ABC's of MUL's

NYSDOT MANAGED USE LANE STUDY
NYSDOT REGION 11

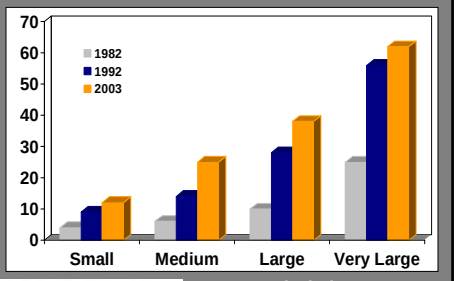
What is the MUL Study?

- 24 month multi-agency collaborative effort
- Develop a toolbox of strategies to implement an MUL system that moves people and goods on selected expressways and arterials in New York City
- Apply state-of-the-art technologies and highway management techniques to maximize the use of the existing arterial system in and adjacent to NYC
- Develop strategies that coordinate with and support regional mobility and congestion management plans

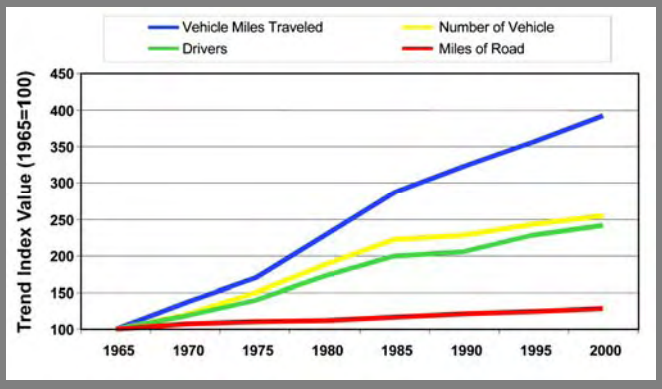
Study goals and objectives

- Improve mobility of people and goods
- Improve the environment
- Promote smarter technologies/reduce energy consumption
- Support regional economic growth through improved access/mobility
- Minimize travel costs (in time and dollars)
- Improve emergency routing and access
- Enhance System Security
- Improves System Safety

We're growing and more congested…



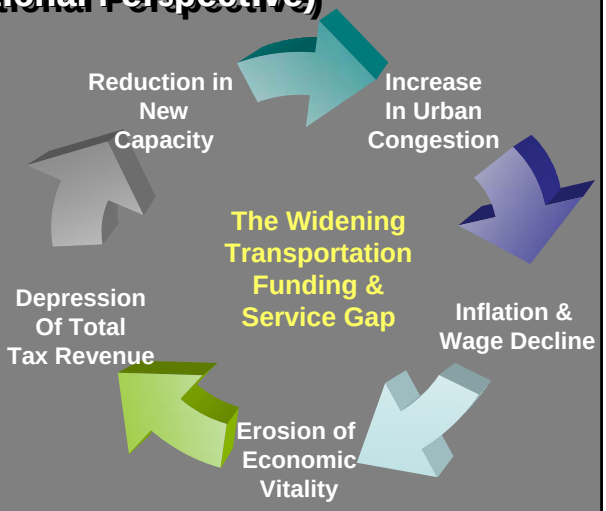
Annual delay per traveler by size of urban area



Sources: TTI, TxDOT, GAO, 2005 – 2006.

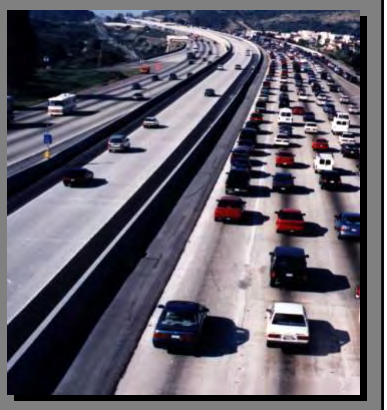
The Transportation Dilemma
(National Perspective)

- Long term transportation maintenance and improvement is expensive ($5 Trillion +)
- … But doing nothing is also expensive …
- **… Yet it's unlikely to change given all the other issues this country faces.**



Why Are Many Communities Considering MUL's?

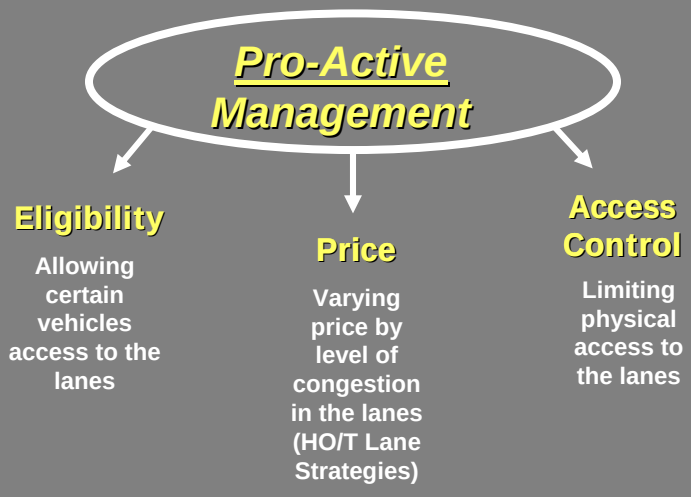
- **Improve efficiency of existing HOV lanes**
- **Provide enhanced services for mass transit**
- **Provide mobility Improvements in corridors where expansion opportunities are limited**



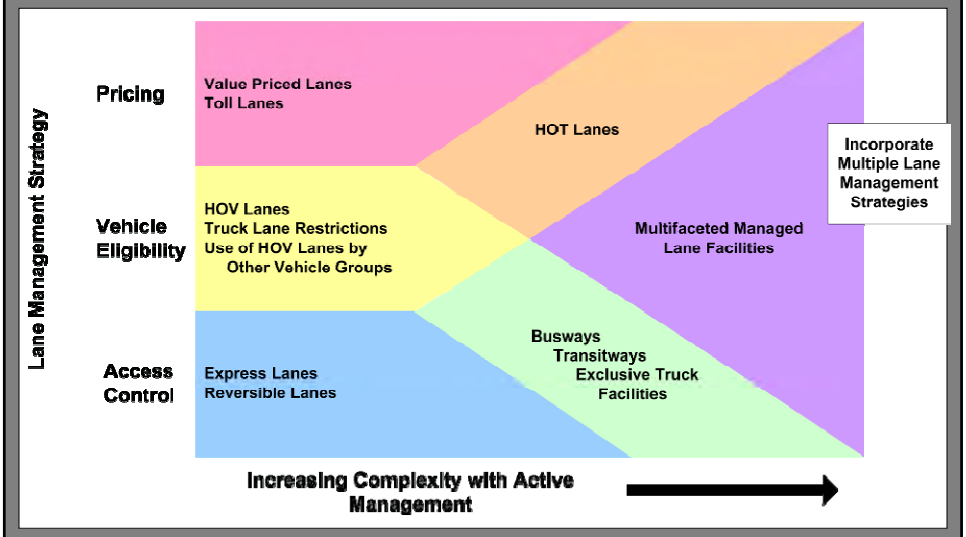
What are Managed Use Lanes?

- Separate new lanes proactively managed to sustain free-flow travel benefits, and/or
- Proactive management of existing lanes to improve vehicle thru-put, reduce travel time, reduce incidents and enhance ability to respond
- managed lanes are defined as a limited number of lanes within an expressway cross section where multiple operating strategies are utilized, and actively adjusted as needed, for the purpose of achieving pre-defined performance objectives (FHWA-HOP-05-037).

What makes MUL's different?



"The Universe" of MUL's



Types of MUL's

- Efficiency-centric
- Transit-centric
- Pricing-centric

Efficiency-Centric MULs

- North America
  - Exclusive lanes
  - Separation / Bypass
  - Lane Restrictions
  - Dual Facilities
- Europe
  - Active Traffic Management (ATM)
    - Typically encompasses entire corridor

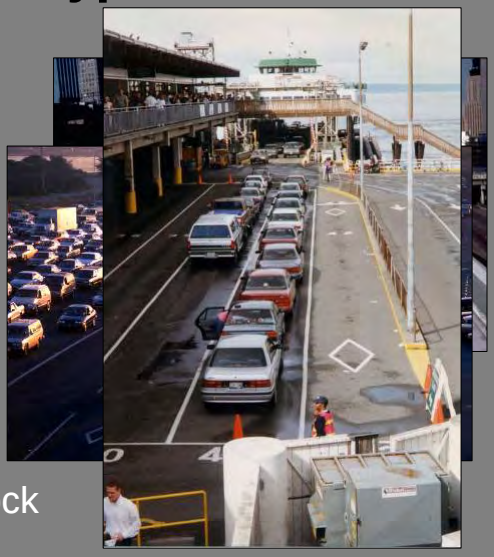
North America: Exclusive Lanes

- Exclusive lanes to eligible vehicles
- Busways/BRT
  - Provide ridership incentive by decreasing delay
- Truck lanes
  - Decrease effects and reduce conflicts

North America: Separation / Bypass Lanes

- Specific section or segment of roadway with unique feature
- Preferential treatment to select users

- Ramp-meter bypass
- Queue bypass - bridge
- Queue bypass – ferry dock



North America: Lane Restrictions

- Limit vehicles to specified lanes
- Typically for trucks
- Reasons
  - Improve operations
  - Reduced accidents
  - Pavement structure
  - Construction zones

Europe: Active Traffic Management

- Dynamically manage Volume and Incident-related congestion
  - Maximize effectiveness / efficiency
  - Increase throughput and safety
  - Integrated systems with new technology
  - Automated dynamic deployment

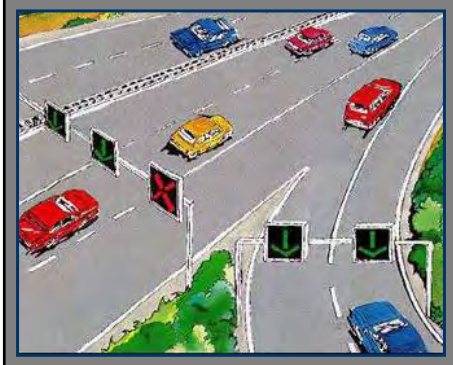
Active Traffic Management (ATM) Strategies

- Speed harmonization (dynamic speed limits)
- Temporary shoulder use (right or left side)
- Junction control (restrict lane use at major merges)
- Dynamic signing (VMS) and re-routing

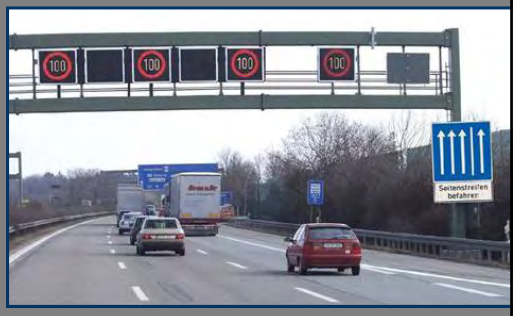
European Active Traffic Management Benefits

- Average throughput increase: 3 - 7%
- Overall capacity increase: 3 - 22%
- Decrease in primary accidents: 3 - 30%;
- Decrease in secondary accidents: 40 – 50%,
- Cost Effectiveness
- Improved speeds during congestion
- Decreased headways
- More uniform driver behavior
- Increase in trip reliability
- Delay onset of freeway breakdown (LOS F)

Germany



Junction Control at Interchange



Speed Harmonization / Temporary Shoulder Use

Distance-based Truck Tolling

The Netherlands

Temporary Left Shoulder Use

Temporary Right Shoulder Use

The Netherlands

Queue Warning

Speed Harmonization

The Netherlands

Dynamic Truck Restrictions

Dynamic Re-routing Information

Dynamic Pavement Markings

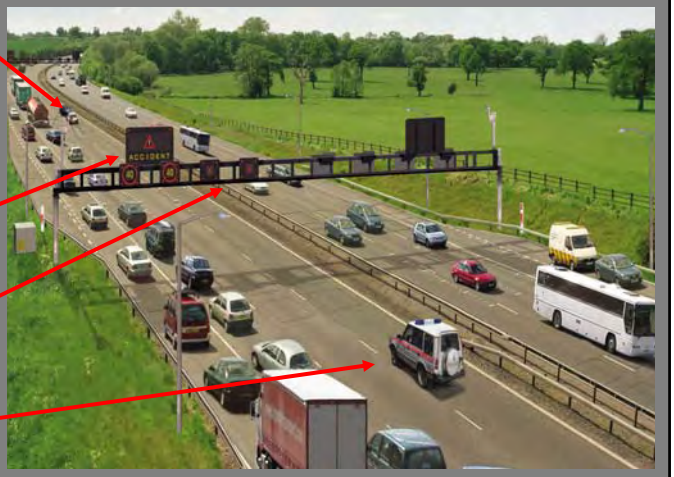
England

Speed Harmonization / Temporary Shoulder Use

What will happen during an incident?

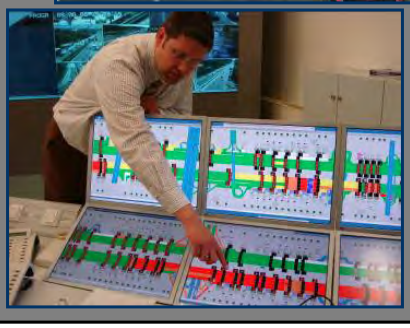
(example on British Motorway)

- Detection technology will alert ATM operators to incidents
- Incident support units and traffic officers will respond
- Message signs will warn drivers
- Operators will verify and close lanes to protect the incident
- Emergency services will access via closed lanes



Proactive Traffic Management

- Volume related congestion
  - Speed harmonization
    - Delay onset of stop-and-go conditions
    - Expert system monitors conditions and deploys speed changes – no operator intervention required
    - Even used in work zones
    - Reduces collisions

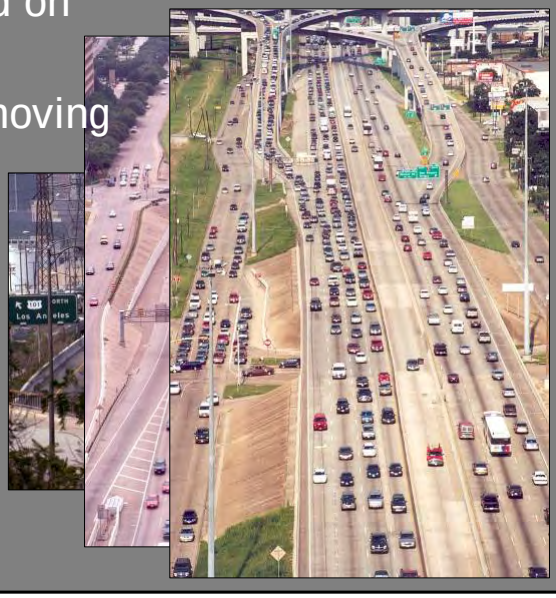


Transit-Centric MUL's

- High Occupancy Vehicle (HOV) Lanes
- Bus on Shoulder (BOS)
- Bus Rapid Transit (BRT)
- Bus Priority Systems
  - Signal prioritization

BRT on HOV Lanes

- Allowed use based on occupancy
- Increase person-moving capacity
- Design variations
  - Separated two-way
  - Concurrent flow
  - Reversible flow
- Local Examples:
  - Gowanus
  - SIE



Example: Bus on Shoulder (Minneapolis)

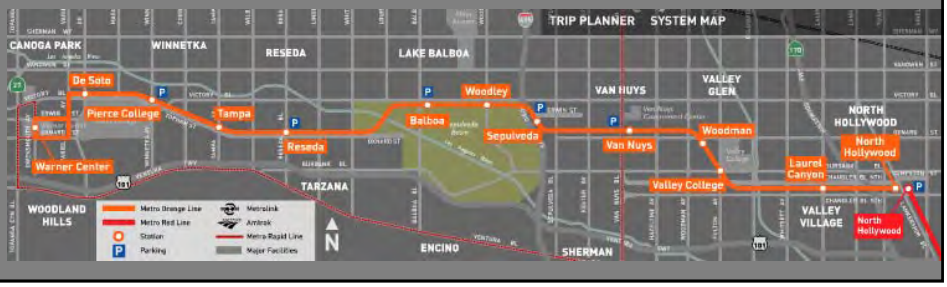
I-35, Minneapolis, Minnesota

Minnesota Bus on Expressway Shoulder Eligibility Criteria

1. Predictable congestion delays
   - Less than 35 mph during peak periods
2. Congestion must occur one or more days a week
3. A minimum of 6 buses per day must use shoulder
4. Expected time savings must be more than 8 minutes per mile per week
5. Roadway must have continuous shoulder width of at least 10 feet (12 foot shoulder preferred)

Example: BRT Orange Line, LA

- Uses abandoned railway
  - Parallels US 101
- 14 miles, 14 stations
  - 34 at-grade arterial crossings



Pricing-Centric MUL's

- Express Toll Lanes (ETL)
  - Everyone Tolled
- High Occupancy / Toll (HOT) Lanes
  - Carpools Free or Discounted Use
- Truck-Only Toll (TOT) Lanes
- *Options*
  - *Integrated bus rapid transit (free or tolled)*
  - *Variable pricing by vehicular class*
  - *Real-time (dynamic) or variable (fixed) pricing*

Electronic Toll and HOT Lanes

- HOT: HOV lane allowing vehicles with lower occupancies (SOVs, HOV-2) to pay toll to use
- ETL: Newly constructed lanes with no HOV preference
- Variations
  - Toll express
  - Credit lanes (FAIR)
- Traffic Management tool, not a revenue generator

MULs and Revenue Generation Lessons Learned

- **Typically not enough to cover capital construction costs**
- **Can pay ongoing operations and maintenance**
  - **Limited amount of excess revenue collected for pre-existing HOV facilities**
  - **Often used for improving transit and HOV efficiency**

Example: I-15 FasTrak (San Diego)

Objectives:

- **Improve public perceptions**
- **Make better use of available capacity**
- **Generate revenue for more transit**

- Opened 1997
- Developed from existing underutilized HOV lanes
- 2-lanes reversible
- 8 miles, no intermediate access
- HOV2+ free, SOV tolled
- 15K - 18K ADT in managed lanes, 76% HOV
- 170K - 295K ADT in general purpose lanes
- $1.3M net revenue in 2005

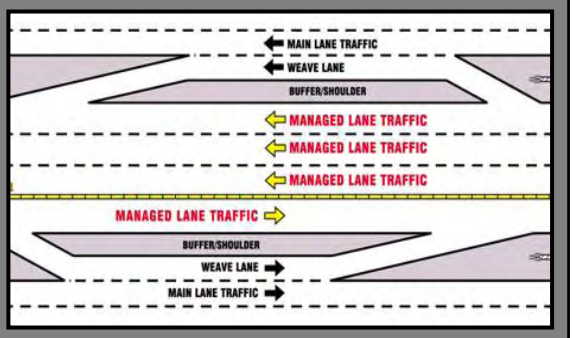
Example: I-15 FasTrak (San Diego) Dynamic Pricing

- ETC
- Interoperable with other toll facilities
- Dynamic pricing adjusted every 6 minutes based on HOT lanes traffic
  - $8.00 max peak period ($1.00 per mile)
  - $.50 prior to peak

Example: I-15 FasTrak (San Diego)

- Daily carpools up 101%
  - Carpool lanes increase ADT 107%
- 70% of carpoolers
  - existence of HOT lanes a factor in forming carpool
- 84% of all
  - Support managed lanes and favor expansion

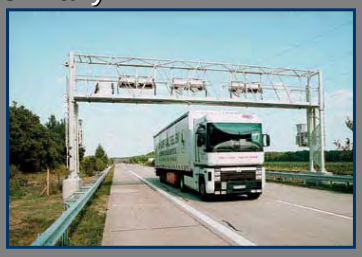
20-mile expansion
4 managed lanes with
interior moveable barrier



Other Pricing Examples

- I-15 HOT Lanes, Salt Lake City: Sticker program for SOVs
- I-290 and I-10 HOT Lanes, Houston: 2HOVs tolled
- I-25, Denver, ETC for SOVs
- Distance-based truck tolling, Germany

I-15, Salt Lake City



Germany

Houston

Truck Only Toll (TOT) Lanes

- Studies only, no current projects
  - Los Angeles, Atlanta, Virginia
- Most likely scenarios:
  - ETC dynamic pricing based on demand
  - Minimum of two directional lanes
  - Shared MUL roadway use (like outer roadway of NJ Turnpike for trucks and HOVs)
  - Priority/exclusivity for truck use during off peaks, priority to commuters during peaks
- Note: American Trucking Association is against *mandatory* tolling.
- Previous Truckway via Hell Gate Bridge/Fremont Secondary studied in Region 11

Overview of MUL Study Area

- Primary Study Area
  - New York City / 5 boroughs
- Secondary Study Area
  - Nassau County
  - Westchester County
  - northeastern New Jersey

MUL Study Network

National Highway Corridors in New York City
Figure 1

Project Schedule

- 24 month study
- April 2007 – April 2009
- 6 Steering Committee meetings
- 4 PRC meetings
- 2 sets of public forums, 5 Boroughs

Project Milestones

- State of the Practice Report – December 2007
- Revised Goals, Objectives and Evaluation Criteria – December 2007
- Initial Candidate Corridors and Strategies – February 2008
- Problem Identification Technical Report – February 2008
- Final List of Corridors and Strategies – early Summer 2008
- Draft Recommendations Report – January 2009
- Final Report – April 2009

Technical Procedures/Approach

- Identify and inventory existing conditions (congestion locations, issues/concerns, etc.)
- Screen candidate corridors and potential strategies based on goals, objectives and evaluation criteria
  - Use evaluation matrices to facilitate review of alternative strategies

Milestones to Date

- Discussions with MPO (NYMTC) which has shown keen interest
- Study discussed with NYC as contributory element of City's planned Congestion Mitigation Plan
- Presentation Made to NYSDOT Delivery Division Meeting in November with considerable interest shown

Discussion and Questions

