CTB Workshop

A NATIONAL PERSPECTIVE ON HIGH-OCCUPANCY TOLL (HOT) LANES

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CONCEPT OF “MANAGED LANES”

- Highway facilities or a set of lanes where operational strategies are proactively implemented and managed in response to changing conditions.
- Examples include high-occupancy vehicle (HOV) lanes, “value-priced” lanes, HOT lanes, or exclusive or special use lanes.
- Potential benefits
  - Regulate demand
  - Separate traffic streams to reduce turbulence
  - Utilize available and unused capacity
Source: Managed Lanes, a Primer, Federal Highway Administration
POTENTIAL BENEFITS OF HOT LANES

• Pricing can encourage road users to take transit, walk, bike, carpool or telework compared to driving alone during peak periods.

• Revenues can be used to enhance transit system capacity, ridesharing programs, and amenities for pedestrians and bicyclists, making those options more attractive to commuters.

• By converting an under-utilized HOV lane to a HOT lane that attracts more vehicles, congestion in the general purpose lanes could be improved.

• Conversely, converting an over-utilized HOV lane to a HOT lane may disincentive its use, lessening traffic on those lanes.
URBAN PARTNERSHIP AGREEMENTS

• USDOT’s comprehensive policy response to urban congestion based on the “4 Ts”
  o Tolling (congestion pricing) demonstration
  o Enhanced transit services
  o Increased emphasis on telecommuting and flex scheduling
  o Deployment of advanced technology

• Deployed in Miami, Minneapolis, San Francisco, and Seattle
TRANSIT BENEFITS AS A RESULT OF HOT LANES

- Federal funding used in following HOT lane projects to purchase express buses and/or fund new express bus service
  - Miami
  - Minneapolis
  - Atlanta
  - San Diego
# NATIONAL COMMUTING PATTERNS

## Table 1: U.S. Commuting Patterns, 1960–2010

<table>
<thead>
<tr>
<th></th>
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<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drove Total</td>
<td>64.0%</td>
<td>77.0%</td>
<td>84.1%</td>
<td>86.5%</td>
<td>87.9%</td>
<td>87.7%</td>
<td>86.3%</td>
</tr>
<tr>
<td>Drove Alone</td>
<td>N/A</td>
<td>N/A</td>
<td>64.4%</td>
<td>73.2%</td>
<td>75.7%</td>
<td>77.0%</td>
<td>76.6%</td>
</tr>
<tr>
<td>Carpooled</td>
<td>N/A</td>
<td>N/A</td>
<td>19.7%</td>
<td>13.4%</td>
<td>12.2%</td>
<td>10.7%</td>
<td>9.7%</td>
</tr>
<tr>
<td>Used Public Transit</td>
<td>12.1%</td>
<td>8.5%</td>
<td>6.2%</td>
<td>5.1%</td>
<td>4.6%</td>
<td>4.7%</td>
<td>4.9%</td>
</tr>
<tr>
<td>Walked</td>
<td>9.9%</td>
<td>7.4%</td>
<td>5.6%</td>
<td>3.9%</td>
<td>2.9%</td>
<td>2.5%</td>
<td>2.8%</td>
</tr>
<tr>
<td>Biked</td>
<td>N/A</td>
<td>N/A</td>
<td>0.5%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.4%</td>
<td>0.5%</td>
</tr>
<tr>
<td>Telecommuted</td>
<td>N/A</td>
<td>N/A</td>
<td>2.3%</td>
<td>3.0%</td>
<td>3.3%</td>
<td>3.6%</td>
<td>4.3%</td>
</tr>
</tbody>
</table>

Source: U.S. Census Bureau, American FactFinder

Source: *Bus Rapid Transit and Managed Lanes*, Reason Foundation
INCREASE IN RIDERSHIP UPON CHANGE FROM HOV TO HOT

<table>
<thead>
<tr>
<th>UPA Site</th>
<th>Before HOT</th>
<th>After HOT</th>
<th>% Change</th>
</tr>
</thead>
<tbody>
<tr>
<td>Miami</td>
<td>1,827</td>
<td>2,877</td>
<td>57%</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>4,572</td>
<td>4,649</td>
<td>8%</td>
</tr>
<tr>
<td>Atlanta</td>
<td>1,210</td>
<td>1,459</td>
<td>21%</td>
</tr>
<tr>
<td>Seattle</td>
<td>4,441</td>
<td>4,889</td>
<td>24%</td>
</tr>
</tbody>
</table>

Figures reflect a.m. peak period
Seattle figures are for eastbound and westbound combined

Source: Center for Urban Transportation Research, University of South Florida
## WEEKDAY BUS TRIPS AND RIDERSHIP ON HOT LANES

<table>
<thead>
<tr>
<th>Region</th>
<th>Corridor</th>
<th>Trips</th>
<th>Riders</th>
<th>Rider Count Period(s)</th>
<th>Riders/Trip</th>
</tr>
</thead>
<tbody>
<tr>
<td>Orange Co.</td>
<td>SR-91</td>
<td>39</td>
<td>450</td>
<td>March 2010; Oct 2011</td>
<td>12</td>
</tr>
<tr>
<td>San Diego</td>
<td>I-15</td>
<td>141</td>
<td>2,158</td>
<td>Spring 2011; Nov 2011</td>
<td>15</td>
</tr>
<tr>
<td>Houston</td>
<td>I-10</td>
<td>391</td>
<td>8,027</td>
<td>Fiscal Year 2011</td>
<td>21</td>
</tr>
<tr>
<td>Houston</td>
<td>US-290</td>
<td>236</td>
<td>4,526</td>
<td>Fiscal Year 2011</td>
<td>19</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>I-394</td>
<td>548</td>
<td>12,141</td>
<td>Calendar Year 2011 (est)</td>
<td>22</td>
</tr>
<tr>
<td>Salt Lake City</td>
<td>I-15</td>
<td>76</td>
<td>3,477</td>
<td>Calendar Year 2011</td>
<td>46</td>
</tr>
<tr>
<td>Denver b</td>
<td>I-25</td>
<td>434</td>
<td>14,840</td>
<td>Aug – Dec 2011</td>
<td>34</td>
</tr>
<tr>
<td>Seattle</td>
<td>SR-167</td>
<td>88</td>
<td>2,334</td>
<td>Oct-Dec 2011; Dec 2011</td>
<td>27</td>
</tr>
<tr>
<td>Miami</td>
<td>I-95</td>
<td>259</td>
<td>4,286</td>
<td>June 2011</td>
<td>17</td>
</tr>
<tr>
<td>Minneapolis</td>
<td>I-35W</td>
<td>495</td>
<td>11,647</td>
<td>Calendar Year 2011 (est)</td>
<td>24</td>
</tr>
<tr>
<td>Bay Area c</td>
<td>I-680</td>
<td>30</td>
<td>307</td>
<td>Calendar Year 2011</td>
<td>10</td>
</tr>
<tr>
<td>Atlanta</td>
<td>I-85</td>
<td>133</td>
<td>3,179</td>
<td>Sept 12 – Oct 7, 2011</td>
<td>24</td>
</tr>
</tbody>
</table>

*Trips based on January 2012 schedules.

The B, L, and 120X routes also operate some service in the reverse commute direction. This service does not use the HOT lanes, but the data on those trips and ridership are included in these totals.

Since the Bay Area (I-680) HOT Lane is southbound only, only buses running in that direction and their ridership are counted.

Source: Gregory Newmark, ‘HOT For Transit? Transit’s Experience of High-Occupancy Toll Lanes"
PREVIOUS MODE OF NEW TRANSIT RIDERS IN CITIES INSTITUTING HOT LANES

**Miami**
- Drove Alone: 45%
- Used Other Transit: 38%
- Didn't Make Trip: 11%
- Other: 3%

**Seattle**
- Drove Alone: 41%
- Used Other Transit: 35%
- Didn't Make Trip: 13%
- Other: 9%

**Minneapolis**
- Drove Alone: 37%
- Used Other Transit: 29%
- Didn't Make Trip: 9%
- Other: 22%

Source: Center for Urban Transportation Research, University of South Florida
SAN DIEGO: I-15

Number of People per Hour per Lane on I-15

21% More People Moved During Avg P.M. Commute

Source: San Diego Association of Governments
SAN DIEGO: I-15

A portion of the peak period travel volumes on the HOT lanes was redistributed from the middle of the peak to its shoulders, improving operation for the entire I-15 corridor.
SAN DIEGO: I-15

• Toll revenue funds the Inland Breeze bus service in the HOT lane corridor
• Toll revenue pays for roughly $430,000 per year in operating costs and $60,000 for Highway Patrol facility enforcement, with the remaining revenue to be spent on improving transit service along the I-15 corridor
MIAMI: I-95

TOTAL RIDERSHIP MULs GGI to MIA
2009: 1,800 / peak period
2012: 5,498 / peak period
Transit can play a role in congestion pricing.

Source: USDOT Federal Highway Administration
MIAMI: I-95

- Average Peak Period Traffic Flow Improved
  - 2008: 20 mph or less in HOV and General Purpose (GP)
  - 2011: HOT 61-to-51 mph, GP 47-to-35 mph

- Change in the Average Peak Volume
  - HOT lanes: 8,900 in 2011 to 9,700 in 2013
  - GP lanes: 18,400 in 2011 to 17,900 in 2013

Source: Urban Partnership Agreement/Congestion Reduction Demonstration Program
MIAMI: I-95

• Express Bus Service Has Improved
  o Average travel speed increased from 18 to 55 mph
  o Travel time decreased from 25 to 8 minutes

• Ridership Has Increased
  o Average weekday ridership increased from 1,827 to 2,877 (57%) between 2008 and 2010 and to 4,500 by Aug 2011

• 2010 Survey
  o 72% of riders new since tolling began
  o 53% of riders said tolling affected their decision to use transit

Source: Urban Partnership Agreement/Congestion Reduction Demonstration Program
MINNEAPOLIS: I-35W

- As of April 2013 monthly trips reached 73,260; Average toll is $1.71; Maximum average $5 to $7
- Increased use and throughput in corridor
- Some shift to HOT Lanes from GP and HOVs have remained
- Reduced Violations

### I-35W HOT Lane Use – AM Peak Period

<table>
<thead>
<tr>
<th></th>
<th>4&lt;sup&gt;th&lt;/sup&gt; Quarter 2008</th>
<th>2&lt;sup&gt;nd&lt;/sup&gt; Quarter 2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Vehicles</td>
<td>2,068</td>
<td>2,969</td>
</tr>
<tr>
<td>Carpoools/Vanpools</td>
<td>1,718 (83%)</td>
<td>1,784 (60%)</td>
</tr>
<tr>
<td>Tolled at Black Dog Road</td>
<td>0 (–)</td>
<td>967 (33%)</td>
</tr>
<tr>
<td>Transit Buses</td>
<td>47 (2%)</td>
<td>54 (2%)</td>
</tr>
<tr>
<td>SOVs (Violators)</td>
<td>303 (15%)</td>
<td>164 (5%)</td>
</tr>
</tbody>
</table>

Source: Urban Partnership Agreement/Congestion Reduction Demonstration Program
MINNEAPOLIS: I-35W

• On I-35W South after HOT lanes conversion:
  o Bus speeds increased
  o Bus travel times decreased
  o Park-and-ride lot usage grew by 641 vehicles

• Marquette and Second Dual Bus Lanes in Downtown Minneapolis:
  o Bus speeds increased
  o Bus travel times decreased
  o Trip-time reliability increased
  o Consolidated bus routes

Source: Urban Partnership Agreement/Congestion Reduction Demonstration Program
LOS ANGELES: I-110 BRT

- I-110 Segment of the Silver Line BRT
  - Transit travel times remained relatively constant
  - Transit on-time performance increased
  - Average daily peak period ridership increased by 52% in the AM peak period and 41% in the PM peak period after CRD-funded service was added, and again by 29% in the AM peak period and 25% in the PM period after tolling began

Source: Urban Partnership Agreement/Congestion Reduction Demonstration Program
LOS ANGELES: I-110 BRT

Survey results indicate:

- Customer satisfaction with frequency of service increased, but availability of seats and parking availability declined
- 62% new riders
- 33% used to drive alone
- 78 new registered vanpools formed
ATLANTA: I-85

• “Ride Transit—Earn Toll Credits” Program
  o Pilot program instituted earlier this year to keep traffic better-flowing on I-85 in Atlanta
  o Toll credit earned when a commuter rides a bus instead of a car in the I-85 Express Lanes
  o They receive a toll credit of $2 per trip, up to $10 per month
DENVER: I-25

- For the I-25 Express Lanes in Denver, transit is placed at the top of the hierarchy of users.

- Having in place monitoring programs to avoid service degradation is critical for ensuring public confidence with HOV-to-HOT conversions.

Source: Gregory Newmark, ‘HOT For Transit? Transit’s Experience of High-Occupancy Toll Lanes’
SEATTLE: SR-167

- SR-167 HOV lanes were converted to HOT lanes due to having available space pre-conversion during peak period commute times, and population expected to increase.

<table>
<thead>
<tr>
<th></th>
<th>May - Jul</th>
<th>Aug - Oct</th>
<th>Nov - Jan</th>
<th>Feb - Apr</th>
</tr>
</thead>
<tbody>
<tr>
<td>Average number of daily tolled trips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year One</td>
<td>1,110</td>
<td>1,260</td>
<td>1,410</td>
<td>1,670</td>
</tr>
<tr>
<td>Year Two</td>
<td>1,750</td>
<td>1,830</td>
<td>1,980</td>
<td>2,090</td>
</tr>
<tr>
<td>Year Three</td>
<td>2,540</td>
<td>2,780</td>
<td>2,670</td>
<td>3,070</td>
</tr>
<tr>
<td>Highest number of daily tolled trips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year One</td>
<td>1,390</td>
<td>1,560</td>
<td>1,910</td>
<td>1,880</td>
</tr>
<tr>
<td>Year Two</td>
<td>2,060</td>
<td>2,150</td>
<td>2,230</td>
<td>2,390</td>
</tr>
<tr>
<td>Year Three</td>
<td>3,160</td>
<td>3,290</td>
<td>3,340</td>
<td>3,480</td>
</tr>
<tr>
<td>Average peak-hour northbound tolled trips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year One</td>
<td>150</td>
<td>180</td>
<td>200</td>
<td>260</td>
</tr>
<tr>
<td>Year Two</td>
<td>250</td>
<td>290</td>
<td>320</td>
<td>350</td>
</tr>
<tr>
<td>Year Three</td>
<td>360</td>
<td>370</td>
<td>340</td>
<td>420</td>
</tr>
<tr>
<td>Average peak-hour southbound tolled trips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year One</td>
<td>110</td>
<td>120</td>
<td>130</td>
<td>160</td>
</tr>
<tr>
<td>Year Two</td>
<td>160</td>
<td>170</td>
<td>190</td>
<td>200</td>
</tr>
<tr>
<td>Year Three</td>
<td>210</td>
<td>210</td>
<td>200</td>
<td>250</td>
</tr>
<tr>
<td>Maximum peak-hour tolled trips</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Year One</td>
<td>210</td>
<td>240</td>
<td>260</td>
<td>310</td>
</tr>
<tr>
<td>Year Two</td>
<td>310</td>
<td>350</td>
<td>390</td>
<td>420</td>
</tr>
<tr>
<td>Year Three</td>
<td>430</td>
<td>440</td>
<td>430</td>
<td>530</td>
</tr>
</tbody>
</table>

Source: Washington State Department of Transportation
SEATTLE: SR-167

- On average, daily general purpose lane volumes have decreased 4-5%, with speeds increasing 8%
- On average, speeds in the HOT lanes have remained around the 60 mph speed limit

Source: Washington State Department of Transportation
BAY AREA: I-680S

- Net toll revenue is required by law to be used for transit service on the corridor or for building additional lanes
- Plans to build an express lane on I-680N

Source: Alameda County
CONCLUSION

• Enhancing travel options and efficiency in congested corridors is critical
• Scaling up HOT lanes into a coordinated network could make the whole greater than sum of its parts
• Going forward, increased sample size of HOT lanes and associated data will better inform public policy
CTB Workshop

A NATIONAL PERSPECTIVE ON HIGH-OCCUPANCY TOLL (HOT) LANES

Questions?

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