

Houston Value Pricing



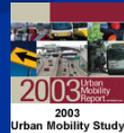
Houston Value Pricing

Our Current Mobility Situation



TRAFFIC CONGESTION

- 128 million hours wasted in traffic
- 3rd worst in U.S. in traffic delays
- Cost each motorist \$711

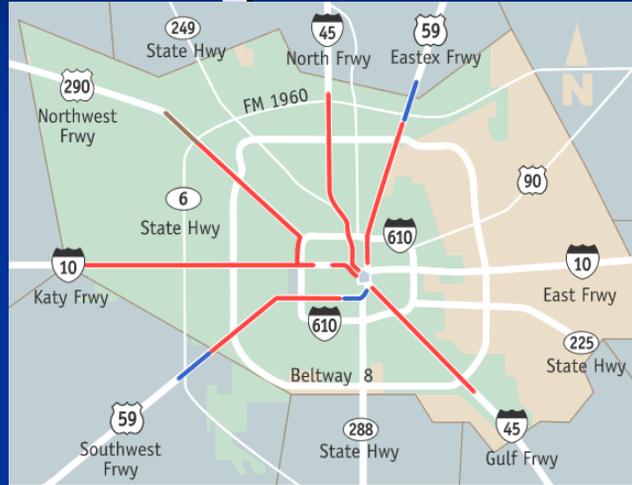


Our current mobility situation:

Traffic Congestion

- Houstonians waste 128 million hours a year sitting in traffic
- Houston ranks as the 3rd worst in the country in traffic delays
- Traffic delays cost each motorist \$711 every year

Houston HOV System



Houston HOV System

One way Houston has addressed traffic congestion is to provide a system of over 100 miles of HOV lanes for buses, vanpools and carpools on six major radial freeways. Two of those HOV lanes also operate as High Occupancy Toll or HOT lanes for two-person carpools during peak traffic periods. These periods are referred to as QuickRide time.

Evolution of Houston QuickRide

- **1984** - Katy Freeway (I-10) HOV lane opened (Initially allowed buses and vanpools only)
- **1986** – expanded to allow HOV 2+
- **1988** - Occupancy requirement raised to 3+ due to congestion
- **1996** – TTI engaged to examine feasibility of HOV 2 pricing
- **1998** – QuickRide, a product of the TTI study introduced on the Katy Freeway
- **2000** – Introduced QuickRide on NW Freeway; METRO/TxDOT apply for FHWA Value Pricing grant
- **2002** - TTI engaged to identify QR improvements, upgrades and expansions

The Katy HOV lane began in Houston in 1984. Initially, a special lane was created in the median of the freeway for buses and vanpools. Then in 1986 in an effort to utilize excess capacity in this lane, two-person carpools were allowed to travel on the lane. This was so popular that the HOV lane soon became congested so in 1988, the occupancy requirement to use the HOV lane was increased to 3 or more. History showed that HOV 2 was too crowded and failing but there was plenty of spare capacity at HOV 3... so what do you do? Have HOV 2.5? ☺ No, stick with HOV 3 but sell spare capacity to willing HOV 2's. So in 1998, following a feasibility study by TTI, transportation experts modified this again to help better utilize the lane by introducing QuickRide on the Katy freeway. QuickRide was later expanded to the Northwest Freeway in 2000. In 2002, the QuickRide improvement project was initiated as part of FHWA Pilot Pricing program.

QuickRide Lanes



QuickRide Hours:

6:45 am – 8:00 am
Katy & NW Freeway

5:00 pm – 6:00 pm
Katy Freeway

Houston is the home of two of the four HOT lanes in the US- the Katy/IH10 and the Northwest Freeway/US 290. As a leader in both High Occupancy Vehicle (HOV) and High Occupancy Toll (HOT) lanes, Houston is moving forward with new approaches to better utilize its HOV lanes.

Houston QuickRide Program



- QR allows enrolled 2-person carpools to use HOV lane during peak hours for a \$2 toll
- Known as High Occupancy Toll lane or HOT lane
- 2,088 Active QuickRide Accounts

QR allows 2-person carpools use of the HOV lane during peak hours for \$2 per trip and a \$2.50 monthly maintenance fee. The implementation of QR changed the HOV lane to a HOT lane during peak periods. Currently there are 2,088 active QuickRide accounts.

Comparison to other HOT Lanes

Facility	Lanes	Eligibility
I-10, Houston	1, reversible, part-time	HOV-2
US 290, Houston	1, reversible, part-time	HOV-2
I-15, San Diego	2, reversible	SOV
SR-91, Orange Co	4, two each direction	SOV

The two other operational HOT lanes in the U.S. are the I-15 in San Diego and SR-91 in Orange County California. As you can see, the number of HOT lanes and the passenger eligibility in California differs from Houston. One major difference is that single occupant vehicles are also allowed on the lane for a toll in California. Also in Houston, since QuickRide is only offered during peak travel times on the Katy and NW Freeways, Houston has “part-time” HOT lanes.

Goal of QuickRide Improvement Project

Use the existing QuickRide facilities to move more people while maintaining reliable travel time and generating additional revenue.

The Houston HOV lanes have been successful and today instead of resting on this success, TxDOT, METRO and FHWA have asked TTI to help them move forward with new approaches to help improve the current system. The goal of the current project, which began in 2002, is to use the existing HOV facilities to move more people while maintaining a reliable travel time for transit and generating additional revenue. This project is part of the FHWA Value Pricing Project.

Project Objectives

- Reduce operating costs
- Improve customer satisfaction
- Increase revenue
- Provide a faster and more reliable travel option to motorists
- Increase QuickRide usage

The objectives of the project are to:

- Increase QuickRide usage
- Reduce Operating Costs
- Improve Customer Satisfaction
- Increase revenue
- Provide a faster and more reliable travel option to motorists

TTI Project Tasks

TTI is developing recommendations for current and future use of the QR lanes through the following tasks:

- **Enforcement**
- **Pricing**
- **Traffic signing**
- **Marketing**
- **Monitoring and Evaluation**

TTI is developing recommendations for current and future use of the QuickRide lanes through the following tasks:

Enforcement: Optimize the collection of fares and insure the lanes are being properly used.

Pricing: Design pricing scenarios that match user needs & preferences with sound traffic operations and HOV priorities using comprehensive surveys, focus groups and locally-calibrated price elasticity estimates.

Traffic signing: Improve the effectiveness of HOV and QuickRide static and dynamic signing to facilitate use and enhance safe and smooth traffic operations.

Marketing: Increase QuickRide enrollment, participation and customer satisfaction through public awareness.

Monitoring and Evaluation: Carefully track usage of QuickRide to understand how drivers react to changes in QuickRide and how they benefit from the program. Perform surveys of users and non-users to better understand traveler priorities in the corridors.

Criteria for Evaluating Options

Usage

- Person-movement
- Carpools
- Transit
- Casual carpools

Fiscal

- Capital costs
- Operating costs
- Revenues
- Staffing requirements

In evaluating the best options for enhancing the current QuickRide program, several criteria are taken into consideration. Each option is being analyzed for how it will affect person movement, carpools, transit and casual carpools. Additionally the costs, revenues and staffing requirements for each option are also evaluated.

Travel Time Savings: Katy QR Lane

2003					
Movement	Time Period	Vehicles billed per time period	Speed in main lanes (mph)*	Speed in HOV lanes (mph)*	Time Savings (min/veh)
Katy AM	6:45-7:00	9	33	52	7
	7:00-7:15	16	31	56	10
	7:15-7:30	21	27	58	13
	7:30-7:45	23	24	56	15
	7:45-8:00	16	25	57	15
Katy PM	5:00-5:15	9	18	53	24
	5:15-5:30	17	16	56	29
	5:30-5:45	16	16	57	29
	5:45-6:00	11	17	57	27

* Average weekday speed over one year

The QR lanes offer the benefit of a significant time savings for motorists. This chart shows the speed on the Katy Freeway main lanes versus the HOT lane with the corresponding time savings for each 15 minute interval during the morning peak travel time. The time savings is 7 – 29 minutes.

Travel Time Savings: Northwest Freeway QR Lane

Time Period	2003			
	Vehicles billed per time period	Speed in main lanes (mph) *	Speed in the HOV lanes (mph)*	Time Savings (min/veh)
6:45 - 7:00	4	31	51	8
7:00 - 7:15	11	28	58	12
7:15 - 7:30	17	25	60	15
7:30 - 7:45	18	24	60	16
7:45 - 8:00	11	26	60	14

* Average weekday speed over one year

Here is the same chart for the Northwest Freeway. It shows a 8-16 minute time savings for using the HOT lane. One interesting finding obtained from surveys completed by motorists on these freeways is that their perceived time savings on both the Katy and Northwest freeway is typically twice the actual savings. Therefore, motorists are valuing the benefit of the HOT lanes to a higher level.

Critical Challenge

QuickRide Billings/Violations

- **Travel time savings on HOV lanes are high**
- **QR tag reads are low**
 - Typically 200/day or 10% of total enrollment
 - Lost revenue
- **Violations are high**
 - 40% of all vehicles
 - Limits legitimate use

A critical issue TTI identified from traffic studies on the lanes is that QR tags reads are very low, typically 200 per day or just 10% of the QR members. Additionally, there is an extremely high violation rate on the HOV/QR lanes. Presently, 40% or more of the vehicles using the Katy and Northwest HOV lanes are using it illegally. They either do not have the correct number of passengers and are not QuickRide members OR they are QuickRide members with inoperable or no transponder on the windshield.

Enforcement Challenges

- Complexity of enforcement
 - Manual Process
- Operational vulnerabilities
 - Enforcement areas
 - Signage
 - Staff limitations
- High violation rate



**If these cannot be overcome,
should not expand operations.**

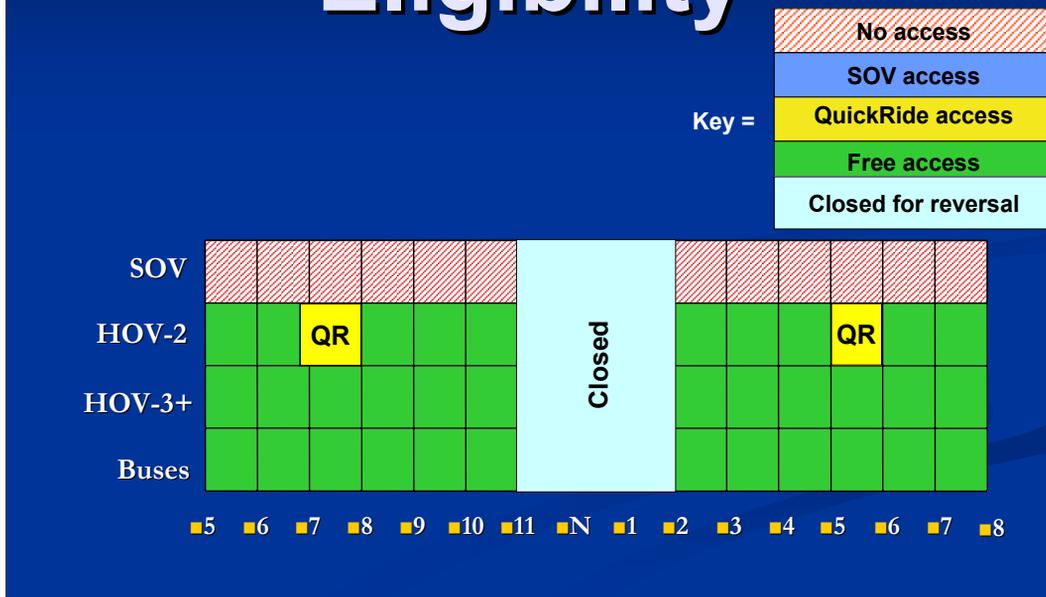
Enforcement is a challenge nationwide and is a critical area being addressed. It has long been a manual process. As mentioned earlier, enforcing the proper usage of the HOV lanes is very complex. It requires enhanced equipment, as well as a dedicated enforcement staff to reduce the violation rate. Additionally, new signage and designated enforcement areas are required. Without satisfactory compliance, the program will likely be overwhelmed and TTI recommends against expanding operations until this is accomplished.

Potential QuickRide Improvements

- Expanding QuickRide hours, and
- Extending privileges to single occupant vehicles (SOVs)

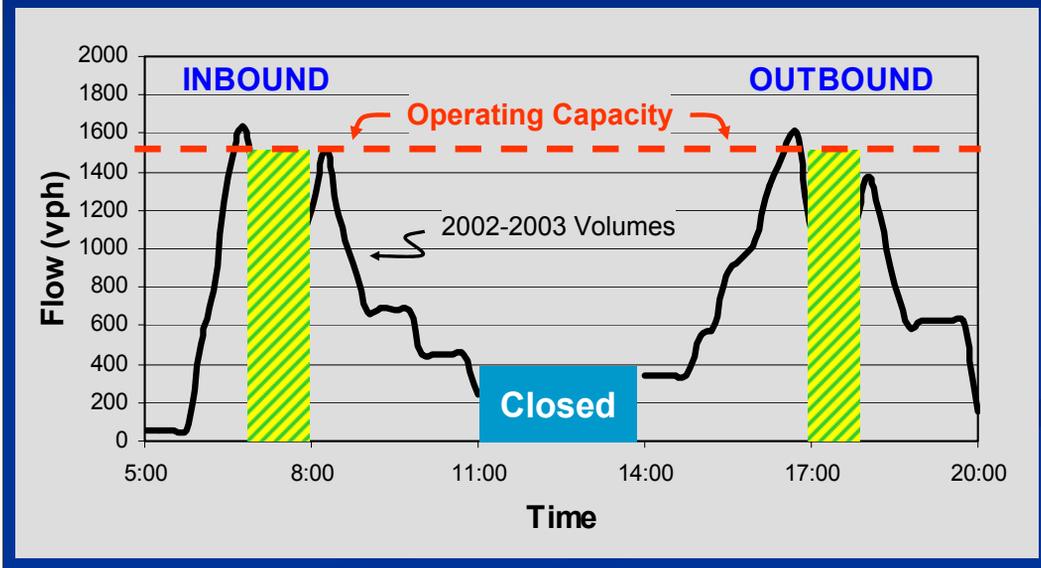
Assuming the enforcement challenge can be met, TTI has assessed the feasibility of expanding QuickRide hours and extending QuickRide privileges to single occupant vehicles (SOVs) for a higher toll.

Current HOV Lane Eligibility



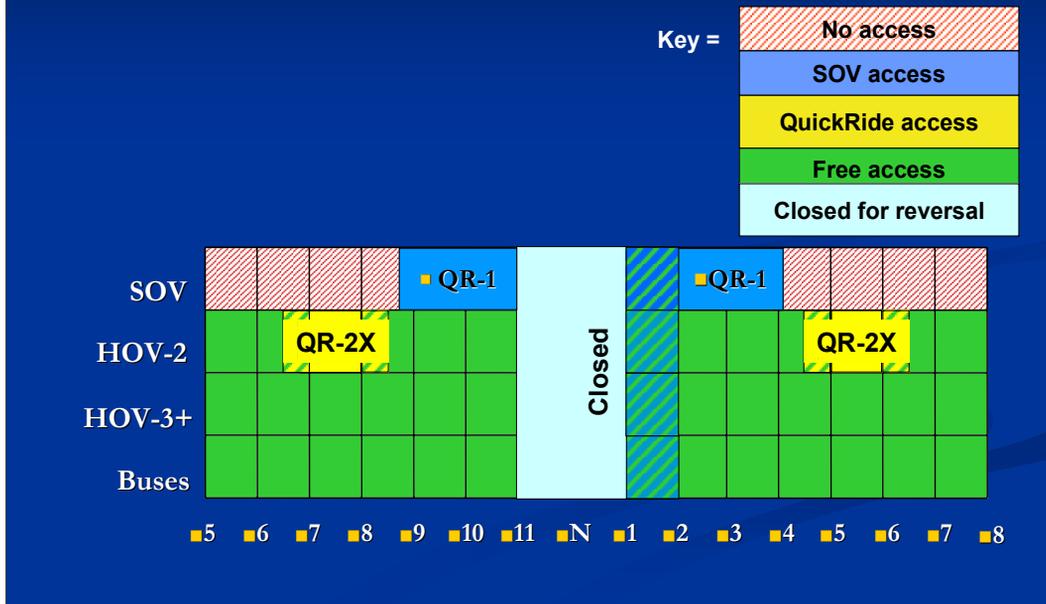
The HOV lanes are available inbound during morning drive time on both the Katy and Northwest Freeways and are reversed for outbound traffic from downtown in the afternoon on the Katy. These lanes are always free for transit and 3+ carpools. Two plus carpools can use it at no cost during off-peak traffic hours and for \$2 per trip during peak travel times as a member of the QuickRide program. This chart illustrates by vehicle type the times the HOV/QR lane is available. Presently, the HOV/QR lanes are closed from 11 a.m. to 2 p.m. so crews can reverse the lane.

Traffic Flow – Katy HOV Lane



This graph shows the available capacity in the HOV during QuickRide hours (highlighted in yellow) as well as the increase in traffic just before and after the QR time period.

Recommended Changes to HOV Lane Eligibility



This chart outlines the recommended changes to the current HOV lane schedule and passenger requirements. QuickRide hours (the time that 2 person vehicles can access the lane for a toll) could be expanded. It is also proposed that single occupant vehicles be allowed to travel on the lane for a toll during the off peak hours of 8:30 a.m. to 11 a.m. and from 2 p.m. to 4 p.m.

Other critical challenges

- **Developing an operational model for dynamic pricing**
- **Implementing better model for account management**
- **Updating toll collection technology to maximize revenue**
- **Installing sign and telecommunications system to allow for dynamic pricing**
- **Public Education**

Other critical challenges being address are:

- Developing an operational model for dynamic pricing – SOVs cannot be adequately managed with a flat rate toll. (Dynamic pricing is pricing that adjusts to maximize use of the lane while maintaining a smooth traffic flow.)
- Implementing an improved system for account management
- Updating the toll collection technology to maximize revenue
- Installing sign and telecommunications system to allow for dynamic pricing
- Public Education – making the public more aware of QuickRide, how it works and its many benefits.

Accomplishments

- Enforcement
- Equipment Upgrades
- QuickRide Operation Expansion
- Pricing
- Signing/Driver communications
- Public education

Accomplishments have been achieved in each area of the project as follows:

Enforcement – The value pricing project has paid for upgrading the current manual enforcement process with new technology to better assist police officers in identifying violators in the HOV lane and ensuring that vehicles are properly charged. The new equipment displays a light that verifies a valid QR customer. If the light doesn't go on, then the vehicle has to have a minimum of three passengers. Additionally, TTI is helping to standardize policing procedures, providing officers with handouts and distributing letters on the QR program to encourage violators to comply and/or join the program.

Modernizing Equipment - The existing automatic vehicle identification (AVI) system is used for toll collection. This system has been substantially upgraded to improve revenue capture without the significant expense of a new toll collection system.

QuickRide Operation Expansion - To maximize the use of the HOV lanes while maintaining a faster and reliable travel time, it is being recommended to extend the operating hours of QuickRide. Additionally, pilot testing of single occupant vehicles (SOVs) on the lane is proposed.

Pricing - Dynamic (variable) Pricing will be used to manage traffic volumes on the lane. TTI is developing a computer algorithm that takes vehicle counts, computes the appropriate price and then sends the price to changeable message signs to help manage and maximize traffic flow.

Driver Communications - Hybrid signing that incorporates static and changeable messages is being developed to dramatically improve the quality and timeliness of QuickRide information, including the current price and passenger requirement. TTI has worked with METRO and TxDOT to design the signs, select locations, and procure the materials. TxDOT's sign shop is fabricating the signs and developing the communication plans.

Public Education – Public education is a critical element in the success of implementing these changes. The public must be aware of and understand the program to realize the many benefits QuickRide provides as a travel option. TTI is developing a communication plan for implementation by TxDOT and METRO.

TxDOT, METRO, FHWA & TTI

**Partners addressing today's
transportation challenges while
preparing for tomorrow's
needs.**

TTI's implementation plan is designed to help TxDOT, METRO and FHWA address Houston's transportation challenges today while preparing to accommodate for the future – the implementation of managed lanes.

Supporting Information

- The following are additional slides that provide supporting detail on the Katy and Northwest Freeways, and the current QuickRide program.

Katy Freeway (I-10)

- 6 to 10 mainlanes
- 4 to 6 frontage road lanes
- 212,000 vpd
- 1 reversible, barrier separated, HOT lane
- 5 HOT lane entry & exit points



The Katy Freeway

The Katy Freeway varies in width from 6 to 10 main lanes, 4 to 6 frontage road lanes and one, 13-mile reversible, barrier-separated HOT lane. Current traffic on the Katy is more than 220,000 vehicles per day. There are 5 entry and exit points on the HOT lane.

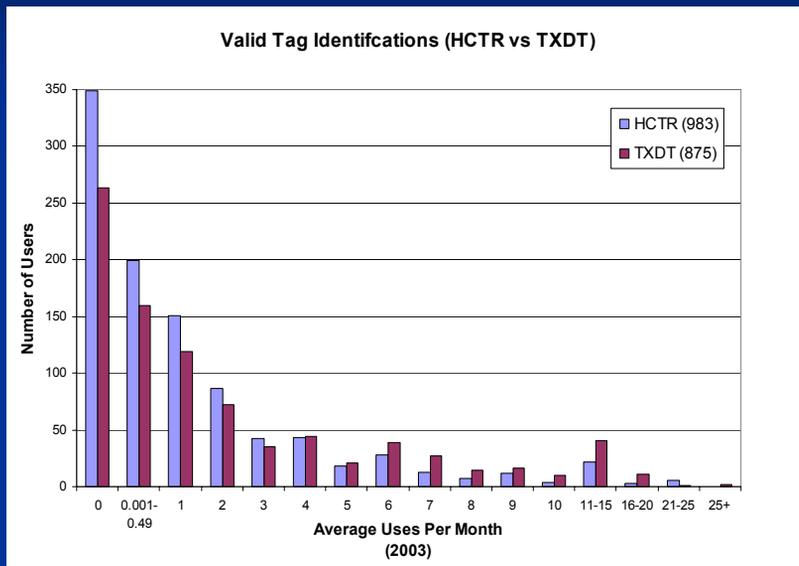
Northwest Freeway (US 290)

- 6 to 10 mainlanes
- 4 to 6 frontage road lanes
- 245,000 vpd
- 1 reversible, barrier separated, HOT lane
- 245,000 vpd
- 6 HOT lane entry and exit points



The Northwest Freeway also consists of 6 to 10 main lanes with 4 to 6 frontage road lanes. Current traffic on the Northwest freeway is more than 245,000 vehicles per day. It also includes a one-lane reversible, barrier separated HOT lane with 6 entry and exit points.

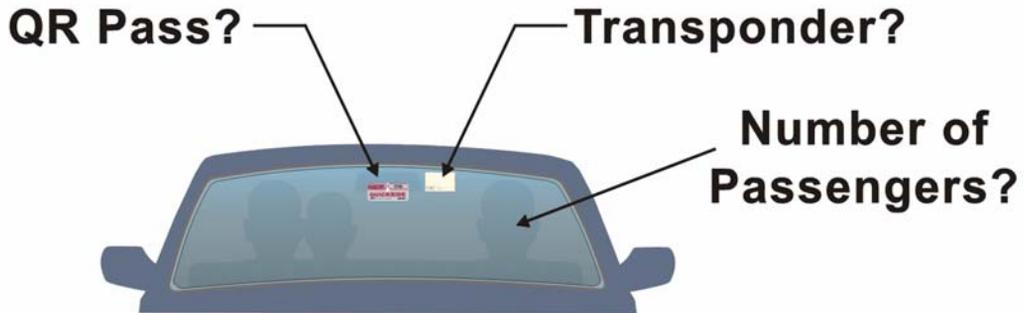
Typical Monthly Uses* per QuickRide Enrollee



*Based on toll collected for QR account

QuickRide is also not being utilized frequently by its current members. This graph shows that most are only using the lane a couple times a month. This issue was also addressed in a recent survey and the majority of respondents cited difficulty in carpooling as the main reason for not using the lane more often.

QR Member Requirements



Motorists who enroll in the QR program receive a transponder/EZ tag and a rear view mirror hang tag to display in their windshield for identification and toll collection. This system however makes verifying and enforcing the proper use of the HOT lane very challenging. Officers need to look for the QR identification in the windshield as well as try to verify the number of occupants in the vehicle.