local political figure can make it difficult to gain public support.

In April 2003, the Governor and Lieutenant Governor of Minnesota announced their support of user fee financed lanes to address transportation capacity concerns in key interstate and state highway corridors. This plan was based on a federal proposal that would permit the collection of user fees to finance interstate highway expansion to reduce traffic congestion. The Minnesota Legislature passed high-occupancy toll legislation during the 2003 legislative session, authorizing Mn/DOT to charge fees to single-occupant vehicles for the use of HOV lanes. In November 2003, the Governor and Lieutenant Governor approved a plan to convert the existing HOV lanes on I-394, in the western suburbs of Minneapolis-St. Paul, to HOT lanes. Speeds at or near the posted speed limit would be maintained by varying the toll charged to SOVs according to use and demand of the HOT lanes, which would use variable message signs to notify drivers of the current toll and use the MnPass ETC system to collect tolls. After ten years of research, education, outreach, and several unsuccessful attempts to implement a value pricing pilot project, Minnesota opened its first HOT lanes on I-394 in May 2005. The prices are dynamically set as often as every three minutes, ranging from $0.50 to $4.50, to keep traffic...
flowing in the MnPass lanes. Initial reports suggest that the I-395 MnPass lanes are working well.

2.2.8 London

Greater London, with seven million people and nearly four million jobs, has been the site of a series of comprehensive studies of congestion pricing over the last 30 years. None of the studies have been implemented. During the 1970’s, the Greater London Council became interested in restraining traffic through a form of “supplementary licensing” in which a daily license would be required within a defined area during the high use hours of the day. The favored options all involved a daily fee of around $2.00 (U.S.) to drive in Central London between 8:00 a.m. and 6:00 p.m. on weekdays. When the Greater London Council was abolished in 1985, this plan lost its principal proponent. In 1994, a plan to draw a cordon line around central London was proposed. It would have 133 toll locations and use transponders to collect the fees. The scheme was predicted to achieve substantial traffic reductions for Central London, but the implementation of the system was considered too expensive. At the conclusion of the study, the Minister of Transport declared that no congestion pricing would be undertaken in London at least for the remainder of the decade. However, results of the study were being considered for applicability to other British metropolitan areas such as Bristol.

In February 2003, the City of London began its Congestion Charging program, a cordon pricing strategy charging drivers to enter the most congested eight square-mile section of central London. Overall congestion in London had continued to increase, with over 250,000 vehicles within the cordon zone on a typical working day, with average speeds dropping below 10 miles per hour. Six weeks into the pricing program, approximately 20% less traffic entered the zone during a typical workday. Motorists who enter an eight square mile area of central London between 7am and 6:30pm will pay a daily fee of £5 (about $9.00). It is expected that the congestion pricing program will reduce traffic in the area by 20 to 30 percent, encouraging people to take transit, bike or walk. In addition, the program is expected to raise over $200 million a year, which will be invested in the city’s public transportation system.

The London Congestion Charging program uses 203 enforcement cameras both on the boundary of the charging zone and at various locations within it. Drivers prepay the entrance charge, and the cameras read the vehicle identification number and automatically identify whether the charge has been paid. Fines are issued to those who have not prepaid. Certain vehicles are exempted from the charge, including taxis, emergency services, and alternative energy vehicles. Residents of central London within the cordon receive a discount.

In May 2005, a public survey was initiated to obtain feedback on a proposal for a Western Extension of the Central London Congestion Charging Scheme. The extension is anticipated to further reduce congestion, accidents, emissions and fuel consumption, and raise revenues to be used for additional transportation improvements.

2.3 LESSONS LEARNED

Overall, a number of important lessons can be learned from the wealth of value pricing studies and operational projects. For example, many studies have shown that road users highly value time savings and are willing to pay a price during the peak period to avoid congestion and delay. Further, value pricing can reduce congestion by shifting demand to off-peak periods or other facilities. Value pricing can be fair and equitable, because adverse impacts can be addressed and mitigated with strong public involvement and a comprehensive public participation program. In addition, nurturing of supporting constituencies are critical factors in acceptance. Initially the public may be concerned that variable pricing may be inequitable, but these concerns can be addressed using the revenues obtained from pricing. Many specific lessons, which are applicable to the Regional Value Pricing Corridor Evaluation and Feasibility Study in the Dallas-Fort Worth Region, are summarized below:

2.3.1 Establish Goals of Value Pricing Project

Many of the studies and projects had similar goals. Many developed screening criteria based on those goals as well as previous studies of value pricing. Some of these goals include:
• Study the potential for value pricing strategies in alleviating congestion in a corridor

• Evaluate the potential of pricing strategies to facilitate the timely, efficient and economical movement of commercial vehicles to industrial and commercial destinations

• Improve the movement of daily commuter vehicles to and from the workplace

• Develop and implement a public process for building community acceptance of market based demand management techniques

• Maximize the use of HOV Lanes that already exist

• Determine if allowing solo drivers to use the express HOV lanes relieved congestion on the general lanes

• Improve air quality

• Develop a market-based approach to set tolls for the express HOT Lanes.

2.3.2 Screening Criteria

Several studies began with defining a set of evaluation criteria, which could be used to both screen toll lane concepts for further evaluation and develop more detailed concepts. Examples of evaluation criteria have included:

• Congestion and travel time savings for new and existing lanes

• Compatibility with federal/state highway design standards

• Capital and operating costs

• Enforceability of toll and HOV requirements

• Tolling feasibility and effectiveness

• Operational impacts on freeway and local streets

• Potential environmental impacts

• Equity

• Ability to finance

2.3.3 Public Outreach and Political Support

Researchers in several studies discovered that focus groups and special meetings of impacted groups must be an integral part of the planning process. Many agencies, such as TxDOT and METRO, have said that one of the greatest challenges was educating and communicating to the public and policymakers the benefits of value pricing. Public input and acceptance are crucial for implementing a value pricing strategy. Based on this lesson, many subsequent studies have included engaging the public early in the process and finding a political champion to promote the concept of value pricing on a particular facility. For example, Lee County officials have stressed the importance of gaining support from local politicians and the public. Collecting quality data and studying performance measures allowed the research groups and the public to accurately measure the impacts and benefits of value pricing. The LeeWay public outreach and education program focuses on informing customers that they are saving money instead of spending it. Many projects, such as the Florida Turnpike study used public involvement, including educational and outreach components (newsletters and project web site), as well as workshops with stakeholders and focus groups were an ongoing process throughout the study.

Presenting the results of successful operational projects can also be a useful tool in a public outreach effort. For example, for SR-91, nearly 75 percent of the commuting public expressed approval of virtually all aspects of the Express Lanes after eighteen months of operation. However, approval of variable tolls and private sector involvement was initially lower, increasing after about a year of experience with the operation. Behavioral studies have confirmed that users value time savings very highly and are willing to pay high prices to avoid congestion.

Based on experiences in Minnesota and Maryland, it has been shown that a political champion is essential to the development and implementation...
of a value pricing project. The lack of support from a local political figure can make it difficult to gain public support. As another example, the San Francisco-Oakland Bay Bridge study, which did not result in implementation of a demonstration project, showed that lack of public and political support and understanding can be detrimental to a project.

2.3.4 Equity

Many studies have failed to result in implementation of an operational project due to concerns about equity. For example, Maryland’s US 50 HOT lane pilot program was removed from consideration due to the perceived inequity of linking an easier commute with a person’s ability to pay. Likewise, in Minnesota, recommendations for a HOT lane on the Interstate 394 HOV facility spanning 13 miles was placed on hold due to the perception of unfairness (“Lexus Lanes”) and political concerns.

However, the SR-91 project has proven that value pricing does not impact equity. The socio-economic profile of SR-91 Express Lanes users was found to be similar to that of the other travelers on the corridor. While the frequency of Express Lanes use is somewhat correlated to income, 25 percent of the lowest income group identified in the study state they are frequent Express Lanes users. Female commuters are significantly more likely than male commuters to be frequent Express Lanes users.

However, the lesson for other agencies is that equity issues need to be addressed in the early stages of a project to prevent questions that might arise later and cause problems for project implementation.

2.3.5 Enforcement

Enforcement of priced lanes is another challenge facing many agencies, particularly those that implement managed lanes adjacent to general purpose lanes. The issue of enforcement is even more critical with priced lanes, as the lack of enforcement results in the loss of revenue and the degradation of the value pricing program. One successful example is the significant reduction of SOV violators on the I-15 HOV lanes, which has been the result of increased California Highway Patrol (CHP) enforcement funded by the project. Throughout the I-15 program, violation rates of SOV’s have been reduced from 17 percent of total vehicles on the HOV lanes to between three and five percent of total traffic, whereas typical HOV lane violation rates throughout California range between five and ten percent.

In other locations, such as Maryland and Alameda County, California, highway patrol representatives had serious concerns about enforcing the vehicles in a HOT lane because neither electronic toll collection nor physical lane separation was deemed to be feasible in the corridor under study. Patrol officers would have to rely to visual identification only, which would not be effective nor a desirable use of resources.

2.3.6 Tolling Technology

On facilities where tolling is not currently in use, agencies face challenges associated with implementing toll collection that is accurate, efficient, and economical. The 407 Express Toll Route is one example of a fully automated electronic toll collection that can be implemented on a highway system in North America that also reduced congestion. Many projects have shown that variable tolls can generate large revenues and that technology is available for collecting tolls at highway speeds, and that video technology can be used successfully to identify users without transponders, which enables invoicing owners of the vehicles for the tolls. In cases where tolls already exist, such as in Houston, no new toll collection equipment was needed in the field because transponder readers were already in place. Further, one may wish to consider following California’s example by defining a statewide standard for tolling technology to create a seamless toll collection system.

2.3.7 Use of Revenues

Using revenues from value pricing studies to benefit other means of public transportation is an important benefit of value pricing. For example, transit service along I-15 has improved, with the establishment of a new express bus route funded from revenues from the project that were used to start a new express bus system called the Inland Breeze. In 2003, London implemented its new Congestion Charging program to relieve a portion of the traffic congestion within the central city district with plans of investing the forecast revenues of $200 million (U.S.) annually to improve the city’s public transportation system. Additional public uses include paying for facility operation, maintenance, and enforcement. While these are potential examples that have already been tried, thinking “outside the box” may eventually lead to even more efficient uses of the potential revenue windfall of transportation pricing.
3.1 VALUE PRICING STRATEGIES

Many different value pricing implementation strategies have been used or studied in various locations worldwide, many of which are described in Chapter 2. These strategies have been successfully applied to toll facilities, existing HOV lanes, and new highways, and can vary greatly according to the goals of the region, the existing configuration or operational strategy of the roadway facility or network, and other factors. The existing transportation system in the Dallas-Fort Worth Region can be categorized into three types of roadways: freeways, tollways, and HOV lanes. These roadway types are owned, operated and maintained by separate agencies, each having a specific mission relating to the types of facilities under its control. The Texas Department of Transportation (TxDOT) constructs and maintains the freeway network, which includes non-tolled, limited-access facilities. Tollways in this region are owned and operated by the Texas Turnpike Authority (TTA) and the North Texas Tollway Authority (NTTA), which are authorized to raise construction capital through the issuance of bonds, and to collect tolls to repay those bonds and to operate and maintain the facility. The HOV lanes are operated by Dallas Area Rapid Transit (DART) and are open to transit vehicles and HOVs, with the goal of improving transit travel times and encouraging ridesharing.

In the context of the Dallas-Fort Worth transportation network, value pricing projects could be developed with the following strategies:

- Pricing Existing HOV Lanes: “Selling” excess capacity on existing HOV facilities
- Applying Value Pricing on Tollways: Implementing variable tolls (by time of day, vehicle classification, congestion level, etc.) on an existing toll facility or designing a new tollway with variable tolls
- Pricing New Capacity on Freeways: Adding new priced lanes to existing freeways or constructing a partially managed new roadway.

3.1.1 Pricing Existing HOV Lanes

There are several operational interim HOV lanes in the Dallas-Fort Worth Region. Interim HOV lanes are currently in place on I.H. 35E (Stemmons Freeway), I.H. 635 (LBJ Freeway), I.H. 30 (East R.L. Thornton Freeway) and I.H. 35E/US 67 (South R.L. Thornton/Marvin D. Love Freeway), serving approximately 100,000 commuters each weekday. In addition, HOV lanes are part of many planned projects in the region, including US 75, SH 183, Loop 12, and SH 121. Extensions of each of the existing interim HOV lanes will also be considered under various future planning projects.

Several current value pricing facilities, including I-15 in San Diego, and I-10 (Katy Freeway) and US 290 (Northwest Freeway) in Houston, were formerly untolled HOV-2+ and HOV-3+ facilities. Through the I-15 Fastrak program, SOVs can now pay a toll for access to the HOV lanes. The QuickRide program on the Katy and Northwest freeways allows HOV-2 vehicles to pay a toll to use the HOV-3+ lanes. These programs provide examples of two ways to apply value pricing to HOV lanes through a “buy-in” program: selling excess capacity to single-occupant vehicles, and selling excess capacity to lower occupancy vehicles while keeping the lane strictly for HOV or transit use. These types of facilities are sometimes referred to as High Occupancy/Toll (HOT) lanes.
Because HOT lanes use the same travel lanes as existing HOV facilities, the additional infrastructure needs for HOV to HOT conversions tend to be relatively low. The most basic infrastructure requirements for a HOT lane include a lane separation and access method between the HOT and general purpose lanes, a way to enforce the occupancy and toll requirements of the facility, and a toll collection system. Therefore, the physical requirements of the HOT lane should be evaluated during the planning process. In addition, the costs associated with implementing value pricing and the projected revenues generated by the program must be evaluated during the study to determine if it is financially feasible.

3.1.2 Applying Value Pricing on Tollways

The transportation network in the Dallas-Fort Worth Region includes several important toll facilities, including the President George Bush Turnpike (PGBT) and Dallas North Tollway (DNT), which are owned and operated by the North Texas Tollway Authority (NTTA). Several additional toll facilities are currently the subject of NTTA planning studies, including SH 121/Southwest Parkway in Tarrant and Johnson Counties, the Trinity Parkway, and extensions of both the PGBT and DNT.

Tollways can be excellent candidates for value pricing. Much of the required infrastructure, including toll collection systems, enforcement systems, and the physical infrastructure required to support value pricing is fully integrated in the tollway system. As applied to existing toll facilities, value pricing programs typically require relatively small changes to the system to enhance its efficiency. Additional capacity is not usually provided as part of tollway-based value pricing programs. Although general tollway improvements such as high-speed ETC lanes can be used to improve the overall efficiency of the facility, travel lanes, interchanges, frontage roads, toll plazas, and toll collection equipment can, in most cases, continue to operate in their existing configurations.

The principal changes to toll facilities are often limited to the systems upon which the toll collection method is based. Computer hardware and software would need to be reconfigured to accommodate variable toll rates, billing needs, and other details. Additional Intelligent Transportation Systems (ITS) devices, or modifications of existing systems, could also be required to monitor traffic conditions and the effectiveness of the program, especially if real-time, congestion-based tolling methods are used. In addition, the costs associated with implementing value pricing and the projected revenues generated by the program must be evaluated during the study to determine if it is financially feasible.

Motorists in the Dallas-Fort Worth area are already familiar with the concept of variable toll rates, since current NTTA tolls vary by vehicle class and use the TollTag system of toll collection. Many toll authorities have implemented or are studying value pricing programs that vary tolls by time-of-day or congestion level. On the toll bridges in Lee County, Florida, value pricing has been shown to consistently reduce peak hour congestion. The Port Authority of New York and New Jersey (PANYNJ) implemented a similar program on the toll bridges and tunnels under its control. The New Jersey Turnpike Authority (NJTA) has implemented tolls that vary by time-of-entry, in addition to distance traveled and vehicle class. These programs are described in Chapter 2, and the lessons learned from these projects are valuable tools for potential implementation of variable tolls in the Dallas-Fort Worth Region. To evaluate the potential benefits of new toll project, NTTA conducted a study of financial feasibility of varying tolls on its facilities. In combination with this study of value pricing as a congestion management tool, both studies yield important results for the region.

3.1.3 Pricing New Capacity on Freeways

Another strategy for managing congestion using value pricing would be to price added capacity to an existing freeway or to construct a new freeway that is partially priced. This strategy could range from constructing separated, priced lanes in the available right-of-way in the existing median to constructing managed lanes to the outside of a facility. Allowing HOV’s to enter for free or for a discount would also be an option. Pricing new capacity on freeways could be used as a strategy when additional capacity is needed before all or some of the traditional sources of funding are available. Revenues generated by the priced facility or lanes would be used to pay back some or all of the construction bonds. For example, SR-91 was originally constructed by a private entity, the California Private Transportation Company (CPTC), with tolls repaying the investment in engineering, construction, and operational costs. The Orange County Transportation Authority has since purchased the facility and continues to finance
this purchase through collected tolls.

State Highway 183 is one example of a freeway in the Dallas-Fort Worth Region where this strategy was considered. Recently NTTA issued preliminary results of its study to add reversible toll lanes on SH 183 between Dallas and Fort Worth. These results indicated that toll lanes along SH 183 would raise about six percent of the projected $1.5 billion construction cost. Although these preliminary results suggest that tolls may not be the only source of funding needed for construction on this particular facility, further detailed studies of other freeways is warranted. This corridor, and possibly others in the Dallas-Forth Worth Region, is the subject of several studies in roadway privatization.

The additional infrastructure needs for adding new capacity would vary for each corridor in the Dallas-Fort Worth Region, based on how the new lanes are configured. Infrastructure improvement needs are dominated by issues of lane additions, physical separation, and access (at-grade or grade separation). In some cases, new lanes can be accommodated within the existing median; however, other alternatives may require additional right-of-way. Either instance may require modifications to existing bridge piers, signs, barriers, etc. In addition, infrastructure requirements are also dependent on the method of enforcement of the occupancy and toll requirements of the facility and the toll collection system. Clearly the physical requirements of new lanes would need to be evaluated during the planning and design process to determine the cost to design and construct the lanes, and to acquire right-of-way. Because one of the goals of this strategy is to pay for some portion of the new construction with the collection of tolls, an accurate cost estimate will dictate if the strategy is financially feasible.

### 3.2 GUIDING PRINCIPLES FOR THIS STUDY

#### 3.2.1 How Value Pricing could be applied to HOV, Tollway, and Freeway Facilities

The three value pricing strategies described above would fall into two categories of implementation, Short-Term and Long-Term, depending upon the need for operational improvements and the timing and cost of planned improvements based on the region’s Metropolitan Transportation Plan (MTP) and Transportation Improvement Program (TIP). The timing and extent of improvements is also linked to the level of environmental planning needed under Major Investment Study (MIS) and the National Environmental Policy Act (NEPA) processes. For this study, the terms short-term and long-term as they relate to implementation of value pricing have been defined as follows:

**Short-term:**
- A facility that exists today and has capacity to support pricing (i.e., an HOV lane with excess capacity to sell to SOV or a static toll that could be varied by time of day) or one that is in design or under construction and with small modifications could support pricing (converting an HOV to a priced lane, adding new lanes in median, varying an existing toll). In general, little to no environmental planning would be needed. Ideally, a short-term project would serve as a demonstration of value pricing for the region because it could be implemented quickly to maximize the observation time.

**Long-term:**
- An existing facility that could support value pricing relatively easily if low cost modifications were made and little to no new right-of-way was required (e.g., existing or planned HOV or HOT lane constructed with full barrier, varying the toll on a tollway). Most likely a NEPA study would not be required, but could result in a Categorical Exclusion (CE) if it were. Projects that are identified as short-term projects, but are not implemented as demonstration projects would fall into this category.
- An existing or planned facility where it would be more challenging to incorporate value pricing and some new right-of-way would be needed (e.g., new capacity added in a median).
- An existing or planned facility where larger amounts of right-of-way and other environmental resources are required to design a managed facility (e.g., new HOT lanes added to the outside of an existing facility, a new fully managed freeway/new tollway).

Ultimately, a regional system of managed lanes would result, consisting of the existing and planned facilities described above.
3.2.2 Regional Policies

Several regional policies in the Dallas-Fort Worth Region have guided the development of this study in terms of how pricing could be applied for the various strategies. The current MTP, Mobility 2025 (Amended April 2005), makes specific recommendations for the incorporation of ‘managed’ lanes. Identified as HOV/M lanes in the MTP, the nature of these lanes is one where user fees are charged, resulting in higher levels of service and higher speeds. It is anticipated that the concept of HOV/M lanes will provide for increases in tolls for SOV users of these lanes thus improving mobility and enhancing revenue raising strategies. The primary goals of this toll management approach are to provide relatively congestion-free travel, reduce travel demand during peak periods, increase transportation system efficiency, and to find innovative ways to finance needed transportation improvements. The HOV/M lanes concept could allow for HOV vehicle occupancies to be increased through toll management strategies designed to encourage carpools and vanpools, and more so when air quality considerations warrant it. It is important to note that this concept will work best in corridors where congestion is expected, even on traditional toll facilities. Through a combination of toll and vehicle occupancy management strategies, capacity can be utilized efficiently thereby maximizing the person-movement capacity of the transportation system.

Recent state legislation, HB3588 and the Texas Transportation Commission support initiatives to look closer at user-fee applications to roadway financing, and the following policy positions of the Regional Transportation Council (RTC), have provided increased initiatives to consider the application of tolling on a broader scale:

- Adopted Policy – All new freeways on new rights-of-way should be studied as potential toll roads (February 1993 policy position)
- Adopted Short list of new freeways on new rights-of-way and express lanes for toll road consideration (March 1994)
- Agreement with TTA (predecessor to NTTA) to consider Value Pricing (May 1994)
- Adopted Managed HOV/Integrated Toll road concept as contained in Mobility 2020 (January 1998)
- RTC does not support converting existing free non-HOV/Managed lanes to Toll Roads (October 2003).

In addition, the RTC’s adopted Policy on excess toll revenue sharing with regard to TxDOT sponsored traditional toll projects (excludes managed lanes) is as follows:

- Excess toll revenue is defined as annual toll revenue after the bonds are paid off, and after annual reserve funds have been set aside to cover facility operational costs, anticipated preventive maintenance activities, and the expected cost of rehabilitation or reconstruction of the facility
- Excess toll revenue from individual projects may be used to help pay down the bonds on other toll projects, to ensure that TxDOT’s toll bond obligations in the region are met
- All excess revenue generated from individual toll projects shall remain in the TxDOT district in which that revenue-generating project is located
- All (or a portion of) the excess revenue generated from individual toll projects shall remain in the counties in which that revenue-generating project is located. These funds can be used to fund future projects either on or off the state system
- Projects funded with excess toll revenue should be selected in a cooperative TxDOT-RTC selection process which considers the desires of the cities and counties in which the revenue-generating project is located.
In 2005, the following new managed lane policy was adopted for the Dallas-Fort Worth region. The purpose of this policy is to establish a framework for the allocation of future revenue from managed lane toll projects in the North Central Texas region.

- The focus of this policy is TxDOT-sponsored managed lane toll projects.
- Excess toll revenue is defined as annual toll revenue after annual debt service, and after annual reserve funds have been set aside to cover facility operational costs, anticipated preventive maintenance activities, assigned profit and related expenses for the Comprehensive Development Agreement (CDA), and the expected cost of rehabilitation or reconstruction of the managed toll lanes.
- All excess revenue generated from an individual managed lane toll project shall remain in the TxDOT district in which that revenue-generating managed lane project is located.
- Local governments and transportation authorities shall be given the right to invest in a CDA project as a means to fund the facility as well as to generate local revenue.
- The excess revenue generated from an individual managed lane toll project shall remain in the counties in which that revenue-generating project is located. Excess revenue shall be returned to the funding partners in proportion to their shares and be used to fund future transportation projects.
- Regional Transportation Council shares will be put into air quality related and sustainable development programs and used to leverage federal transportation funds.

The region’s policies have indicated a strong move to increase mobility and the network’s efficiency through a variety of methods, including a broader potential use of pricing.

### 3.3 SCREENING CRITERIA FOR SHORT-TERM OR LONG-TERM CONSIDERATION

A screening process was developed to assess the potential application of value pricing concepts on the existing and proposed HOV, tollway, and freeway corridors in the Dallas-Fort Worth Region. This process can be carried out at any time, based on the policies in place and planned improvements under consideration. The screening process begins with all existing and planned facilities in the Dallas-Fort Worth Region and results in the identification of those facilities that could be considered in the short-term and those that could be part of the longer term planning process. Figure 3-1 represents the screening process.
The screening criteria established to separate potential short-term and long-term consideration of value pricing are described below. To be considered in the short-term,

1. The facility needs to be identified in the adopted MTP with a recommendation as a HOV or Managed Facility.

AND

2. The facility is not an interim HOV facility or an existing tollway, but could support a new managed lane (or lanes) in the right-of-way (all freeways remain free, but new capacity could be priced).

AND

3. The facility would be in place or construction would be completed within five years.

3.4 10 FACILITY EVALUATION CRITERIA FOR SHORT-TERM AND LONG-TERM CONSIDERATION

All potential value pricing facilities would be evaluated based on the 10 evaluation criteria developed for this study. However, the evaluation criteria would be applied differently for short-term and long-term consideration. Moreover, some of the evaluation criteria take on more or less importance in each timeframe. For the short-term, one goal of applying these criteria would be to identify a demonstration project that can be implemented quickly and allow the region to gage the benefits and challenges of value pricing. Likewise, for the long-term, these criteria would be used to evaluate value pricing alternatives within the project development process.

The 10 evaluation criteria are as follows:

1. Facility main lanes exceed LOS ‘E’

2. Facility subject to legislative/legal considerations

3. Facility supports managed lane(s) enforcement

4. Facility supports toll collection

5. Facility represents a potential candidate for incentive based pricing

6. Facility improvement minimizes construction disruption

7. Facility can be constructed or modified and open to traffic within a reasonable timeframe

8. Facility supports physical lane separation

9. Facility can be designed with minimal design exceptions

10. Facility supports ingress/egress directly to the managed lanes.

The remainder of this section provides the guidelines for applying the 10 evaluation criteria (quantitative and qualitative guidelines), as appropriate, and how they could be applied to evaluate the need for and potential for success of value pricing on HOV, tollway, or freeway facilities in the Dallas-Fort Worth Region. In the case of quantitative guidelines to evaluate and assess various types of facilities, thresholds are presented based on lessons learned from value pricing projects, accepted design standards, and team input.

3.4.1 Facility Main Lanes Exceed LOS E

The criterion for evaluating the transportation system performance is based on the operational Level of Service (LOS) of the facility. The LOS is a qualitative measure of operating conditions, which a driver will experience while traveling on a particular roadway segment. The LOS reflects driver satisfaction with the following factors that influence the degree of congestion: speed and travel time, traffic interruptions, freedom to maneuver, perceived safety, driving comfort and convenience, and delays. The LOS is measured using a scale of the severity of congestion experienced by drivers. The LOS scale ranges from A to F, as defined in the 2000 Update to the Highway Capacity Manual, with LOS A representing free flow movement of traffic with low traffic volumes and high speeds and LOS F representing failure with stop-and-go congestion and long delays at signalized intersections. LOS B is in the range of stable flow with above average conditions. LOS C is normally utilized as a measure of average conditions for suburban and urban locations. LOS D occurs near a critical boundary where
traffic flows become unstable. At LOS E, the roadway is operating near capacity and day-to-day delays are very unpredictable.

The threshold for applying value pricing has been established as LOS E (at capacity). This LOS represents the condition where the roadway is operating near capacity and day-to-day delays are unpredictable. Because a facility is made up of segments that operate at different levels, the segments that have the worst operational characteristics would govern the entire facility. Often these segments operating at or above capacity “bleed” over into other segments.

For an HOV facility, this could mean that even with severe congestion in the parallel general purpose (unmanaged) lanes, the HOV lane is underutilized. In this case, the excess capacity in the HOV lane could be sold to single occupancy vehicles (SOV) or lower occupancy vehicles to become a High Occupancy Toll (HOT) lane. This method has been used on I-15 FasTrak program in San Diego, California, which allows solo drivers to pay a toll to use the HOV-2+ Express Lanes. Or, the demand for the HOV lane could exceed its capacity, as was the case in Houston on the Katy Freeway. In this case, increasing the occupancy requirement to HOV-3+ would return the HOV lane to free flow conditions. Then, excess capacity on the HOV-3+ facility could be sold to HOV-2+ or SOV’s. Other considerations for pricing a facility include improving trip reliability and predictability.

For a congested tollway, value pricing could be used to encourage drivers to choose off-peak periods by either raising the tolls during peak periods, or lowering the tolls during off peak periods. This was done successfully in Lee County, Florida by lowering tolls during the shoulder periods (the hours before and after each peak period) so that more drivers chose to use the facility during those times. For either type of facility, it is important that free-flow conditions be maintained to provide an incentive to both HOV’s and toll customers to continue to use it.

For a congested freeway, value pricing could be used with new capacity that is tolled that would reduce volumes in the main lanes and provide a benefit to travelers in the form of a choice to remain in the free lanes, which have an improved LOS, or to move to the toll lanes and experience free flow conditions.

For short-term evaluation, planners would need to look at existing traffic conditions to determine if the peak hour volumes in the main lanes exceed the hourly volumes to maintain free flow conditions. The MTP’s Freeway Segment Report, also know as the Mobility LOS analysis (MOBLOS) is the source of this data. Or, a facility-specific traffic study has been or could be easily conducted if additional information is required.

For the long-term projects, a travel demand forecasting and traffic operations analysis that codes value pricing into the model is recommended. The Dallas-Fort Worth Region has an excellent travel demand model capable of this type of analysis. Examples of travel demand data that may need to be refined to evaluate value pricing include screenline data and total weekday travel on major links in the travel corridors. The traffic analysis should also include a comparison of each alternative to the base case with respect to travel time savings, number of trips, number of peak hour trips, mode split variations, new HOV/transit trips, new solo trips, and congestion levels, to assess the changes in travel patterns in part caused by the value pricing strategies. Factors such as time of day, choice of route, and pattern of travel changes should be considered.

Based on the three strategies described previously, the following steps for evaluating the transportation system performance in the long-term include:

- Determine if an existing HOV lane is underutilized or congested or is projected to be underutilized or congested. If it is underutilized, excess capacity may be available to sell to lower occupancy vehicles. If the HOV is highly congested, raising the occupancy requirements and selling the new excess capacity could be evaluated

- Determine if the tollway is experiencing unacceptable levels of congestion during peak and non-peak periods, determine the usage by vehicle classification, and identify the potential causes of the congestion

- For a freeway, identify the locations of the most severe congestion and determine the limits of new capacity needed to satisfy the travel demand.

The methodology for carrying out these steps involves utilizing the travel demand model for the region. Traditional methods of traffic analysis would also be used to evaluate operations. In addition, a companion paper that describes the current practices for estimating demand with regional models
used around the country has been prepared for this study, Estimating Travel Demand (NCTCOG, 2004).

- Calculate the actual traffic volumes (automobile and transit) on the HOV lane for the peak and non-peak periods, and forecast the projected volumes for the design year. For facilities with existing HOV lanes, this would include traffic and operations data for HOV and General Purpose (GP) lanes (baseline condition), including vehicle counts, occupancy counts, LOS, and travel times.

- Calculate the excess capacity of the HOV lane based on existing and future conditions. Typically LOS C/D equates to between 1600 and 1800 vehicles per hour. Therefore, the excess capacity would equal the difference between the actual volume and the volume corresponding to free flow conditions.

Once it is determined that there is excess capacity available to sell to lower occupancy vehicles, the next step would be to evaluate what effect this has on the corridor. Because the effects do not lie completely within the HOT lane itself, a travel demand modeling exercise would be needed to evaluate the effect on the network.

For toll facilities, the applicability of value pricing would be determined based on peak period demand on the toll road. If a given facility is experiencing severe congestion in the peak hour, increasing tolls is an option to reduce the demand by shifting some of the demand into the shoulder periods. However, if the facility has significant congestion throughout the entire peak period, higher peak toll rates may have only limited impact. Key elements of this analysis would include:

- Identifying the nature of congestion. Does it occur throughout the tollway, only at toll collection points, or at other locations?
- Identifying peak periods and shoulder periods (either side of peak) and traffic volumes associated with each period.
- Determining the amount of peak-period traffic that should be “shifted” from peak to shoulder periods to improve peak period operations.

Value pricing is typically applied to a toll facility in the form of a “fixed-rate” peak surcharge or off-peak discount rather than a variable toll based on congestion. Ideally, toll roads should provide an acceptable level of service of either LOS C or D. However, it is most important for the facility to provide a travel time savings in comparison to the adjacent competing non-tolled facilities. As an example, the New Jersey Turnpike has segments that experience significant congestion, but the lack of any reasonable alternatives prevents diversion away from the toll road.

Each of these strategies is intended to influence the departure time choices of tollway users. The sensitivity of these users to the price of the trip, and the resulting demand on the roadway, is described by the toll elasticity of the facility. The behavior of users is most easily influenced by tolls on facilities that are more sensitive to changes in toll rate, or show a higher level of toll elasticity. On these facilities, drivers could be shifted out of the peak period with relatively small changes in toll rate. On facilities with inelastic tolls, the peak-period toll increases or off-peak toll discounts that would affect the departure-time choice of drivers could be unreasonably large, and potentially infeasible from a political or public opinion perspective.

If the effect of tolls is sufficiently elastic to affect the departure-time choice of drivers, some users can be shifted from peak periods to off-peak periods. This effectively “flattens” the peak period and decreases the volume during the most congested hours, with no required increase in capacity. This congestion relief is the main benefit of implementing a value pricing program on a tolled facility. Observations of existing value pricing projects indicate that changes in peak pricing clearly influence the temporal distribution of trips, shifting traffic away from periods with the highest charges.

The regional model would be used to determine the impact on the tolled facility and the adjacent non-tolled facilities. The overall evaluation process would focus on the change in travel time and vehicle trips within the area of influence of the facility. As an initial step, the model would be used to determine the impacted area using time savings for individual origin-destination zonal pairs as a mechanism to identify the area of influence. This analysis would be conducted separately by time period (peak and off-peak) so that the impacts can be quantified for both the peak period and overall daily levels of travel.
With the influence areas established for each time period, the regional model would then be used to present measures of effectiveness in terms of travel times, auto occupancy, overall person travel, and transit usage. Generally, value pricing for toll roads may shift traffic by time period from the peak to the shoulder periods, decreasing travel times for drivers in both the peak and shoulder periods. Increased toll rates could be expected to have a positive impact on carpooling and transit service utilizing the toll road. However, some of the tolled traffic may also divert back to the non-tolled facilities in response to the increased tolls.

Like other value pricing strategies, new priced lanes on a freeway would be required to operate at free-flow conditions, typically at LOS C/D or better, to justify the toll. Therefore, a methodology similar to those used in other value pricing studies to evaluate adding new priced capacity to a freeway consists of the following steps:

- Calculate the existing traffic volumes (automobile and transit) for the peak and non-peak periods, and forecast the projected volumes for the design year. This existing data collection could include traffic and operations data such as vehicle counts, occupancy counts, LOS, and travel times.

- Using regional modeling tools, estimate the traffic volume that would shift to tolled express lanes based on local value-of-time estimates and travel time savings, since drivers will tend to choose the toll lane if the time savings value exceeds the out-of-pocket cost required to pay the toll.

- Calculate the needed capacity based on existing and future conditions, the estimated traffic shift, and maintaining free flow conditions. Typically free flow, or LOS C/D, equates to between 1,600 and 1,800 vehicles per hour (or less for a non-separated system), which can be used to determine the optimum number of tolled lanes for the facility.

Following the SR-91 example, tolls ideally would be set as a function of the congestion on the parallel, general purpose lanes. Tolls could also be applied to other vehicle types such as trucks in order to maximize revenue, although significant congestion would have to exist in order to divert truck traffic.

Generally, toll rates would be established based on the particular conditions that exist in each corridor. It is anticipated that the toll rates would vary by season, time of day and, within the peak period, by level of congestion. Toll rates would also be established for the various vehicle types permitted to use the facility. Based on experience with other facilities, toll rates within the peak hour would be expected to be four or five times the toll rate of the off-peak period.

For example, tolls on SR-91 vary from $1.05 during the late evening and early morning to $7.00 during the PM peak on Thursdays and Fridays. The Orange County Transportation Authority (OCTA), the operator of the facility, has estimated that the maximum number of vehicles that can predictably travel through the SR-91 Express Lanes at free-flow speeds is about 3,400 vehicles per hour per direction, or 1,700 vehicles per lane. Congestion may occur as usage approaches or exceeds these volumes. OCTA adjusts tolls as necessary by monitoring volumes on each hourly time segment over 12-week periods. If vehicle volumes (per direction, per hour) begin to approach levels where speeds could slow, tolls may be adjusted. The most recent toll adjustment increased the Thursday and Friday PM peak tolls by $1.50, to the current $7.00.

3.4.2 Facility Subject to Legislative/Legal Considerations

It is possible that legislation, guidance, or policies must be clarified, created, or modified to allow the implementation of value pricing in a region or on a facility. Or, policies related to tolls may require modification or clarification. In addition, environmental laws or regulations may affect implementation of value pricing. Therefore a team of legal and policy advisors should be established to research and resolve any legislative needs or policies related to value pricing as part of an implementation plan. For example, if tolls will be collected on a formerly free facility, such as a HOV lane, it is possible that the owner of the HOV lane does not have legal jurisdiction to collect tolls. In this case, the regional toll authority may need to be involved in the toll collection portion of the project, requiring either legislation or a memorandum of understanding between the agencies. Or, there may be other policies that govern whether a free facility can be priced.

Recent legislation greatly expands the possibilities for pricing in Texas. Several resolutions and
policies related to tollways and managed lanes are currently in place in the Dallas-Fort Worth Region. In 1994, the Texas Turnpike Authority was requested to study potential toll roads for consideration of value pricing strategies, including varying prices by time of day and auto occupancy. Future toll roads and all new freeways or new alignments will be assessed as potential tollways through the metropolitan transportation planning process, to offset a portion of the cost of construction, management and/or operation. Mobility 2025 (amended April 2005) also recommended that all planned two-lane HOV lanes be used during off-peak periods as SOV express lanes or toll lanes to provide additional needed capacity and a potential source of revenue. Further clarification of the regulations governing pricing may be needed for each demonstration project.

In addition, the HOV lanes on I.H. 30, I.H. 35E, I.H. 635, and I.H. 35E/US 67 are operated by DART and are currently interim HOV lanes. Therefore, the requirements for implementing value pricing on an “interim HOV” are different from the requirements of a permanent HOV facility. Specifically, interim HOV lanes do not utilize full barrier systems to separate the managed lanes from the general purpose lanes, which is an undesirable condition for a value pricing strategy. Therefore, unless specifically modified, interim HOV lanes would not be considered for value pricing implementation.

Like many tollways throughout the country, including portions of the President George Bush Turnpike (PGBT) and the Dallas North Tollway (DNT), existing bond covenants prohibit discounting tolls on tolled facilities. Therefore, if value pricing is desirable on one of the existing tollways, the bond covenant restriction must be considered. NTTA’s and TTA’s input is critical to determining how value pricing could be implemented on a tollway in both the short-term and long-term. Future toll road bond covenants will likely be written with flexibility to one day incorporate a managed lane philosophy. However, the PGBT and DNT would not be considered for value pricing implementation in the short-term.

**Environmental Regulations and Air Quality**

Environmental regulations must also be evaluated for the implementation of transportation projects, although depending upon the type of project; a National Environmental Policy Act (NEPA) study may not be required. For example, I-10 (Katy Freeway) in Houston and I-15 in San Diego determined that their value pricing programs did not require NEPA documentation because the value pricing programs were congestion management tools, and the implementation of these facilities would be beneficial to the environment by increasing ridesharing and roadway capacity efficiency. The I-15 project team also highlighted the transit improvements that were funded by revenues generated by the project. Environmental lobby groups supported both projects, and the Federal Highway Administration leaders were in agreement with the agencies that no environmental studies were required.

The 1990 Clean Air Act and Amendments require the Dallas-Fort Worth Region to carry out a structured, multi-year approach to attaining federal clean air standards. Federal highway funding aid can be withheld as one of the sanctions imposed for failure to meet these requirements. Also, the region must show that its transportation plans and programs are in conformity with the region’s clean air plans. Finally, the region’s clean air plans include transportation control measures intended to reduce emissions from mobile sources, which are given a special, priority status for federal-aid funding in the region’s annual Transportation Improvement Program (TIP). The TIP is then adopted by the state and called the Statewide Transportation Improvement Program (STIP). The Dallas-Fort Worth metropolitan region exceeds Federal air pollution standards, classifying it as a non-attainment area according to the Clean Air Act and Amendments of 1990. The U.S. Department of Transportation cannot fund, authorize, or approve Federal actions to support programs or projects that are not first found to conform to the Clean Air Act requirements. Specifically in the case of HOV lanes, the addition of SOV capacity would be prohibited unless the project is introduced into the region’s Transportation Improvement Plan (TIP) to bring the region into conformity with air pollution standards. The relationship between managed lanes and air quality can be modeled for particular projects. There may be a slight increase in Vehicle Miles of Travel (VMT). However, there may also be a slight decrease in hot spot and idle vehicle emissions. As an example, the air quality analysis conducted as part of San Diego’s I-15 HOT program found that, during the first three years of operation, the program seemed to moderate emission levels along I-15 during the study period. Current air quality modeling for the Dallas-Fort Worth Region indicates that the same positive results would be expected.

In order for the region to receive federal transportation funds, NCTCOG, the Metropolitan Planning Organization (MPO) for the Dallas-Fort Worth Region, must adopt a financially constrained transportation plan and
a TIP that conforms with the region’s air quality plans. For the FHWA to make a conformity determination, the region’s transportation planners must show that the emissions projected to result from implementation of the transportation plans and programs are within motor vehicle emissions budgets that are developed as part of the required air quality plans. Environmental impacts and issues are often best understood as a result of a comprehensive planning analysis.

**Agency Responsibilities**

A value pricing project combines characteristics of freeway, HOV lanes, and tollways. In the Dallas-Fort Worth Region, these facilities are operated by TxDOT, DART, and NTTA, respectively. It is likely that each agency will contribute to the implementation strategy based on its area of expertise and purpose. Early in the planning process, a determination needs to be made regarding the roles of the agencies in the planning, implementation, monitoring, and enforcement of a managed (HOV/M) lane. It is possible that the legislature would want to legally establish the operating agency or agencies and specific responsibilities such as maintenance, enforcement, and toll collection. It is also advised that project officials and local stakeholders cooperatively develop legislation to direct the allowable uses for revenues from the facility, as the use of revenue can be a major issue in determining the fairness and acceptability of a program. Short of legislation, the consortium of agencies should work through the value pricing plans and develop a memorandum of understanding that includes how the agencies would work together to design, implement operate and maintain the facility.

Other programs have also used enabling legislation to outline how and when toll rates can change and to establish a minimum acceptable level of service in the priced lane to ensure time savings availability. The Federal Highway Administration’s Guide for HOT Lane Development provides some guidance for potential legislative requirements. Although enabling legislation can vary widely depending on local conditions and requirements, there are many common provisions that are likely to be addressed, including:

- Creation of an authority or commission, including the legal name and nature of the newly created entity
- Scope, purpose, and function of the new entity
- Definition of terms
- Delineation of districts within which the entity operates
- Details about the entity’s governing board, including the number, composition, selection or appointment process, compensation, and term of members, voting/procedural rules for governing board action, and meeting requirements
- The legal powers of the commission/authority, including the ability to establish rules and regulations, hire employees, sue and be sued, enter into contracts, construct facilities, acquire property, use the power of eminent domain, and impose fees
- The authority to issue and refund bonds and use tolls and revenues in associated trust indentures
- The authority to set and revise tolls and any applicable guidelines or formulas
- The ability to invest bond proceeds
- Administrative requirements, which may include periodic audits, competitive bidding, annual reports, public notice and/or hearing requirements
- Any constraints or rules on the use of funds
- The rights and remedies of bondholders
- Tax-exempt status of authority property and bonds
- The venue and jurisdiction of legal actions against the authority/commission
- Police powers
- Operating, maintenance, and repair obligations
- Relationship to other entities, e.g., for oversight, reporting, etc.
In addition to these typical provisions, an enabling act may have non-competition sections, which guarantee to the new entity that no new directly competing facility will be authorized by the state. Other legislation is likely to be required to cover issues such as:

- Signing the managed portion of the road to designate that it is different from the rest of the network
- Advertising controls on the road
- Operational procedures (such as arrangements for emergency vehicles and information disclosure rules, which are particularly important where tolls are levied electronically)
- Defining the enforcement regulations for non payment
- The use of cameras to enforce occupancy requirements
- Provisions for land acquisition and clearance
- Structure for involvement of the private sector in the provision of roads.

**Equity**

The goal of value pricing is to provide the opportunity for users to save time and increase mobility by paying a toll based on the value of their trip. Value pricing programs in place or under study around the country have yielded a lively debate about whether this value of time or toll is inequitable to travelers of lower economic status. Studies have shown that the facilities that currently collect a fee based on time of travel or occupancy have not just attracted high-income motorists. SR-91 in Orange County, California, was the first value pricing facility in the United States and has been thoroughly studied over the years it has been in operation. According to user surveys, those who use the SR-91 Express Lanes on any given day were found to be an economically diverse group. Commuters in high-income groups were just over twice as likely as commuters in low-income groups to be frequent toll lane users (23% compared to 10%). Although a clear correlation was found between income and frequency of toll lane use, 50% of the highest income travelers (> $100,000 annual household income) report they never or infrequently use the toll lanes while 25% of the lowest income travelers (< $25,000 annual household income) report they use the toll lanes on a frequent basis (50% or more of the time). These statistics indicate that users’ value of time spent in traffic is not directly related to income. It also shows that people value their time differentially day-to-day, depending on daily commitments such as daycare, second jobs, or other appointments. This day-to-day decision ultimately provides all motorists with an equal choice.

In addition to equity associated with driver choices, it is important to consider how shifts in traffic that result from implementing a toll on a previously free facility affect the surrounding network. For example, would local roads become more congested as a result of pricing? Would traffic be diverted to communities with low-income or minority populations? The travel demand forecasts would be used to measure the effects of value pricing on the surrounding roadway network and a comparison of baseline and future conditions would reveal patterns of traffic shifts.

In terms of equity associated with tollways, value pricing on tollways is applied to more efficiently allocate limited roadway capacity by varying the tolls by time of day, congestion level, vehicle class, or other characteristics. It is important to note that the tollways in the Dallas-Fort Worth Region are already entirely tolled as opposed to toll son portions of a facility. Users currently choose to use these facilities knowing that they already priced, and the application of value pricing does not decrease the availability of routes in the corridor or physically limit the choices available to a motorist.

When variable tolls are implemented on a toll facility, the toll schedule is adjusted in some way to create higher tolls in the peak periods and lower tolls in the off-peak period or depending upon congestion levels, creating a toll differential. The LeeWay program in Lee County, Florida implemented an off-peak discount, leaving the peak tolls at the previous rate. The off-peak discount is funded through the FHWA Value Pricing Pilot Program, and because the toll rates actually decreased overall, equity concerns were relatively minor.

Due to fiscal constraints, the most common method of creating a toll differential between the peak and off-peak periods is to increase peak period tolls. This approach could create equity concerns because studies have shown that in some cases lower-income motorists have less ability to adjust their work.
schedules and time of travel to avoid a toll. Often, as in the case of the New Jersey Turnpike value pricing program, variable tolls are implemented in conjunction with toll increase for all users. In 2001, tolls on the New Jersey Turnpike increased 5 percent for off-peak drivers, but increased over 18% for peak-period drivers. If equity remains a concern, income-based discounts or other programs could be considered. The existing NCTCOG model would need to be revised to provide separate toll values by income group, so that the diversion model could reflect the discounts.

The issue of equity associated with adding new capacity to freeways is similar. As noted, even though value pricing has proven to be equitable in other areas, it is still necessary to evaluate how shifts in traffic that result from implementing value pricing affect the surrounding network. Equity concerns are often best understood as a result of a comprehensive planning analysis.

The SR-91 project in Orange County, California dealt with additional equity concerns. Because the project was initially created as a public-private partnership between Caltrans and the California Public Transportation Company (CPTC), initial agreements included a no-compete clause. To ensure that the private investment could be repaid through collected tolls, freeway expansion on the adjacent SR-91 general purpose lanes was prohibited. In response to political and public pressure for freeway expansion, the Orange County Transportation Authority purchased the managed facility, and transportation agencies are planning expansion of the adjacent freeway. The SR-91 case illustrates the need for toll lane operators to be aware of and responsive to concerns of all users of corridors on which pricing is implemented.

A concept called “FAIR” (Fast and Intertwined Regular) lanes attempts to overcome public resistance and address the equity issues has been the subject of study throughout the United States. Under this idea, congested freeways are separated into fast lanes and regular lanes. The fast lanes are electronically tolled, with tolls set dynamically in real time to ensure that traffic moves at the maximum allowable free-flow speed. Users of the regular lanes still face congested conditions but are eligible to receive credits if their vehicles have electronic toll tags. Accumulated credits can be used as toll payments on days they choose to use the fast lanes, or as payment for transit or para-transit (shuttle van) services.

### 3.4.3 Facility Supports Enforcement

Enforcement is essential to the success of a managed facility, and should be highly visible, frequent, and impose penalties that are strict enough to deter future violation and minimize the evasion of road tolls. Value pricing facilities rely on travel time savings to attract users to the facility. Violators degrade the performance of the facility by occupying roadway capacity that is managed and allocated for HOV, tolled, and other specific types of users. Public trust in the facility can also decrease if paying users perceive an unacceptable rate of violations. Because the loss of revenue is at stake (in addition to a degradation of service to due excess traffic), enforcement of a priced lane can be even more critical than that of an HOV lane. Therefore, the additional costs and training of this more intense enforcement method, including additional enforcement areas and more police need to be considered in the full cost of the program. In addition, violators negatively affect the revenue collection of the facility, effectively taking funds that are allocated for operational costs, facility improvements, and other uses.

Reported nationwide HOV violation rates typically range from 5 to 40 percent. HOV lanes with high violation rates can be especially suited to conversion to HOV/M lanes. Charging a toll in addition to the occupancy restriction increases the importance of enforcement. Additional enforcement usually incorporates increased visual patrols to verify vehicle occupancy and some form of electronic detection and photographic record of vehicles not using the appropriate toll transponder. Revenues generated by the HOV/M lane, especially those resulting from enforcement activities, usually fund these increased enforcement efforts. HOV lane violation rates on Dallas HOV facilities are comparably low, ranging from approximately one percent on I.H. 30 to three to six percent on the concurrent flow facilities. While these violation rates are typically lower than those experienced on other facilities nationwide, it is likely that they could be further reduced through increased enforcement made possible through a value pricing program. Currently, officers set up stationary patrols at designated enforcement zones along the existing HOV lanes. These enforcement zones consist of wide paved areas near the HOV lane access points, from which vehicle occupancy is determined visually. The fine for HOV violation on DART HOV lanes is $287 (2005 data).

For example, one of the positive benefits on the I-15 program in San Diego has been the significant reduction in SOV violators, the result of...
increased California Highway Patrol (CHP) enforcement funded by the project. The HOV violation rate for California has a “first offense” fine of $271. In October 1996, illegal SOV’s comprised 17 percent of total vehicles on the HOV lanes. Throughout the ExpressPass and FasTrak™ program phases, violation rates have ranged between three and five percent of total traffic, whereas typical HOV lane violation rates throughout California range between five and ten percent.

For tollways, the existing NTTA enforcement programs could continue to be used in conjunction with a value pricing program. Toll plazas include traditional coin and change-made collection methods, along with the TollTag ETC program. Rates for both manual and automated collection methods could be varied according to time-of-day. Toll plaza lanes also include an automated enforcement system. When vehicles pass through toll lanes without correctly paying the toll, an image of the vehicle’s license plate is captured and a violation notice is sent to the registered owner by mail.

In general, the evaluation of enforcement needs would consist of strategically locating enforcement areas. Also, it must be determined if enforcement officers assigned to a facility would be willing and capable of accommodating the additional requirements needed to enforce a managed lane. The enforcement personnel must be visible on the roadway to implement the rules/restrictions as well as provide severe penalties (based on legislation) if the driver is caught violating any of the roadway rules. Enforcement encompasses the steps taken to minimize the evasion of road tolls, albeit technical, operational or legal. The enforcement areas should be stationed on a wide shoulder for enforcement activities. A clear view of oncoming vehicles is essential so that officers can both verify the occupancy of HOV’s and determine the presence of a toll tag or permit for paying vehicles. Sufficient distance between the enforcement area and the next downstream exit will aid in apprehending violators.

For value pricing implementation on HOV facilities, existing enforcement strategies can typically be used. However, enforcement can be much more complicated on priced lanes because enforcement officers must also verify the presence of a permit or transponder for those vehicles paying to use the lane in addition to inspecting vehicles for occupancy. Current electronic surveillance methods may not be adequate to ensure detection of all violators. Therefore, enforcement areas would be needed to allow officers to park safely while monitoring the priced lane and for violators to pull over safely, while not slowing traffic in the lane. An enforcement officer could be notified when a non-transponder vehicle passes through the enforcement area and could then visually inspect the vehicle for appropriate occupancy.

In addition, ITS can be a valuable tool in enforcing value pricing programs. Many ITS elements, such as detection and surveillance equipment, are integral parts of an electronic toll collection system. Variable message signs can communicate hours of operation and other details, or communicate dynamic prices if this strategy is employed. In addition to enforcement, other uses for ITS, such as detecting and verifying incidents and communicating weather and pavement details, can be used to enhance the operation of a managed facility. Many of finer grain details of an enforcement plan can best be determined once conceptual design is completed as part of a planning exercise.

3.4.4 Facility Supports Toll Collection

The implementation of a toll collection system can be one of the greatest challenges and expenses in applying value pricing to an existing free facility. Typically, electronic toll collection (ETC) is preferable to toll plazas or permits. ETC systems allow instantaneous collection of tolls at or near highway speeds and require fewer geometric changes to the facility. Still, ETC systems require extensive specialized infrastructure that may be difficult to retrofit to an existing facility. Most ETC systems use antennas, mounted on overhead gantries, to read uniquely identifiable windshield-mounted toll tags. Antennas must be placed near entrances and exits if tolls are distance-based, but can be located with more flexibility if a flat toll is collected. The antennas require a source of electricity and a method to relay vehicle data to a processing facility, where the appropriate charge can be billed to an individual user. Fortunately, many motorists in the Dallas-Fort Worth area are already familiar with the NTTA’s TollTag system. ETC systems developed for managed lanes in the Dallas-Fort Worth area could be integrated with the existing TollTag system, using the same system architecture, communications equipment, and billing methods. TollTag has been widely accepted by the public and can currently be used on all NTTA facilities, Dallas-Fort Worth International Airport (DFW) parking facilities, and Harris County Toll Road Authority (HCTRA) facilities in Houston.

Planned facilities also require these ETC elements. However, they may be more fully integrated into the design of the facility. For example, antennas can be
integrated with sign bridges, and data cables between antenna sites and the central facility can be installed along the roadway during construction. ITS components such as variable message signs and in-pavement traffic counters can be installed more easily. The provision of a toll collection system should be considered early in the design process.

Toll facilities such as the President George Bush Turnpike, the Dallas North Tollway have the advantage of already having a toll collection infrastructure in place, which can typically be modified to incorporate dynamic or static toll changes quite easily through software changes. Coordination with the toll authority (NTTA) is critical in evaluating these modifications.

With respect to design issues, the major infrastructure needed to support toll collection efforts includes ETC antennae and overhead gantries. In addition, the ability to provide a seamless interaction with other toll collection efforts would make the managed lanes easier and more convenient to use. Therefore, future corridor studies should take into consideration the physical requirements of toll collection equipment and the availability of payment technology. It is possible that nearby facility that incorporates some, if not all, of these features would provide an easier method to “string” the facilities together.

While some interim and pilot projects have used permit-based systems, high-speed ETC systems are the preferred method of toll collection on managed facilities, especially in a region with a successful tolling system. Tolls can be collected at free-flow speeds, and windshield-mounted transponders can be distributed to a large number of drivers, many of whom may choose to use the facility only occasionally. Drivers have the flexibility to choose on a daily basis whether they want to bypass the congestion of the general purpose lanes in exchange for a toll.

ETC systems are a significant technological and financial component of free to tolled lane conversions. Typically, the equipment is mounted overhead on sign bridges or existing overpass bridges. Where existing structures are not available, dedicated overhead gantries support the transponder detectors at various intervals along the roadway. For comparison, the ETC system used on eight-mile-long I-15 HOT lane facility in San Diego had an estimated capital cost in 2001 of over $11 million.

Recent advances in toll collection technology have further increased the functionality and convenience of ETC systems. Transcore, a developer of toll collection technology, introduced the “TagTeller,” which allows automated distribution of electronic toll tags. Similar to an ATM machine, the TagTeller accepts cash, credit cards, and debit cards, and can be installed at drive-up, walk-up, and in-lane locations. The machine can be used to open new accounts, replenish existing accounts, pay violations, and perform other routine account maintenance tasks, and can also distribute ETC tags. Tags are potentially interoperable with other transportation or transit networks, and could provide a simple way for occasional or visiting roadway users to access an ETC system.

3.4.5 Facility Represents a Potential Candidate for Incentive Based Pricing

Value pricing is an incentive based program in and of itself. By introducing price to encourage changes in travel behavior, value pricing programs are a way to manage demand by encouraging travelers to use the facility in off peak or shoulder periods or to carpool or use transit. Incentive programs that include additional promotions are an innovative way to make value pricing even more beneficial and attractive to the region by increasing use of the priced facilities and enhancing revenues and mobility. The SR-91 project used this concept to promote value pricing in an untested market. The original owner of the facility, along with local businesses, offered a variety of discounts to encourage the use of the SR-91 Express Lanes. Some of the incentives included discounts on the purchase of gasoline and $1,000 in prepaid tolls offered by homebuilders with the purchase of a new home. In the Dallas-Fort Worth Region, providing incentives to encourage the use of priced lanes or to support their implementation could be used to help meet various goals of a value pricing program. The two basic goals of value pricing include:

- Managing demand
- Marketing the managed facility

Using incentives to managed demand is a popular technique in many urban regions of the United States. Incentives for carpooling, vanpooling, and transit use sponsored by federal, state, and local agencies have met with success and have encouraged the use of alternate modes of travel in highly congested areas. These types of incentives could also prove successful in
conjunction with a managed lane. Examples could include offering carpoolers, vanpoolers, or transit riders the ability to earn credits for riding a bus or using the managed lanes or even discounts on vans purchased predominantly for vanpooling.

Offering incentives to use the managed lanes is a concept that has not been employed on a large scale to date in the transportation industry. However, incentive programs are used in many other industries to reward program participants. For example, the retail grocery industry uses coupons to encourage people to buy particular products at a discount. Many sales companies offer incentives to employees to meet or exceed sales quotas, often in the form of monetary rewards, vacations, or discounts on products. Restaurants offer frequent buyer cards (buy 10 meals, get one free). One of the most popular types of award programs is the frequent flyer programs offered by most airlines. Frequent flyer programs date back to 1981, when American Airlines launched AAdvantage. Since then, the number of programs has increased substantially and now includes hotels and rental car companies, with more than 80 million people participating in one program or another. Frequent flyer programs have been lauded as one of the most successful marketing programs ever developed, and are actually a subset of a larger class of related marketing approaches known as loyalty marketing. For more information on loyalty marketing, go to www.frequentflier.com.

Extending the concept of loyalty marketing to value pricing and establishing an incentive based program unique to managed facilities the Dallas-Fort Worth region would be the first of its kind and would help to set the standard for implementing value pricing programs elsewhere. However, the concept would be similar to previous loyalty marketing programs: encourage repeat business by rewarding customers for their loyalty. Goals of such an incentive program would be:

- To advertise and market the program to attract and retain customers
- To provide a benefit or reward to users of the program, beyond the travel time savings
- To solicit support from the local business community by allowing them the opportunity to advertise their services, particularly services that depend on access to or from the priced facility.

Once the goal or goals of incentive based pricing are established for a particular facility, planners can work with local businesses to identify an appropriate incentive. Some examples of incentives that could be applicable for a particular value pricing program include:

- Discounted access to the managed lanes themselves (i.e., get a free trip for every 15 trips or reduced fee days)
- Frequent flyer miles
- Baseball or football tickets
- Discounts coupons for restaurants
- Discount coupons for rental cars
- Passes to area attractions like Six Flags
- Discounts on goods or services.

It is recommended that there be one type of incentive per facility to start so that the program is simple, yet effective to implement and monitor. If a particular incentive can be linked to the facility itself, such as awarding frequent flyer miles to motorists who use congested roadways leading to DFW Airport, it is likely that the airlines would also realize a benefit and be more inclined to partner with the managed facility owner to develop a program that can benefit both parties as well as the public. This partnering outreach could begin soon after the concept of the managed lane is developed, providing maximum time to fully develop the concept and create and implement a marketing plan. Although any facility may be a candidate for an incentive based pricing, this program could also be considered a pilot application of an innovative concept.

3.4.6 Facility Improvement Minimizes Construction Disruption

Three categories of construction were identified for the purposes of evaluating the potential to disrupt traffic on the facility main lanes while the priced lanes are being constructed:
These types of projects would incur varying degrees of disruption to the surrounding traffic. Note that applying value pricing to an existing toll road by varying the toll would require little or no construction. Minimizing construction disruption is one goal of the implementing agency in reducing the inconvenience to motorists while a value pricing project is being constructed.

A full reconstruction would include adding new lanes and shoulders to a facility, bridge widening or replacement, new interchange construction, adding enforcement areas and physical lane separation (see section 3.4.8 for a discussion of physical lane separation) between the managed and main lanes, and generally any construction activities that require full lane closures for extended periods of time. Full reconstruction projects are likely to be the most disruptive to traffic using the facility or corridor and would require new rights-of-way.

A partial reconstruction would be less disruptive, but may require some lane closures for short periods of time to add shoulders and enforcement areas, and physical lane separation. Some new right-of-way may be needed.

Median shaving would be the least disruptive because all new construction would be added in the median of the facility. Some disruption to the main lanes may occur if some of the main lane shoulders need to be narrowed to ensure adequate lanes widths for the managed lanes. Although many of these issues can be better identified during the planning phase, many may not be resolved until a more detailed level of design is completed.

### 3.4.7 Facility can be Constructed or Modified and Open to Traffic Within a Reasonable Timeframe

The implementation schedule for a facility is a crucial evaluation criteria for determining whether the project will fall into the category of potential demonstration project. Although a cutoff of five years has been selected as a screening criteria to separate short-term consideration from long-term consideration, the ultimate open to traffic date is a factor in the success of a project (i.e., projects completed sooner have a more immediate benefit). Therefore, this criteria is based solely on the amount of time needed to open a priced facility to traffic, which is ultimately dependent on the type of construction anticipated (see section 3.4.6 above). This criteria is more critical for selecting a demonstration project because one of the goals of a demonstration project is to learn as much as possible about the viability of value pricing in the region. For long range planning purposes, the timing of project implementation is tied to the MTP, TIP, STIP, and ultimately to funding availability and priorities in the region. This criteria may be used to prioritize projects based on how quickly they can be implemented, but not necessarily by their level of benefit.

### 3.4.8 Facility Supports Physical Lane Separation

A lane separation strategy is a key part of the implementation of a value pricing program. The need to evaluate methods of lane separation is more apparent on a HOV/M lane than on a tollway, where occupancy is typically not a consideration. Separation of general purpose and managed lanes enhances the overall operation of a managed facility. Large speed differentials, which tend to increase the occurrence and severity of rear-end and sideswipe collisions, could be created between the managed and general purpose lanes during periods of heavy congestion in the general purpose lanes. Lane separation also prevents or prohibits the mixing of these different users. Additionally, enforcement activities are simplified when violators are confined to the managed portion of the facility.

Several methods are available to separate traffic on the managed lanes and general purpose lanes and prevent movement between the two uses. Three common methods include barrier separation, buffer separation, and contiguous (no separation). On barrier-separated facilities, a concrete barrier or plastic pylons is used to divide the two types of traffic. A moveable concrete barrier, such as the “zipper” used on the existing contraflow I.H. 30 HOV lane, can be used effectively to separate off-peak direction and peak direction travel. Buffer separated facilities use a paved buffer, sometimes with flexible pylons or other semi permanent devices, to separate the lanes. Examples of lane separation types are shown in Figure 3-2.

The manner in which drivers move between the general purpose and managed lanes largely depends on the type of separation used on the facility. Barrier and buffer separation require designated entrances and exits at points along the facility, usually near key interchanges. Contiguous lanes
require no specified access points because traffic can freely move in and out of the lane; however, these also can encourage more violation of the priced lanes. In addition, contiguous lanes, with their noted higher crash rates and violations, will increase recurrent congestion, cause more blockage of the managed lane itself, and reduce reliability.

The separation strategy chosen for a managed lane has a significant effect on the ways users can access the managed portion of the facility. For this study, interim HOV lanes will not be considered for short-term or long-term projects because they are not barrier separated. However, they will be considered when permanent corridor/facility improvements are recommended in the MTP.

Typically, most managed lanes are in the median area of the larger facility so that users of the general purpose lanes (usually the majority of traffic) can directly access the interchange ramps. However, users of the managed lane must cross the general purpose lanes, either by grade-separated flyover ramps, wishbone ramps, or by at-grade slip ramps. Grade-separated or wishbone ramps eliminate at-grade conflicts, but greatly increase the right-of-way needs and construction costs of the facility. Users can enter or exit a contiguous managed lane at any point and must simply allow enough distance to complete the at-grade weave to or from the interchange ramp. In any of these cases, studies to determine if any time advantage that was gained by using the managed lane is damaged by having to “weave” with general use traffic.

If buffer or barrier separation is used, dedicated access points between the managed and general purpose lanes must be provided. These access points need to be located far enough upstream or downstream to allow for a safe weave between the interchange ramps and the managed lanes. Various sources, including the California Department of Transportation (Caltrans) HOV Design Guidelines, recommend providing at least 1000 feet per lane between upstream and downstream entrance ramps.

While some value pricing studies have considered implementing pricing programs on non-separated facilities, this approach can complicate the toll collection and enforcement efforts on the facility. In most cases, program operators will wish to add lane separation, usually in the form of concrete barriers or plastic pylons, between the managed and general purpose lanes. Adding lane separation also requires the development of an access strategy. The widening associated with these additional features could impact existing bridges, interchanges, median areas, and service roads, and could create significant right-of-way impacts given the confines of an urban roadway.

Based on AASHTO’s A Policy on Geometric Design of Highways and Streets (Chapter VIII, Freeways), the HOT lane side of a concrete barrier would require a minimum four-foot shoulder and the general purpose lane side of the barrier could require a ten-foot shoulder, giving a total separation width of up to 16 feet (including the two-foot-wide barrier). Figure 3-3,
which shows a two-lane reversible HOV facility on I-394 in the Twin Cities area of Minnesota, illustrates the potential right-of-way issues that could be associated with adding barrier separation. Additionally, if access through the barrier were provided along the managed lane at various intervals, each starting section of the barrier would need to be treated to provide a buffer to protect vehicles during collisions. Concrete traffic barrier, at a cost of about $45 per linear foot (based on the I.H. 820 Corridor Alternative Analysis), is the most costly in terms of initial capital costs compared to the other options, but maintenance costs are fairly low as compared to other strategies. Concrete barriers also enhance the safety of the facility by physically separating different types of traffic, and provide a mounting location for lights and signs.

Tubular markers, shown in Figure 3-4, are a common type of lane separator used for value pricing projects in the United States. SR-91 in Orange County, California, uses plastic flexible pylons, and their use has been studied for other projects such as the HOT lane extension on I-10 in Houston, Route 101 in Sonoma County, California, SR-57 in Irvine, California, and I-25/US 36 in Denver, Colorado. Tubular markers are typically spaced 20 to 50 feet apart and are affixed to the roadway surface with adhesive. The recommended width to accommodate the pylons is 18 inches on each side, which could require the roadway to be widened an additional three feet. Plastic pylons are resistant to a limited number of vehicle impacts and generally cause no damage to vehicles that impact them. However, the “kill rate” of plastic pylons is about 10 percent every 60 to 90 days, which means that in about one year, approximately all units would need to be replaced at $60 per unit. While initial capital costs for pylons are comparatively low, maintenance and replacement costs would be greater than those for concrete barriers.

In summary, the configuration and location of the new lanes combined with the number and type of freeway-to-freeway connection requirements is most likely the largest cost factor when adding separate toll lanes to a freeway.

3.4.9 Facility can be Designed with Minimal Design Exceptions

In general, FHWA design exceptions are an issue in the region because of restricted right-of-way and limited freeway width on some existing facilities. TxDOT has had to seek exceptions where the facility right-of-way does not support proper lane and shoulder widths that are consistent with FHWA standards. As a rule of thumb, such exceptions should be kept to a minimum. NCTCOG and other agencies that work on developing preliminary designs strive to avoid design exceptions. When evaluating a managed facility, the same design standards apply that would be considered for any highway project. Specifically, a facility with three or fewer lanes would require 10-foot outside shoulders and 4-foot inside shoulders. A facility with four or more lanes and reversible lanes require 10-foot inside and outside shoulders. All lanes are required to be 12 feet wide. Vertical clearance between the roadway and overpass structures should be 16 feet.
For short-term evaluation, this criterion is more critical because of the short time frame for implementation and because most short-term implementation projects would likely be retrofits of existing facilities that were designed using older standards. For long-term planning, it is assumed that design standards would be considered and met during the design process.

3.4.10 Facility Supports Ingress/Egress Directly to/from the Managed Lanes

As noted in the discussion of physical lane separation, access to and from the managed facility can be at-grade, grade-separated, or not allowed at all except at the endpoints. Two principle at-grade access strategies have been commonly used to provide access between separated managed lanes and adjacent general purpose lanes. Figure 3-5 shows an at-grade buffer opening on I-405 in Orange County, California. Open weaving is permitted at this location, which is of sufficient length to support acceleration/deceleration and merging maneuvers and allows vehicles to enter and exit the HOV lane. Open weaving minimizes the pavement width required for access, but introduces the potential conflicts that are associated with weaving areas. Figure 3-6, also on I-405 in Orange County, illustrates an alternate access method: directional slip ramps. Each slip ramp can accommodate a single on or off movement, with a channelization preventing conflicting movements. Typically, an auxiliary lane is added to isolate the weaving movement from the main traffic flow, reducing the potential for conflict. Additional pavement width is required for the auxiliary lane, however, and more access points may be required because the movements are directional. Designers of these types of facilities must also consider the differential in speeds between the managed and general use lanes.

When employing either method of at-grade access, sufficient space should be provided between the upstream and downstream entrance and exit ramps and the buffer opening to allow safe, gradual merging between the two points. To accommodate weaving and merging traffic, the location of each opening should be carefully coordinated with highway entrance and exit ramps. The Caltrans publication HOV Guidelines for Planning, Design, and Operations, published in July 1991, recommends a buffer/barrier opening of at least 1,300 feet, and a weaving distance of at least 500 feet per lane between the upstream and downstream ramps and the opening. For facilities in Texas, and specifically for the design of improvements to the LBJ Freeway, weaving distances are typically closer to 1,000 feet per lane. For at-grade access, the locations of slip ramps should be carefully coordinated with highway entrance and exit ramps to accommodate weaving and merging traffic. A
weaving distance of at least 1,000 feet per lane between upstream and downstream highway entrance and exit ramps is also suggested by the Caltrans HOV design guidelines.

On the other extreme, the I-15 HOT lanes are accessible only at their endpoints. However, studies are underway to extend the current eight-mile facility by 12 miles north to SR 78 in Escondido to improve overall operation of I-15. This plan calls for a three-lane HOT lane concept with moveable median barriers and access points to and from the freeway at various locations. Similarly, the SR-91 Express Lanes run approximately 10 miles from the SR 91/55 junction in Anaheim to the Orange/Riverside County Line and have no intermediate access points, although adding one is currently under consideration in the OCTA 10-year plan. An additional access point would enable drivers originating from a larger area to enter the lanes, potentially increasing usage. However, the lack of intermediate access points has advantages in that the conflicts and impacts associated with furnishing ingress and egress from the HOT lane are eliminated, making the facility more attractive for long distance trips. As mentioned earlier, the pattern of ingress/egress will also greatly impact the design of the enforcement for the system.

Slip ramp locations should also take into account the operating characteristics of the adjacent freeway lanes and the location of all nearby entrance and exit points upstream and downstream of the buffer/barrier opening. In addition, the buffer and acceleration/deceleration lanes require additional pavement area, increasing cost. Also, because access is limited to certain locations upstream and downstream of interchange ramps, there is the potential for bottleneck formation near access points. In areas of heavy weaving between the priced lanes and interchange ramps, grade-separated access may be desirable.

Typically, the greatest efficiency, safety, and capacity are achieved when conflicting movements are grade separated. Grade separation is usually an effective way of achieving these goals, but it comes at the expense of increased complexity in design and construction, and therefore greater construction, operation, and maintenance costs.

Grade separation provides access to the managed lane while eliminating the weaving and merging movements that conflict with the operations of the freeway lanes. In addition, the ramps themselves provide acceleration and deceleration areas, which allow high-speed merges and also provide some storage distance when the freeway lanes are congested. Grade-separated options include median drop ramps from overpasses or direct freeway-to-freeway connections, such as flyover ramps as shown in Figures 3-7 and 3-8.
3.5 OTHER CONSIDERATIONS FOR IMPLEMENTING VALUE PRICING

In addition to the ten evaluation criteria established for this study, the following activities associated with value pricing are important considerations for both short and long-term projects. In most cases, these factors are better understood after a more comprehensive analysis is performed as part of project planning.

3.5.1 Public Outreach and Marketing

Public understanding is one of the key elements that will influence the success of a value pricing program. If even a single demonstration a value pricing project were to be unsuccessful because of public misconceptions and lack of proper education, it might become more difficult to implement other projects. In addition to public workshops and other outreach tools, a marketing campaign could be developed that would advertise and market the value as well as the logistics of pricing, such as features of the program (hours, costs, and restrictions) and future plans for the program.

The public outreach and marketing program could begin as soon as a project is approved for implementation and should continue throughout the program. A marketing effort is seen as an important step to ensure the success of the project and ultimate long-term implementation of value pricing. Many of the value pricing projects in the United States have incorporated the services of an experienced marketing firm to develop and implement a successful marketing campaign. Overall, the campaign should strive to accomplish the following objectives:

- Identify and target the appropriate markets
- Explain the concept of managed lanes
- Reassure current HOV/tollway users that they will be given top priority once SOV’s are permitted to use the lane
- Provide clear and detailed publications including complete, honest, and straightforward information explaining details, rules, and benefits and emphasizing simplicity, efficiency, and reliability
- Improve user/agency communication by establishing a toll-free hotline, customer service center/storefront office and media kits, editorials, and testimonials
- Make participation in user surveys a condition of the program
- Provide daily traffic reports to local media

Many operational projects, such as I-15, SR-91, and LeeWay were successful because in part they focused on public involvement from the outset. Likewise, the lack of success of some of the studies that did not become operational projects could be attributed in part to not involving the public early on, but focusing only on the technical issues. Based on research of the marketing efforts of these operational projects, there are three key steps to making a variable pricing project successful:

- Define the public opinion through research, public preference surveys, focus groups, and finding out what the decision makers are concerned about. Laying this groundwork is vital.
- Build local support by extending the outreach effort beyond the DOT and other agencies. Local support should include elected officials, community and opinion leaders, and the media. It is important to frame the project’s message before the opponents do and for the project to be aligned with the public’s needs.
- Find a champion or group of champions to publicly support the project. It is important for all levels to “buy into” the project because it is difficult for elected leaders to make themselves vulnerable unless others are on board. Nearly all successful pricing projects have a project champion.

With SR-91, for example, the marketing team used many one-on-one communication strategies, as well as some for small groups, all aimed at relationship building by focusing on the benefits and costs to the community. Understanding the public’s motivations is the key to developing the “brand,” position, and message. The message that was marketed for SR-91 was a “Fast, Safe, Reliable Commute” because that was what the public indicated it was looking for. Recent surveys
of SR-91 users still back this up: most of them still respond that their commute is faster, safer, and more reliable.

3.5.2 Collateral Actions

Collateral actions are those programs or projects established to support the pricing program by using revenues generated by the managed lanes or tollways. There are two categories of collateral actions: 1) operations and maintenance and 2) associated new and supporting projects. The ability for revenues collected from the value pricing project to cover operations and maintenance is one way to measure a facility’s financial viability, as well as its public acceptance. Operation and maintenance costs generally include facilities and staff needed to operate and maintain the system, including electronic toll collection and enforcement programs.

Associated new projects could include services that enhance the effectiveness of the managed lanes, such as alternative work hour programs, transit system improvements, or other transportation demand management (TDM) measures. For example, part of the revenues generated by I-15 FasTrak project fund a new bus route which provides an alternate transportation method in the I-15 corridor. These services can further decrease the demand on the facility, and can also increase mobility by providing additional choices to travelers in the corridor. Value pricing strategies, along with TDM measures created through resulting revenues, should be evaluated as part of a corridor-wide transportation improvement strategy.

A concept called “FAIR” (Fast and Intertwined Regular) lanes attempts to overcome public resistance and address the equity issues has been the subject of debate throughout the United States. Under this concept, congested freeways are separated into fast lanes and regular lanes. The fast lanes are electronically tolled, with tolls set dynamically in real time to ensure that traffic moves at the maximum allowable free-flow speed. Users of the regular lanes still face congested conditions but are eligible to receive credits if their vehicles have electronic toll tags. Accumulated credits can be used as toll payments on days they choose to use the fast lanes, or as payment for transit.

3.5.3 Monitoring Program

Most value pricing programs include some form of monitoring program to evaluate its success in reducing congestion and travel times. Some methods of collecting user data include conducting public acceptance surveys, determining levels of usage and average time savings, and evaluation of the violation rate and enforcement issues. This monitoring is especially important for a region’s first or first few demonstration projects. Data can be used to measure and market as well as quell fears of equity and fairness concerns.
4.1 INTRODUCTION

In July 2004, NCTCOG and its partners initiated an application to FHWA for a grant through the Value Pricing Pilot Program (VPPP) to implement a demonstration project in the Dallas-Fort Worth Region. A demonstration project is a major step toward showing the transportation leaders of north central Texas the benefits and costs of using value pricing to improve mobility in the region. The decision to select I.H. 30 as a candidate for the grant and thus the region's value pricing demonstration project resulted from the application of the screening criteria and the ten evaluation criteria described in Chapter 3.

The application, which can be found in Appendix A, was submitted to FHWA on July 15, 2004.

This section describes how I.H. 30 was ultimately selected from the pool of potential short-term candidates to be the value pricing demonstration project in the Dallas-Fort Worth Region. This section also serves as an example of how to apply the screening process and the ten evaluation criteria described in Chapter 3. The facilities that made it through the screening process were then evaluated based on the 10 evaluation criteria to understand their potential for success, relative to the other facilities.

Projects not qualifying for short-term implementation could be evaluated in the future as part of the MTP and MIS/NEPA processes as part of a corridor-based or regional network of priced facilities. A discussion of the long-term application of the guidelines can be found in Chapter 5.

4.2 SCREENING PROCESS TO IDENTIFY POTENTIAL PROJECTS

As noted in Chapter 3, to be considered for short-term implementation or as a demonstration project, the facility (or segment of the facility) must meet the following screening criteria:

1. The facility needs to be identified in the adopted MTP with a recommendation as a HOV or Managed Facility.

AND

2. The facility is not an interim HOV facility (due to the lack of concrete barrier) or an existing tollway (due to bond covenants that restrict toll discounts), but could support a new managed lane (or lanes) in the right-of-way.

AND

3. The facility would be in place or construction would be completed within five years.

In accordance with the first screening criterion, a project must be recommended in the current MTP, Mobility 2025 (Amended April 2005), as a HOV or Managed Facility in order for it to be considered for short-term implementation. Figure 4-1 shows the HOV projects currently recommended in the plan and thus the facilities that were considered. In addition, to qualify as a short-term or demonstration project, the facilities must either be in place or be constructed within five years. The timing factor is an important element in determining demonstration project status. To be able to learn from the demonstration project, it should be able to be implemented quickly and at a relatively low cost.
Of the projects shown in Figure 4-1, the following six facilities would likely be open to traffic within five years (i.e., by 2010) and could support new, priced lanes. The timing of implementation of the six facilities is based on the letting cycles of the Transportation Improvement Program and the staging of the Metropolitan Transportation Plan.

**I.H. 30 (Tom Landry Freeway):** Managed lanes will be built as a part of the ongoing reconstruction of I.H. 30 in western Dallas County from just west of I.H. 35E in Dallas to west of Northwest 19th Street (future S.H. 161) in Grand Prairie. This project will be the Dallas-Fort Worth region’s first multi-lane reversible HOV facility, with two reversible lanes operating during the peak periods between proposed wishbone ramps west of Westmoreland Road in Dallas and Northwest 19th Street. The remaining section east of Westmoreland Road toward I.H. 35E will operate as a single reversible lane. Additional access points to and from the HOV facility will be constructed west of Loop 12 (slip ramps), east of MacArthur Boulevard (wishbone ramps), and west of Belt Line Road (wishbone ramps).

**I.H. 35E/U.S. 67 (South R.L. Thornton/Martin D. Love Freeway):** Dallas Area Rapid Transit (DART) and TxDOT completed construction of the HOV facility for I.H. 35E and U.S. 67 in south Dallas in 2001. It consists of a single reversible lane on I.H. 35E between I.H. 30 and Loop 12, and on U.S. 67 between I.H. 35E and Loop 12, which operates only during the peak periods and has no intermediate access points. U.S. 67 also has one concurrent-flow lane in each direction between the terminus of the reversible HOV facility at Loop 12 and I.H. 20. The northern terminus of the HOV facility provides a direct downtown connection to and from the Houston and Jefferson Street viaducts as well as a slip ramp to/from the I.H. 35 mainlanes.

**S.H. 121/S.H. 183 (Airport Freeway):**
S.H. 121/S.H. 183, stretching from I.H. 820 in North Richland Hills to S.H. 161 in Irving, is currently under evaluation as a Comprehensive Development Agreement through TxDOT. The facility will be totally reconstructed with three mainlanes (plus auxiliary lanes), three managed lanes, and three frontage road lanes in each direction. Access points into and out of the managed lanes will occur (tentatively) at I.H. 820, Hurstview Drive, Brown Trail/Bedford Euless Road, Westpark Drive/Murphy Road, International Parkway (DFW International Airport), and S.H. 161. The managed lanes are being designed for 24-
President George Bush Turnpike – Segment IV (“Superconnector”): This section of the President George Bush Turnpike is expected to open in October 2005 with 3 mainlanes in each direction between I.H. 35E in Carrollton and I.H. 635 in Irving. It contains interchanges at Sandy Lake Road, Belt Line Road, Valwood Road, Valley View Lane, new ramp connections at Las Colinas Boulevard to and from the north, and direct flyover connections to and from the west at I.H. 635.

I.H. 635 East (Lyndon B. Johnson Freeway): The proposed continuation of I.H. 635 HOV facility will be a reconstruction of the existing median and left shoulders of the freeway to provide one concurrent-flow lane in each direction between U.S. 75 and Skillman Street, and one reversible lane between Skillman Street and I.H. 30. The concurrent-flow and reversible-flow sections will both be barrier-separated from the mainlanes. The concurrent-flow section will have an intermediate access point at TI Boulevard, which is part of “High Five” Interchange Project currently under construction, and it will be operational 24-hours-per-day similar to the existing I.H. 635 HOV facility west of U.S. 75. The reversible-flow section will be operational during the peak periods and have intermediate access points at Plano Road, Jupiter Road (eastbound only), and Northwest Highway (westbound only).

U.S. 75 (Central Expressway): The proposed HOV facility for U.S. 75 will be a reconstruction of the existing median and left shoulders of the freeway to provide one concurrent-flow lane in each direction between I.H. 635 in Dallas and Exchange Parkway in Allen. The concurrent-flow lane will be separated from the mainlanes by a 3-foot buffer with a curb-device “soft” barrier at its center. The southern terminus of this facility will be the I.H. 635 HOV flyover ramp and U.S. 75 frontage road wishbone ramp currently under construction as a part of the “High Five” Interchange Project. The northern terminus of the facility will occur as a slip ramp to/from the U.S. 75 mainlanes just south of McDermott Road with a northbound auxiliary lane continuing up to Exchange Parkway to facilitate weaving. Intermediate access points to and from the HOV facility will occur between Park Boulevard and Parker Road in Plano, and between Arapaho Road and Campbell Road in Richardson.

All six facilities are shown in Figure 4-2.
4.3 APPLICATION OF THE 10 EVALUATION CRITERIA TO IDENTIFY A DEMONSTRATION PROJECT

The following criteria were then used to evaluate each facility’s ability to support the elements of value pricing, based on the guidelines established and documented in Chapter 3:

1. Facility main lanes exceed LOS ‘E’
2. Facility subject to legislative/legal considerations
3. Facility supports managed lane(s) enforcement
4. Facility supports toll collection
5. Facility represents a potential candidate for incentive based pricing
6. Facility improvement minimizes construction disruption
7. Facility can be constructed or modified and open to traffic within a reasonable timeframe
8. Facility supports physical lane separation
9. Facility can be designed with minimal design exceptions
10. Facility supports ingress/egress directly to the managed lanes.

A scoring system was established to rate each facility:

+ Positive: The facility meets or exceeds the criteria
- Negative: The facility fails to meet the criteria
0 Neutral: There is not enough information to evaluate the criteria at this time
N/A Not applicable: criteria does not apply to this facility or for this timeframe

For each of the 10 evaluation criteria, each facility was evaluated based on its existing condition and its recommended future configuration. The results of this evaluation are presented below.

4.3.1 Facility Main Lanes Exceed LOS E

This first criteria measures whether or not the facility is experiencing unacceptable levels of congestion and would therefore warrant an improvement. The Level of Service (LOS) of a facility is a measure of its traffic operational characteristics. The LOS is a measure of the congestion experienced by drivers, and ranges from A (free flow with little or no congestion) to F (failure with stop-and-go conditions). The LOS is normally computed for the peak periods of a typical day, with LOS D (approaching unstable flow) or better generally considered acceptable for intersections or highways in urban and suburban areas. At LOS E, volumes are near or at capacity. LOS F represents conditions in which demand exceeds capacity and in which there are...
operational breakdowns with stop-and-go traffic and extremely long delays at signalized intersections.

NCTCOG uses LOS E as a threshold to measure unacceptable levels of service. LOS E represents the capacity limit of the facility and is characterized by slow and periodically stopped traffic, where delays begin to form. The source of the LOS information for each of the six facilities under consideration is the MOBLOS in the Metropolitan Transportation Plan. Any facility that exceeds LOS E and therefore experiences LOS F was given a positive score, to indicate that it warrants an improvement. Data for the PGBT Segment 4 was not included as part of the MOBLOS data and therefore was given a score of “N/A.”

4.3.2 Facility Subject to Legislative/Legal Considerations

The six facilities under consideration are not subject to legal considerations that would prohibit value pricing. The only legal consideration that might affect the ability to implement value pricing as a demonstration project is associated with existing toll roads, where discounting the toll would be prohibited. The two existing toll facilities were screened out and eliminated from further consideration in the first step of this process.

4.3.3 Facility Supports Enforcement

To support enforcement activities and keep the violation rate low, a facility must have, at a minimum, full shoulders that can support stationary patrol cars, the ability of a patrol officer to stop a violator and direct his or her vehicle onto the shoulder, and enough merge distance for violators to merge back into moving traffic. Many managed facilities also have wider enforcement areas to provide a higher degree of safety for patrol officers and enforcement activities.

Each of the six facilities under consideration was evaluated to determine if it has or could be designed to have at least one ten-foot shoulder to support enforcement. Facilities that can support this requirement earned a positive score. A neutral rating was given to facilities that do not currently have a design concept completed, yet are assumed to have adequate design features to support managed lanes.

<table>
<thead>
<tr>
<th>Facility Supports Enforcement</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility Under Consideration</td>
</tr>
<tr>
<td>I.H. 30 (Tom Landry Freeway)</td>
</tr>
<tr>
<td>I.H. 35E/U.S. 67 (South R.L. Thornton/Martin D. Love Freeway)</td>
</tr>
<tr>
<td>S.H. 121/S.H. 183 (Airport Freeway)</td>
</tr>
<tr>
<td>President George Bush Turnpike – Segment IV (“Superconnector”)</td>
</tr>
<tr>
<td>I.H. 635 East (Lyndon B. Johnson Freeway)</td>
</tr>
<tr>
<td>U.S. 75 (Central Expressway)</td>
</tr>
</tbody>
</table>
4.3.4 Facility Supports Toll Collection

The preferred method for toll collection in the Dallas-Fort Worth Region is electronic toll collection (ETC). Therefore, the ability to support toll collection is based on the hardware and software requirements to either expand an existing toll collection system that is already in place (e.g., the extension of an existing toll road) or to construct a new collection system. In all cases, the value pricing toll collection system would work seamlessly with the region’s TollTag system.

Each of the six facilities was evaluated to determine if would be feasible to install an ETC system, based on the hardware and software needs, such as right-of-way for toll gantries, configuration. In each case there did not appear to be any impediments to installing and operating an ETC system. The PBGT, as a toll road, already has an ETC system in place.

4.3.5 Facility Represents a Potential Candidate for Incentive Based Pricing

Incentive based pricing refers to the potential for the roadway owner, in conjunction with a local vendor or service provider, to create a unique incentive program to encourage the use of the managed facility or to build general support for the concept of value pricing. It was assumed that this evaluation criterion would be considered later in the process, once a demonstration project was selected. Therefore, no scores were given for this criterion.

4.3.6 Facility Improvement Minimizes Construction Disruption

The six facilities were evaluated to determine what type of construction would be necessary to implement value pricing. In some cases, the managed lanes could be constructed within the median or on new alignment at the same time as the reconstruction of the main lanes. These facilities were considered neutral. Reconstruction projects that would likely require lane closures or lane restrictions were considered to be the most disruptive and were assigned a negative score. Facilities that require no construction were given a positive score.

4.3.7 Facility be Constructed or Modified and Open to Traffic within a Reasonable Timeframe

Although all of the facilities would likely be constructed within five years, as dictated by the screening process, the actual construction time frame was estimated to determine if a facility could be open before the five year cutoff. As stated in Chapter 3, the earlier a value pricing project is implemented, the sooner the benefits can be realized and the viability of pricing in the region can be analyzed. The facilities that could be ready before five years earned a positive score. Those that appeared to require the full five years due to the magnitude and complexity of the project were given a negative score.

---

### Facility Supports Toll Collection

<table>
<thead>
<tr>
<th>Facility Under Consideration</th>
<th>Supports Electronic Toll Collection</th>
<th>Hardware and Software</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.H. 30 (Tom Landry Freeway)</td>
<td>Specific areas are being designed to support gantry construction.</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>I.H. 35E/U.S. 67 (South R.L. Thornton/Martin D. Love Freeway)</td>
<td>This facility could support gantry construction and electronics.</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>S.H. 121/S.H. 183 (Airport Freeway)</td>
<td>This facility could support gantry construction and electronics.</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>President George Bush Turnpike – Segment IV (“Superconnector”)</td>
<td>This facility is already a toll facility and supports electronic toll collection.</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>I.H. 635 East (Lyndon B. Johnson Freeway)</td>
<td>This facility could support gantry construction and electronics.</td>
<td></td>
<td>+</td>
</tr>
<tr>
<td>U.S. 75 (Central Expressway)</td>
<td>This facility could support gantry construction and electronics.</td>
<td></td>
<td>+</td>
</tr>
</tbody>
</table>
### Facility Improvement Minimizes Construction Disruption

<table>
<thead>
<tr>
<th>Facility Under Consideration</th>
<th>Type of Construction and Ability to Minimize Disruption to Main Lanes</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.H. 30 (Tom Landry Freeway)</td>
<td>Construction disruption is not associated with managed lanes, but instead with the main lanes during the reconstruction of the facility and construction of wishbone ramps.</td>
<td>0</td>
</tr>
<tr>
<td>I.H. 35E/U.S. 67 (South R.L. Thornton/Martin D. Love Freeway)</td>
<td>The HOV already in place and therefore minimal construction is needed.</td>
<td>+</td>
</tr>
<tr>
<td>S.H. 121/S.H. 183 (Airport Freeway)</td>
<td>This facility would need to be reconstructed to provide the managed lanes and new frontage roads.</td>
<td>-</td>
</tr>
<tr>
<td>President George Bush Turnpike – Segment IV (“Superconnector”)</td>
<td>No construction is required.</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 635 East (Lyndon B. Johnson Freeway)</td>
<td>This facility would require only a median shaving; therefore most of the work would be in the median and requires taking little shoulder width from the main lanes. In some cases the outside shoulder would need to be widened.</td>
<td>0</td>
</tr>
<tr>
<td>U.S. 75 (Central Expressway)</td>
<td>The managed lanes would be provided in the median, causing minimal disruption. The facility already has wide inside shoulders that would minimize outside widening.</td>
<td>+</td>
</tr>
</tbody>
</table>

### Facility be Constructed or Modified and Open to Traffic within a Reasonable Timeframe

<table>
<thead>
<tr>
<th>Facility Under Consideration</th>
<th>Time Frame for Completion of Construction</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.H. 30 (Tom Landry Freeway)</td>
<td>This facility is currently being redesigned and constructed, and will be open to traffic by 2007.</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 35E/U.S. 67 (South R.L. Thornton/Martin D. Love Freeway)</td>
<td>The facility already exists, and only toll facilities would need to be constructed, most likely by 2007.</td>
<td>+</td>
</tr>
<tr>
<td>S.H. 121/S.H. 183 (Airport Freeway)</td>
<td>This facility would require total reconstruction, and would most likely take the full five years. It is programmed for completion by 2010. However, design has not yet started and it therefore would have less value as a demonstration project, even if it were completed within the five year period.</td>
<td>-</td>
</tr>
<tr>
<td>President George Bush Turnpike – Segment IV (“Superconnector”)</td>
<td>This facility is ready for value pricing implementation, in that only software modifications would be needed.</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 635 East (Lyndon B. Johnson Freeway)</td>
<td>The interim HOV lanes are programmed to be constructed by 2007. The design is being finalized in preparation for an October 2005 letting. The construction start is expected in the spring of 2006.</td>
<td>+</td>
</tr>
<tr>
<td>U.S. 75 (Central Expressway)</td>
<td>This project is currently in design, with completion of construction programmed for 2007.</td>
<td>+</td>
</tr>
</tbody>
</table>

#### 4.3.8 Facility Supports Physical Lane Separation

The ability of a facility to support physical lane separation (full concrete barrier with appropriate inside and outside shoulder widths) is dependent upon the available right-of-way. Facilities that can support a full barrier earned a positive score. Those facilities that are assumed to be designed with a barrier (but are unknown at this time) were considered neutral. Facilities that were too narrow to accommodate a barrier and shoulders were given a negative score.
### Facility can be Designed with Minimal FHWA Design Exceptions

This criterion measures whether the facility can meet minimum design standards and avoid design exceptions that would require approval by FHWA. Facilities with few or no design exceptions scored a positive score. Those that do not or could not meet current standards were given a negative score. Those that are not yet in design received a neutral score.

<table>
<thead>
<tr>
<th>Facility Under Consideration</th>
<th>Potential Design Exceptions</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.H. 30 (Tom Landry Freeway)</td>
<td>This facility can be constructed according to FHWA/TxDOT design guidelines. There are no vertical clearance issues. Horizontal issues may require 11 foot lanes and narrower shoulders in some segments to accommodate the reversible lanes.</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 35E/U.S. 67 (South R.L. Thornton/Martin D. Love Freeway)</td>
<td>This facility has narrow shoulders in some segments and no shoulders on the HOV and some segments of the main lanes. The barrier-to-barrier width is 13 feet. There are less than desirable vertical clearances at some locations (e.g., Illinois Avenue, Louisiana Avenue, Beckley Street, and 12th street).</td>
<td>-</td>
</tr>
<tr>
<td>S.H. 121/S.H. 183 (Airport Freeway)</td>
<td>This facility is not yet in design, although it is anticipated that it would be designed to meet all current standards.</td>
<td>0</td>
</tr>
<tr>
<td>President George Bush Turnpike – Segment IV (“Superconnector”)</td>
<td>This facility already exists and meets design standards.</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 635 East (Lyndon B. Johnson Freeway)</td>
<td>This facility does not have consistent shoulder widths, with a barrier-to-barrier width of 15-16 feet in most segments. It has less than desirable vertical clearances (e.g., at Greenville Street, Abrams Street, Skillman Avenue, Forest Street, and Royal Avenue)</td>
<td>-</td>
</tr>
<tr>
<td>U.S. 75 (Central Expressway)</td>
<td>Due to right-of-way constraints, this facility could not support shoulders on the managed lanes (barrier-to-barrier width is 15-16 feet) and would therefore be subject to design exceptions.</td>
<td>-</td>
</tr>
</tbody>
</table>
### 4.3.10 Facility Supports Ingress/Egress Directly to the Managed Lanes

The range of access configurations includes no intermediate access points, slip ramps between the managed lanes and the main lanes, and grade separated ramps that allow direct ingress and egress to the managed lanes and avoid managed lane traffic mixing with main lane traffic. The facilities that can accommodate direct ingress and egress were given positive scores. The facilities that could not accommodate any access were given negative scores.

<table>
<thead>
<tr>
<th>Facility Under Consideration</th>
<th>Access to and from the Managed Lanes</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td>I.H. 30 (Tom Landry Freeway)</td>
<td>Wishbone ramps could be constructed to provide access to all main lane exits (east of SH 161, east of MacArthur, and at Cockrell Hill Road). In addition, wishbone ramps would provide access to the park-and-ride center (NW I.H. 30 and MacArthur). There would be one location that would require a temporary slip ramp (just west of Loop 12) where traffic would have to merge across 4 lanes to exit onto Loop 12. This slip ramp would be temporary until the Loop 12 interchange is built.</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 35E/U.S. 67 (South R.L. Thornton/Martin D. Love Freeway)</td>
<td>Access would be provided at the endpoints of the facility (Jefferson Street or to 35E past downtown). Where the two highways merge together, traffic would have to cross the main lanes to enter/exit the facility. At the downtown exit, because of the Mixmaster, traffic would have to cross 3 lanes to exit.</td>
<td>-</td>
</tr>
<tr>
<td>S.H. 121/S.H. 183 (Airport Freeway)</td>
<td>Although it is anticipated that direct access to the managed lanes could be provided, it is not yet known at this time because this facility is not yet in design.</td>
<td>0</td>
</tr>
<tr>
<td>President George Bush Turnpike – Segment IV (“Superconnector”)</td>
<td>This facility would be fully managed and therefore all access points provide direct access.</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 635 East (Lyndon B. Johnson Freeway)</td>
<td>This facility would support some intermediate access (northbound: 3 entrances and 1 exit, southbound: 3 exits and 1 entrance) in the form of slip ramps except for the T-ramp at Texas Instruments (TI) Boulevard, which is part of the High Five interchange, and could be used in the interim. Due to right-of-way constraints, the slip ramp would not have its own lane, and there is concern that there would not be enough storage for managed lane traffic to merge into the congested main lanes.</td>
<td>-</td>
</tr>
<tr>
<td>U.S. 75 (Central Expressway)</td>
<td>The pylon buffers transition to striping at the access points to allow traffic to merge (Richardson between Campbell and Arapaho and in Plano between Park Blvd and Parker Road). It is possible that there would be less than desirable storage for managed lane traffic to merge into the congested main lanes causing queues to form on the managed lanes.</td>
<td>-</td>
</tr>
</tbody>
</table>
4.3.11 Summary

The summary of scores is shown below in Table 4-1. Based on the evaluation of the six facilities, I.H. 30 was selected as the candidate demonstration project because it had the most positive scores. The application for managed lanes on I.H. 30 was supported by the Texas Transportation Commission and was submitted to FHWA. TxDOT was subsequently awarded a grant in the amount of $416,000 for implementation of value pricing under the authority of the Value Pricing Pilot Program. At the time of the application, the North Central Texas region was in the process of upgrading I.H. 30/Tom Landry Freeway to meet the needs identified in the long-range Metropolitan Transportation Plan. The existing design and engineering plans for the I.H. 30/Tom Landry Freeway called for five mixed lanes of traffic in each direction, with a single reversible HOV lane. TxDOT and DART are committed to the construction of a single lane HOV facility to be in place by 2007 as part of the list of transportation control measures (TCM) that are documented in the State Implementation Plan (SIP). This VPPP grant will be used to revise the facility design to accommodate a multi-lane, managed/HOV facility in place of a single-lane, HOV-only facility.

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<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>I.H. 30</td>
<td>+</td>
<td>N/A</td>
<td>+</td>
<td>+</td>
<td>N/A</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 35E/ U.S. 67</td>
<td>+</td>
<td>N/A</td>
<td>-</td>
<td>+</td>
<td>N/A</td>
<td>+</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>S.H. 121/ S.H. 183</td>
<td>+</td>
<td>N/A</td>
<td>0</td>
<td>+</td>
<td>N/A</td>
<td>-</td>
<td>-</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>PGBT</td>
<td>N/A</td>
<td>N/A</td>
<td>+</td>
<td>+</td>
<td>N/A</td>
<td>+</td>
<td>+</td>
<td>N/A</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td>I.H. 635</td>
<td>+</td>
<td>N/A</td>
<td>-</td>
<td>+</td>
<td>N/A</td>
<td>0</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>US 75</td>
<td>+</td>
<td>N/A</td>
<td>-</td>
<td>+</td>
<td>N/A</td>
<td>+</td>
<td>+</td>
<td>-</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Table 4-1: Summary of Evaluation of Six Potential Short-term Value Pricing Projects
The guidelines developed in Chapter 3 can be applied to the long range planning process. However, the goals of long-term planning for value pricing are different from those described in Chapter 4, where the purpose of applying the evaluation criteria was to select a demonstration project. The goal for the long-term is to achieve a paradigm shift in the way the region incorporates value pricing in its planning process. Instead of considering occupancy based managed lanes as the predominant solution for improving mobility, value pricing could become the principal tool for relieving traffic congestion, while also generating revenue.

In general, facilities considered in the long range planning process would require more than five years for planning, design, and construction and would not be limited to what is currently recommended in the MTP as an HOV or managed lane. In addition, projects that were considered to be potential short-term projects but were not implemented would become part of the long-term plan for value pricing in the region. Essentially, this means that any existing or planned facility could be considered for value pricing in the future. In fact, NCTCOG and its partners will continue to use the guidelines established for this Regional Value Pricing study to make recommendations for future Metropolitan Transportation Plans.

As discussed in Chapter 3, the 10 evaluation criteria would be applied like they were for the short-term process, but with some differences. For example, the traffic needs would be investigated using the regional model instead of using the MOBLOS data. In addition, elements such as enforcement, toll collection, lane separation, and access and design exceptions, would be considered in the planning and design processes. Also, the financial feasibility of implementing value pricing is a much more important factor for future projects. Public policies related to legal constraints or regional guidelines would play an important role in selecting implementation strategies. Most importantly, lessons learned from value pricing demonstration project in the Dallas-Fort Worth Region would be applied to the development of future value pricing projects.

The value pricing strategies presented in the guidelines in Chapter 3 were defined as follows:

- Pricing HOV Lanes: Selling excess capacity on existing HOV facilities
- Applying Value Pricing on Tollways: Implementing variable tolls (by time of day, vehicle classification, congestion level, etc.) on an existing toll facility or designing a new tollway with variable tolls
- Pricing New Capacity on Freeways: Adding new priced lanes to existing freeways or constructing a partially managed new roadway

### 5.1 THE “UNIVERSE” OF FACILITIES IN THE DALLAS-FORT WORTH REGION

The range of facilities to be considered for the long-term includes nearly all existing or planned facilities in the region. However, the existing interim HOV lanes, due to their lack of physical lane separation, and the existing toll roads, due to their bond covenant restrictions, would likely not be considered in the long-term. However, they are included in the universe of potential facilities because it is possible that in the future they can be modified, either geometrically or legally, to accommodate value pricing. Figure 5-1 below represents the potential facilities that could be considered in the long range planning of value pricing.
5.2 APPLYING THE 10 EVALUATION CRITERIA

5.2.1 Facility Main Lanes Exceed LOS E

For all three types of value pricing strategies, use of the region’s transportation model is key to analyzing the effect of value pricing on the priced facility as well as on the surrounding roadway network. The projected traffic volumes, temporal shifts, diversions to other roadways, and mode choice shifts that can be shown by the model will help planners calculate the usage of the facility as well as projected revenues. Travel demand modeling would be used to evaluate the operations of the managed facility and to determine the impacts to the general purpose lanes and the adjacent non-tolled facilities. The overall evaluation process would focus on the change in travel time and vehicle trips within the area of influence of the proposed managed lane facility. As an initial step, the model would be used to determine the impacted area using time savings for individual origin-destination zonal pairs as a mechanism to identify the area of influence. This analysis would be conducted separately by time period (peak, off-peak, or shoulder periods) so that the impacts can be quantified for both the peak period and overall daily levels of travel.

The guidelines outlined for traffic relate to the ability of a particular facility to support the number of projected users for the purposes of designing capacity, increasing mobility, and generating revenues. However, effectively incorporated toll-based pricing scenarios as part of the travel demand modeling procedures has been a challenge for many agencies. Current state of practice ranges from post processors and sketch planning exercises to the use of more sophisticated activity-based models. The regional model used in the Dallas-Fort Worth Region may require modifications or post-processing of results to evaluate value pricing.

Travel time savings is essential to attracting users to a managed facility, where the “premium” service provided to users is largely related to travel time savings as compared to the adjacent congested general purpose lanes. As a general rule, managed facilities can most efficiently attract users when they offer a time savings of at least one minute per mile compared to the general purpose lanes. The 7.5 mile I-15 HOT lane facility in San Diego typically offers

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Figure 5-1: Recommended Transportation Facilities in the Dallas-Fort Worth Region (Mobility 2025, Amended April 2005)
a travel time savings of 7 to 20 minutes, which corresponds to the general HOV time savings rule.

If enough motorists can be shifted from the peak period or buy into the managed lane, congestion during the peak period could be measurably reduced. The temporal shift is most effective on facilities that have a pronounced peak period, with significant excess capacity in the “shoulder” periods before and after the peak. For facilities where the cost to implement value pricing is low, a smaller number of users would be needed to justify the project. However, for more complex projects, where costs are higher, a larger number of users would be needed to justify and support the project.

5.2.2 Facility Subject to Legal Considerations

As discussed in Chapter 3, legal considerations range from statutes that encourage or prohibit value pricing to those regulations that would be considered during the project development process. In addition, equity is an important issue related to the public’s acceptance of value pricing. An evaluation of transportation and social equity is needed to ensure that parallel free choices are available for drivers not wishing to pay a toll, and that lower income or minority users and communities are not adversely affected by value pricing. Lessons learned from the I.H. 30 project as well as other value pricing projects nationwide should guide the equity analysis.

5.2.3 Design Features of Value Pricing Projects

The design features noted in the guidelines – enforcement, toll collection, lane separation, and access – are required to successfully implement value pricing. The complexity and right-of-way associated with incorporating them into the design of a facility determines the schedule, cost, availability of funding, and a project’s priority in terms of the needs of the region.

For example, most HOV facilities and tollways include some form of stationary enforcement, so incorporating this as a new feature may not be necessary. Likewise, in the case of new HOV lane construction, incorporating a full concrete barrier could require additional widening, but this design feature would be relatively simple to include. The electronic toll collection system could also be incorporated into the roadway by installing new toll gantries or using existing overpass structures to support the toll readers. Tollways would already have this feature in place.

For freeways where new toll lanes within the median of an existing freeway would be constructed, enforcement areas and toll collection equipment would not already exist. And while access from the “right lane” is provided on access controlled freeways, access to and from the median would have to be designed to allow merging and diverging traffic in coordination with the existing and planned access locations. In addition, bridge piers are generally located in the median and require a clear zone buffer for safety. The median toll lanes would need to be designed to account for this safety buffer. I.H. 30, which was selected as a demonstration project, is an example of such a freeway in the Dallas-Fort Worth Region.

For facilities that would generally be new major construction, such as new HOV lanes added to the outside of a facility or new tollway construction, where the toll would be set to generate revenues as well as manage congestion, the value pricing design features would be developed with all of the other highway design features.

Incentive programs would provide another innovative component to value pricing. While value pricing has been proven in many states to improve mobility in highly congested areas, additional public education is a key factor in its success. Incentive based pricing is yet another way to encourage support for the concept of value pricing.

Recent changes to transportation policies have altered the way in which the agencies in the Dallas-Fort Worth Region can consider value pricing as a congestion management or revenue generating tool. Specifically, in 2003, the Regional Transportation Council (RTC) made the decision to consider value pricing on all HOV, tollway, and freeway facilities, opening the door to consideration of pricing on nearly every facility in the region.

5.2.4 Other Considerations for Value Pricing.

In addition to congestion management and revenue producing benefits, value pricing can provide benefits in the form of other programs. Called collateral actions, these programs have been established to enhance the pricing program by funding new services, such as alternative work hour programs, neighborhood telecommuting centers, and transit system improvements. National experience indicates that revenues from successful value pricing projects have also yielded system
enhancements. One of the best examples is in San Diego, where excess revenues from the I-15 HOT lane were used to fund a new and expanded transit service, called the Inland Breeze, which improved transit service along I-15.

Other benefits of value pricing have been documented, such as on SR-91 in California, where some drivers choose to pay the toll even when there is no congestion. This suggests that some drivers experience a higher level of security, safety, and reliability in a priced lane, even during non-peak hours. Another benefit from the I-15 project was the significant reduction in SOV violators on the HOV lanes, which was the result of increased California Highway Patrol (CHP) enforcement funded by the project. The LeeWay system in Lee County, Florida realized benefits related to improved traffic flow on adjacent facilities, such as I-80 north of the toll plaza, I-880 to the south, and US 101 in the West Bay.

NCTCOG’s use of innovative methods to manage congestion could provide additional benefits for the Dallas-Fort Worth Region, simply by exposing the operators and users of the transportation system to alternate methods of congestion relief. This increased awareness of the benefits of value pricing could strengthen the public’s commitment to changing travel behaviors – by increasing occupancy, combining trips, or driving off-peak. Consequently, public understanding is one of the key elements that will influence the success of a value pricing program. If early value pricing demonstration programs in the region were to be unsuccessful because of public misconceptions and lack of proper education, it is possible that future pricing programs would have a reduced chance of being implemented in other corridors. In addition to public workshops and other outreach tools used during the planning process, a marketing campaign should be developed that would advertise the value as well as the logistics of value pricing, such as features of the program (hours, costs, and restrictions) and future plans for the program.

Although the public outreach and marketing program does not need to begin during the metropolitan transportation planning phase, it is important to think about when and how such efforts will need to be incorporated (and how much they will cost). Nonetheless, it would be beneficial to build local support from elected officials, community and opinion leaders, and the media, even during the planning phases. It is important to frame the project’s message before the opponents do and for the project to be aligned with the public’s needs. One way to accomplish this is to identify a champion (or champions) to publicly support the concept of value pricing in the region.

5.2.5 Incorporating Value Pricing Decision Points into the Project Development Process

Value pricing presents a unique opportunity for NCTCOG and its transportation partners to study the potential for implementing an innovative concept to help manage congestion on some of the most heavily traveled roadways in the region. The success of value pricing on any of the corridors in the region could open doors for widespread implementation of pricing on a system of corridors in the future. Results from operational projects around the country show that travelers are willing to pay for improvements in transportation service, and that pricing can lead to more efficient use of existing highway capacity. Given choices, drivers will make cost-based decisions for transportation, just as they do in other parts of their economic lives. The response to value pricing in the Dallas-Fort Worth Region will serve as an important guide for transportation planners and policy makers throughout Texas.

Therefore, it is important to understand how the implementation of value pricing should be incorporated into the project development process in the Dallas-Fort Worth Region. The project development process is shown in the flowchart in Figure 5-2, and includes the stages of project development, estimated time frames, and key decision points for value pricing decisions. This flowchart is intended to serve as a guide for developing value pricing projects within the much larger project development process.
Outline a public involvement process (regional/local level): 6-10 mos.

**Regional Value Pricing Corridor Evaluation And Feasibility Study | June 2005**

**Figure 5-2: Value Pricing Key Decision Points**

<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Major Investment Study</td>
<td>1-2 yrs</td>
<td>Determine basic concept of project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check applicability of trust agreements and bond covenants</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Check for any legal or legislative road blocks</td>
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<tr>
<td></td>
<td></td>
<td>Check for consistency with regional policy positions</td>
</tr>
<tr>
<td></td>
<td>4-6 yrs</td>
<td>Begin to identify project champion</td>
</tr>
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<td></td>
<td></td>
<td>First level traffic and revenue studies (Sketch Level Analysis)</td>
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<tr>
<td></td>
<td></td>
<td>Grant application (if applicable)</td>
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</table>

<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>National Environmental</td>
<td>2-5 yrs</td>
<td>Inclusion of project in regional MTP</td>
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<tr>
<td>Policy Act (NEPA)</td>
<td></td>
<td>Inclusion of project for continued project development and NEPA process</td>
</tr>
<tr>
<td>Planning Study</td>
<td></td>
<td>Comprehensive Development Agreement interest</td>
</tr>
<tr>
<td></td>
<td></td>
<td>If CDA interest, TxDOT receives unsolicited bid</td>
</tr>
<tr>
<td></td>
<td>6-12 mos.</td>
<td>For CDA, TxDOT Commission seeks formal bids (competitive process)</td>
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<thead>
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<th>Duration</th>
<th>Description</th>
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<tbody>
<tr>
<td>Design Phase</td>
<td>2-4 yrs</td>
<td>Preliminary design of the project (schematic design)</td>
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<td></td>
<td>Determine level of enforcement that can be provided</td>
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<tr>
<td></td>
<td></td>
<td>Determine any incentive-based programs that are applicable</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Determine what collateral actions could be provided</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Develop interagency agreements for the participation/roles in the project</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Second level traffic and revenue studies (Preliminary Analysis)</td>
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<tr>
<td></td>
<td></td>
<td>Identify Operations &amp; Management Plan component</td>
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<td></td>
<td></td>
<td>(toll structure, time of day, toll collection, occupancy, etc.)</td>
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<tr>
<td></td>
<td></td>
<td>Environmental clearances for the project (NEPA process: FONSI/ROD)</td>
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<table>
<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Construction</td>
<td>2-5 yrs</td>
<td>Develop partnering agreements for funding and Operations &amp; Management</td>
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<tr>
<td></td>
<td></td>
<td>Develop marketing plan</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Investment grade/bond market studies</td>
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<td></td>
<td></td>
<td>Final design plans for project (TxDOT Austin Approval)</td>
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<td></td>
<td>6-8 yrs</td>
<td>Review and refine Operations &amp; Management and Enforcement Plans</td>
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<td></td>
<td>3-6 yrs</td>
<td>Final design plans for project (TxDOT Austin Approval)</td>
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<thead>
<tr>
<th>Phase</th>
<th>Duration</th>
<th>Description</th>
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<tr>
<td>Construction</td>
<td>2-5 yrs</td>
<td>TxDOT seeks competitive bids</td>
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<td>TxDOT lets project to go to construction</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Project proceeds to construction</td>
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<tr>
<td></td>
<td>3-6 yrs</td>
<td>Begin implementation of marketing plan</td>
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<td></td>
<td></td>
<td>Toll rate studies (upgrade/freshening of Investment Grade Study)</td>
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<tr>
<td></td>
<td>3-6 yrs</td>
<td>Finalize Maintenance &amp; Operations and Enforcement Plans</td>
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<table>
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<tr>
<th>Phase</th>
<th>Duration</th>
<th>Description</th>
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</thead>
<tbody>
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<td>Post Construction</td>
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<td>Begin project monitoring</td>
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<tr>
<td>Operations and</td>
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<td>Monitor toll rate/revenue flow</td>
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<tr>
<td>Maintenance</td>
<td></td>
<td>Monitor Operations &amp; Management and Enforcement Plans</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Monitor toll structure Operations &amp; Maintenance</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Application</th>
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</thead>
<tbody>
<tr>
<td>Major Investment Study</td>
<td>1-2 yrs</td>
</tr>
<tr>
<td>National Environmental</td>
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</tr>
<tr>
<td>Construction</td>
<td>2-5 yrs</td>
</tr>
<tr>
<td>Post Construction</td>
<td>on-going</td>
</tr>
</tbody>
</table>
appendix A
Interstate Highway 30/Tom Landry Freeway
Managed Facility Operational Plan

Proposal to:
Federal Highway Administration, Value Pricing Pilot Program
TEA-21 Section 1216(a) Value Pricing Pilot Program Application

Jointly Submitted by the Regional Transportation Council on behalf of:
Dallas Area Rapid Transit,
Fort Worth Transportation Authority,
North Central Texas Council of Governments,
North Texas Tollway Authority, and
Texas Department of Transportation (Dallas and Fort Worth Districts)

July 2004
Contacts:

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Transportation Engineer II

Wilfred Babbili
Transportation Planner II
INTRODUCTION

The passage of the Transportation Equity Act for the 21st Century (TEA-21) has continued the “Congestion Pricing Pilot Program,” now titled the “Value Pricing Pilot Program” (VPPP), initiated as part of the Intermodal Surface Transportation Efficiency Act (ISTEA). Under TEA-21 Section 1216(a), the Value Pricing Pilot Program creates a means to develop cooperative agreements between the Federal Highway Administration (FHWA) and up to 15 state or local governments to establish, maintain, and monitor local pricing projects.

The North Central Texas Council of Governments (NCTCOG), on behalf of the Regional Transportation Council (RTC) – the policy body for the Metropolitan Planning Organization (MPO) for the Dallas-Fort Worth metropolitan area – submits this application for the Interstate Highway (I.H.) 30/Tom Landry Freeway Managed Facility Operational Plan. I.H. 30/Tom Landry Freeway serves as a major east/west corridor between Fort Worth and Dallas, Texas. The Dallas-Fort Worth metropolitan area’s transportation plan, Mobility 2025 – 2004 Update, adopted by the RTC in January 2004, documents a multimodal approach to providing transportation services, including a managed lane element. The RTC, which is responsible for implementing transportation policy issues in the Dallas-Fort Worth metropolitan area, supports a policy position to enhance the region’s transportation system through the Metropolitan Transportation Plan by maximizing high-occupancy vehicle (HOV) lane utilization by offering managed facilities through pricing, and by considering the expanded use of toll roads.

The proposed Managed Facility Operational Plan is derived from the Dallas-Fort Worth Regional Value Pricing Corridor Evaluation and Feasibility Study, a cooperative study between FHWA’s VPPP and local stakeholders to determine a viable demonstration project corridor for implementation of value pricing concepts. The Regional Value Pricing Corridor Evaluation and Feasibility Study, currently undergoing final documentation, will be submitted to FHWA by fall 2004. This application for continuance in FHWA’s VPPP represents a value pricing implementation study to be funded through a VPPP grant for 80 percent of the project cost from FHWA. NCTCOG proposes to meet all legal and administrative requirements related to matching funds, selection and remuneration of consultant, monitoring work, and reporting. Funds for this study will be accounted for through an interagency agreement establishing the roles and responsibilities with the Texas Department of Transportation (TxDOT).

The primary objectives of this project are to improve mobility, enhance the environment, promote economic sustainability, expedite project implementation, and aid in offsetting potential revenue shortfalls for transportation facilities. Knowing these objectives, the purpose of the Managed Facility Operational Plan can be summarized as a means to design and construct a value pricing management operation having the most potential for successful implementation within the I.H. 30/Tom Landry Freeway corridor.

The Regional Value Pricing Task Force, established through the Dallas-Fort Worth Regional Value Pricing Corridor Evaluation and Feasibility Study, will continue to ensure that the identified work items in this Managed Facility Operational Plan are carried out with input from all participating agencies and local communities. Appendix A makes available the membership roster of stakeholders participating on the Regional Value Pricing Task Force. Through the combined efforts of the task force, the I.H. 30/Tom Landry Freeway corridor will be reconstructed to incorporate a suitable managed lane strategy. The Task Force consists of the following local stakeholders:

- The Dallas and Fort Worth TxDOT Districts;
- Dallas Area Rapid Transit (DART), the regional transit agency serving the Dallas area and managing existing HOV operations in the area;
- Fort Worth Transportation Authority (the T), the regional transit agency serving the Fort Worth area;
- North Texas Tollway Authority (NTTA), the regional tollway authority;
- NCTCOG, the region’s MPO; and
- Texas Transportation Institute, active participants in TxDOT-sponsored managed lane research.
ASSESSMENT PLAN

NCTCOG will serve as the point of contact for the I.H. 30/Tom Landry Freeway Managed Facility Operational Plan. This study will allow for the operation of managed lanes on I.H. 30/Tom Landry Freeway that will accommodate HOVs, potential express bus service, and single-occupant vehicle (SOV) buy-in for available capacity through value pricing strategies.

1. Congestion Problem:

The rapidly increasing congestion within the Dallas-Fort Worth region points to a critical need for mitigation of these effects by efficiently managing and operating existing facilities and planning for future management opportunities. The North Central Texas region continues to experience significant growth from a population of 5,309,000 in 2000 that has grown to over 5,858,000 in 2004 representing an average annual growth rate of 137,000 persons. The peak period transportation demand related to this high growth rate is already straining the greater portion of the region’s transportation system. This congestion has begun to expand into many of the previously off peak or “shoulder” hours, creating a more inefficient, unreliable, and unpredictable system. Consequently, major transportation agencies are having difficulty in planning, designing, funding, and constructing traditional transportation projects, which are acceptable to the community, as expeditiously as the region’s transportation leaders believe is needed.

Selected Corridor:

The Dallas-Fort Worth Regional Value Pricing Corridor Evaluation and Feasibility Study identified 23 local corridors that pass the initial screening criteria that were narrowed down to seven corridors having the highest potential for short-term implementation. The project partners met to discuss these corridors using the criteria established through that study as listed below:

- Facility not subject to legal considerations or constraints;
- Facility supports enforcement;
- Facility provides options for social equity;
- Facility minimizes construction disruption;
- Facility constructability: ability to open to traffic within five years;
- Facility allows barrier lane separation;
- Facility meets urban design standards;
- Facility access: weaving distance meets minimum design requirements; and
- Facility main lanes exceed level-of-service (LOS) E, judged by evaluating:
  - HOV a.m. peak hour (number of vehicles) and LOS year 2003
  - Main lane a.m. peak hour LOS year 1999 and 2003
  - Main lane p.m. peak hour LOS year 1999 and 2003

As a result of the analysis, the I.H. 30/Tom Landry Freeway corridor was selected for the initial value pricing demonstration project within the Dallas-Fort Worth region.
Facility Description

The I.H. 30 corridor was originally constructed as a six-lane limited access toll road facility with circuitous ramps for getting on and off the tollway and providing space for the former tollbooths. The I.H. 30/Tom Landry Freeway corridor identified in this submittal extends from Arlington to the Dallas Central Business District (CBD). The full facility limits stretch approximately 15 miles from Beckley Street, on the west side of Dallas, to State Highway (S.H.) 360 west of the Tarrant County/Dallas County line. A three-mile transition area will be constructed between the existing six main lanes west of Cooper Street in Arlington to the new managed lane configuration east of S.H. 360. The map shown in Figure 1 highlights the I.H. 30/Tom Landry Freeway corridor as described above.

The proposed I.H. 30/Tom Landry Freeway Value Pricing Project extends the research and recommendations of the Dallas-Fort Worth Regional Value Pricing Corridor Evaluation and Feasibility Study. As such, the proposed pricing program is directly derived from the findings of that study. The proposed project covers the eastern half of a heavily congested 30-mile corridor connecting the urban activity centers of Dallas and Fort Worth bisecting the major suburban activity centers, Great Southwest Industrial Park, and the major entertainment districts of Arlington and Grand Prairie. The I.H. 30 corridor is critically deficient in its lack of continuous frontage roads, circuitous access, and egress interchange with Loop 12/Walton Walker Boulevard. Additionally, there is no direct interchange with the S.H. 360/ Angus Wynne Jr. Freeway. Because the tolls were discontinued after the bonds were paid off and the facility returned to non-toll status, it has taken many years to program interchange improvements. Now, traffic demand throughout this corridor, caused by strong demographic growth, greatly exceeds this facility’s capacity and results in a greatly degraded LOS. Also, the I.H. 30/Tom Landry Freeway access and egress configurations are below standard, due to its initial limited access toll way design, and impact the safety and efficiency for carrying its traffic load.

The North Central Texas region is now in the process of upgrading I.H. 30/Tom Landry Freeway in order to meet the needs identified in the long-range Metropolitan Transportation Plan. The existing design and engineering plans for the I.H. 30/Tom Landry Freeway are being reviewed to look for any opportunities to integrate transportation modes and services, including freeways/tollways, HOV lanes, light rail transit, and commuter rail service, and to utilize technology, pricing, and management techniques in order to seek any means possible to improve the performance of the facility.

Mobility 2025 – 2004 Update calls for 10 lanes of mixed traffic with an additional two lanes of reversible HOV lanes. Due to financial constraints, the I.H. 30/Tom Landry Freeway is currently undergoing a
staged reconstruction process. Statewide and regional policy requires that as capacity is added in a
corridor, it must be re-evaluated for potential toll/managed lane applications, including value pricing.
Currently the staged construction plan calls for five mixed lanes of traffic in each direction, with a single
reversible HOV lane. TxDOT and DART are committed to the construction of a single lane HOV facility
to be in place by 2007 as part of the list of transportation control measures (TCM) that are documented
in the State Implementation Plan (SIP). This VPPP application is to revise the facility design to
accommodate a multi-lane, managed/HOV facility in place of a single-lane, HOV-only facility.

2. Nature of the Proposed Pricing Project:

The following goals are meant to address the problems in this corridor:

1. Provide for enhanced mobility, access, and safety;
2. Offer project operational and design flexibility through increased system integration;
3. Improve transit interface locations to encourage higher utilization;
4. Meet cost-effectiveness measures and provide for revenue enhancement potential;
5. Continue to expand the public outreach components for developing transportation solutions;
6. Increase options for transportation and lifestyle changes that will improve air quality; and
7. Address right-of-way constraints (leverage funds for construction – not right-of-way)

TxDOT has made several evaluations of potential facility designs. Based on TxDOT’s existing
studies, the evaluation currently recommends the incorporation of managed lanes in the center
of the right-of-way flanked by mixed-use traffic lanes. A combination of express and HOV lanes
are warranted when the competing freeway facilities are congested, providing a travel time
advantage. The right-of-way footprint required to accommodate the needs of both the express
and HOV demand could not be reasonably met if separate facilities for each mode were used.
To better integrate these modes into the Mobility 2025 – 2004 Update, the express and HOV
modes were blended together to form a “managed/HOV lane” design. This design incorporates
multi-lanes geared to serve both express and HOV trip needs. The concept of value pricing
would be instituted on these managed-HOV lanes in order to market the facility, manage the
traffic flow, and provide an incentive to rideshare. The very nature of lane management is one
where user fees are charged to maintain high levels of service and optimum speeds.

Several design concepts are being pursued for the I.H. 30/Tom Landry Freeway. The
base configuration will be upgraded to increase the general-purpose capacity from the
current three lanes in each direction to four lanes in each direction. In addition, the I.H. 30/
Tom Landry Freeway is being designed with a managed lane section in the median. The
I.H. 30/Tom Landry Freeway managed facility will incorporate one lane in each direction with
one reversible lane to accommodate peak-direction managed-lane traffic that will require
a moveable barrier. Based on anticipated projections for the managed portions of the
I.H. 30/Tom Landry Freeway, the need for more than one lane in each direction will be documented.
Operationally, a managed lane section will be barrier separated from the mixed flow lanes.

Sufficient HOV demand exists on the I.H. 30/Tom Landry Freeway facility to warrant a separate
HOV facility where the excess capacity can be managed through auto occupancy and user fees.
In order to accommodate HOV demand on this toll facility, NCTCOG is suggesting a managed
facility approach. This concept is different than the traditional HOV concept on other freeway-
type facilities in that separate HOV-only lanes are not suggested. Rather, HOV occupancy will
be verified and excess capacity will be sold to SOVs using Automatic Vehicle Identification (AVI)
technology. The SOV toll may vary by time of day. The incentives for the HOV participant would
be a reduced toll or other incentives versus that of SOVs.

Assessment Work Plan:

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<tr>
<th>Work Plan Description</th>
<th>Responsible Agency</th>
<th>Budget ($)</th>
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<tbody>
<tr>
<td>1 Schematic and Planning of Facility</td>
<td>DART/TxDOT</td>
<td>100,000</td>
</tr>
<tr>
<td>2 Plan Specifications and Estimates Design of Facility</td>
<td>DART/TxDOT</td>
<td>2,100,000</td>
</tr>
<tr>
<td>3 Construction of Facility (Incremental Cost)</td>
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<td>4 Purchase and Installation of Tolling Equipment</td>
<td>NTTA</td>
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<td>5 Facility Operation and Use Enforcement (3 years)</td>
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<td>6 Toll Collection Operation and Toll Enforcement (3 years)</td>
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<td>11,100,000</td>
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<td>7 Maintenance of Toll Collection Equipment (3 years)</td>
<td>NTTA</td>
<td>450,000</td>
</tr>
<tr>
<td>8 Maintenance of Managed Lane Operations (3 years)</td>
<td>DART</td>
<td>2,175,000</td>
</tr>
<tr>
<td>9 Maintenance of Managed Lane Facility (3 years)</td>
<td>TxDOT</td>
<td>150,000</td>
</tr>
<tr>
<td>10 Value Pricing Pilot Program Monitoring and Performance Evaluation</td>
<td>NCTCOG</td>
<td>100,000</td>
</tr>
<tr>
<td><strong>Total</strong> (Based on static costs plus three years of operations and maintenance costs)</td>
<td></td>
<td><strong>$35,625,000</strong></td>
</tr>
</tbody>
</table>
Value Pricing Opportunities and Strategies:

The I.H. 30/Tom Landry Freeway Managed Facility Operational Plan will consider a full range of value pricing strategies for operational implementation. The Regional Value Pricing Task Force, through the activities associated with the region’s value pricing initiatives, will ensure adequate review, discussion, and resolution of institutional structures to employ the most appropriate value pricing opportunities and strategies. Potential strategies to be reviewed as part of this application are listed below:

1. SOV buy-in on HOV lanes;
2. HOV ridership incentives;
3. Integration efforts and use incentive;
4. Increased express bus and vanpool usage to connect activity centers; and
5. Increased bus route usage through enhanced travel time reliability.

Project Timeline: The work effort for the I.H. 30/Tom Landry Freeway Managed Facility Operational Plan will begin immediately upon notification of approval. Note that the I.H. 30/Tom Landry Freeway already has ongoing activities with regard to the planned HOV operation planned in this facility. This demonstration project would be an upgrade of the ongoing project already in the pipeline.

Because this corridor is committed to be in operation in order to meet Transportation Control Measure/SIP commitments for improving air quality, this project, including the managed lane, is targeted to be in operation by 2007. This timeline assumes the funds are received by October 2004 and expended over a 36-month period.

3. Program Participants

General: The transportation providers in the North Central Texas region work year round to properly develop transportation projects in an inclusive manner. This includes regular regional and local meetings with agency, municipal, and community representatives who are active in transportation policy implementation. This established process will provide an additional forum for the VPPP to be discussed as needed for policy guidance.

Specific to Assessment Plan:

• Lead Agency Contact: The lead agency for the I.H. 30/Tom Landry Freeway Managed Facility Operational Plan submittal will be NCTCOG. Cooperating agencies include DART, the T, NTTA, and the Dallas and Fort Worth Districts of TxDOT.

• Regional Value Pricing Task Force: The Regional Value Pricing Task Force, consisting of the agencies mentioned above, will provide general guidance and review for the I.H. 30/Tom Landry Freeway Managed Facility Operational Plan.

• Task Specific Work Integration Efforts: The I.H. 30/Tom Landry Freeway Managed Facility Operational Plan will establish the design, operation, and maintenance requirements to implement the first value pricing application in the Dallas-Fort Worth region. It is anticipated that additional corridors will pass the threshold criteria showing the ability to employ value pricing strategies in the future. Monitoring this and other potential corridors is also part of this proposal. A consultant may be retained to perform this function. The state and local transportation agencies will all work together to oversee and coordinate the consultant’s efforts.

4. Public Involvement:

Public involvement will occur at different levels, depending on the information being presented and the specific tasks being undertaken. In projects where managed HOV lanes, value pricing, and other topics
related to pricing arise they are brought to the attention of the public early and continually in the process. In general, the public involvement process will consist of:

**Regional:** Regional public involvement occurs through NCTCOG and includes regular quarterly public meetings for all planning activities, including the development of the Metropolitan Transportation Plan, Transportation Improvement Program, Unified Planning Work Program, and air quality conformity.

**I.H. 30/Tom Landry Freeway Corridor Study:** The I.H. 30/Tom Landry Freeway Corridor Study will include continuous public involvement activities through its environmental study, feasibility study, and corridor study focused on the individual requirements of this corridor. Regular public meetings will be held along with individual stakeholder meetings for more direct public input.

**Project:** The I.H. 30/Tom Landry Freeway Corridor Study will have its own detailed public involvement process focusing on particular details of the facility.

**Equity Analysis and Assessment (Environmental Justice):** An equity analysis will be performed as part of the I.H. 30/Tom Landry Freeway Environmental Assessment to ensure that the requirements of Title VI and Presidential Order on Environmental Justice are met.

5. **Legal and Administrative Authority:**

The Texas Legislature passed SB 370 during the 75th Legislative session that gave legal authority for TxDOT, toll authorities, transit agencies, and the private sector to participate in value pricing. In addition, NCTCOG has the responsibility to develop and maintain the Metropolitan Transportation Plan and include system management strategies such as the managed facility identified. Additionally, several major investment studies, including the LBJ Corridor Major Investment Study, recommended managed lanes as part of their Locally Preferred Alternatives (LPA), which received local municipal support. Several facilities in the Dallas-Fort Worth region, including the LBJ Corridor, are already in the process of implementing managed/HOV lanes and working toward obtaining full NEPA clearance with the identified managed/HOV lane included for further development.

6. **Available Pre-Project Studies and Findings:**

The concept of applying value pricing to a project is new to the North Central Texas region. However, there has been some initial work completed as part of the metropolitan transportation process, ongoing and completed major investment studies, and other planning efforts. The following is available, upon request, for reference for the Regional Value Pricing Evaluation Study.

- **Dallas-Fort Worth Regional Value Pricing Corridor Evaluation And Feasibility Study**
- Integrated Managed HOV/Tollway concept as contained in the Mobility 2025: The Metropolitan Transportation Plan, 2004 Update
- LBJ Major Investment Study documentation
- S.H. 114/S.H. 121 Major Investment Study documentation
- Available DART-collected HOV ridership and park-and-ride lot data (multiple years of data)
- LBJ Freeway HOV Lanes – Preliminary Feasibility Study
- LBJ Freeway Managed Lanes – Phase Two Traffic and Revenue Study
- LBJ Freeway West Section and East Section Environmental Assessments
- Available TxDOT Research results when completed, including:
  1. Research Project – TxDOT 0-4009 Pricing of Managed Lanes
  3. Research Project – TxDOT 0-4160 Operating Freeways with Managed Lanes
  4. Research Project – TxDOT 0-4818 Developing a Comprehensive Pricing Evaluation Model for Managed Lanes