

Managed Lanes Networks: Enhancing Mobility for Metro Atlanta

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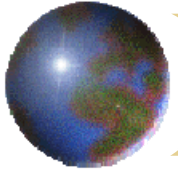




Managed Lanes Projects, 2009



- Managed lanes in Operation
- ★ Managed lanes being implemented
- Proposals being considered
- Feasibility studies



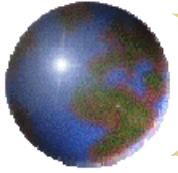
Regions planning ML networks

- In Long Range Plan already:

- Dallas
- Houston
- San Diego
- San Francisco

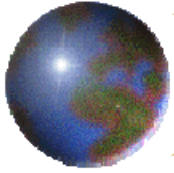
- Being considered:

- Atlanta
- Los Angeles
- Miami
- Seattle
- Washington, DC



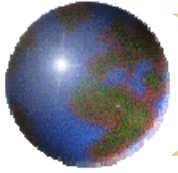
Two very different types of Managed Lanes

- ❖ ML 1.0: Carpool (HOV) lane that sells excess capacity to non-carpools.
- ❖ ML 2.0: Express toll lane selling fast, reliable trips, while providing some HOV preference.



Key differences between ML 1.0 and ML 2.0

	ML 1.0	ML 2.0
HOV type	HOV-2+	HOV-3 or above
Infrastructure	Conversion	Construction
Revenue use	Transit ops	Debt service
Configuration	Gen.1 lane/dir.	Gen. 2 lanes/dir.
Examples	I-15, I-394 I-25, SR 167	SR 91, I-495, 95 Express, LBJ, NTE

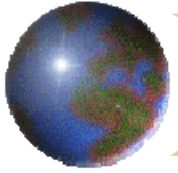


Performance differences between ML 1.0 and ML 2.0

	ML 1.0*	ML 2.0**
Percent tolled	32.5%	83%
Annual revenue	\$1.7M	\$37.5M

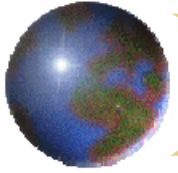
*Average of 4 projects

**SR 91 only



Why ML networks should adopt the ML 2.0 model

- ➊ Need to add significant new capacity
- ➋ Need to pay for new capacity
- ➌ Need to “manage” nearly all traffic
- ➍ Enforcement considerations



Need for considerable new capacity

- ❖ Many freeways have no HOV lanes to convert.
- ❖ Two lanes/direction preferable.
- ❖ ML to ML flyover connectors needed.
- ❖ Direct access ramps, for transit/other users also desirable.



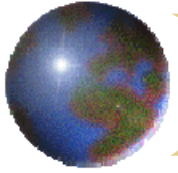
Main Lanes

Managed Lanes

Direct Access Road to Arterial

Direct Transit Access Ramps

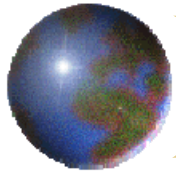
BRT Station



Paying for new capacity from toll revenues (1)

2003 Poole/Orski HOT Networks study

- 8 generic systems (incl. Atlanta)
- Single lane per direction
- Roadway construction costs only
- Costs in 2000 \$
- Average self-support from tolls: 58%

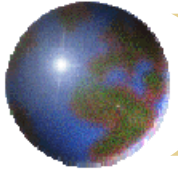


Paying for new capacity from toll revenues (2)

Current large ML projects:

- DC Beltway (I-495) 79% self-support
- Dallas LBJ (I-635) 83% "
- Ft. Worth (I-820) 73% "

*But these are large stand-alone ML
projects; network self-support
would be lower.*



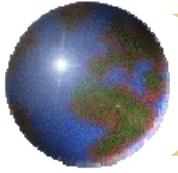
*For reliable LOS C traffic,
most vehicles must be priced.*

Atlanta I-75 HOT Lane study (HOV-2)

PM peak, 2030, MLs with 28% of total lane capacity approach 25% of traffic; hence, are closed to SOVs.

91 Express Lanes, (HOV-3 discount)

PM peak, 2006, MLs with 33% of total lane capacity handle 49% of total traffic, nearly all of whom pay the market price.



Synergy of managed lanes and bus rapid transit (BRT)

- ❖ Value-priced lane is *virtual equivalent* of an exclusive fixed guideway.
- ❖ Pricing limits vehicle flow to what's compatible with LOS C conditions.
- ❖ Reliable high speed is sustainable long-term, thanks to pricing.
- ❖ Miami implementing this on new I-95 Express Lanes.



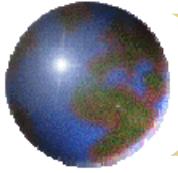
BRT/Managed Lanes *Move People*

Level of Service	Vehicles per Hour	Vehicle Speed	Vehicle Occupancy	Passenger Trips per Hour (ptph)	Equivalent Lanes
LOS C	1,600	50-60	1.2	1,920	1
Bus Toll Lane @ 25* (1.6%)	1,587 **	50-60	2.7	4,296	2.2
Bus Toll Lane @ 50* (3.2%)	1,575**	50-60	4.0	6,242	3.3
Bus Toll Lane @ 100* (6.4%)	1,551**	50-60	6.5	10,134	5.3

*Assumes 80-Passenger Bus, 100% load factor

** Assumes 15% HOV-3

Source: Tampa-Hillsborough County Expressway Authority



How ML/BRT network compares with Light or Heavy Rail Transit

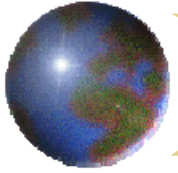
500 In-mi ML/BRT: \$5B (@\$10M/In-mi)

500 In-mi ML/BRT: \$7.5B (@\$15M/In-mi)

250 rt-mi LRT: \$31 B, per FTA

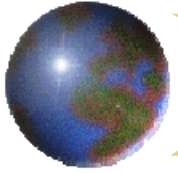
250 rt-mi HRT: \$38 B, per FTA

Plus, the ML/BRT guideway would not depend on limited FTA funding.



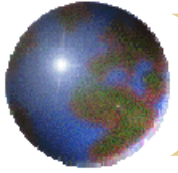
How ML network differs from stand-alone ML

- ➊ Complex pricing
- ➋ Complex signage
- ➌ Complex system operations and control
- ➍ Need for automated enforcement



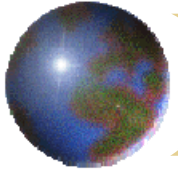
Complex pricing

- ⊕ From any entrance to any exit (a la 407 ETR in Toronto)
- ⊕ Different demand on different links
- ⊕ Hence, link-specific pricing
- ⊕ Probably price as cents/mile, based on miles driven each link.



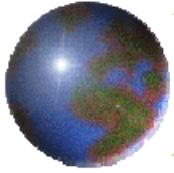
Complex signage

- ⊕ Variable message signs
- ⊕ Placed prior to each link
- ⊕ Current rate/mile for upcoming link
- ⊕ No way to convey total trip price



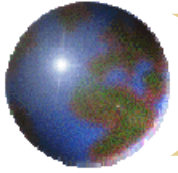
Complex system operations and control

- Variable pricing on dozens of links
- Maintain LOS C on all links
- Cope with incidents
- Major investment in ITS



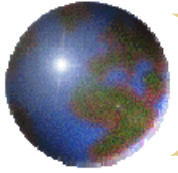
Need for automated enforcement

- Most freeways don't have space to add "declaration" or "enforcement" lanes.
- Networks with many links and multiple entrance/exit points would require multiple enforcement zones.
- Visual observation is even more labor-intensive with multiple zones.



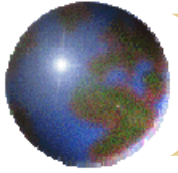
Alternative: redefine carpools eligible to use HOT lanes

- ❖ Original purpose of HOV lanes was to get *commuters* to share rides, leaving vehicles at home.
- ❖ *Registered* carpools would restore this concept, via local ride-sharing agencies.
- ❖ Agency would audit employers to ensure carpools remain in operation.
- ❖ A version of this is in operation on Miami I-95 Express Lanes.



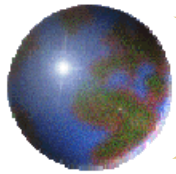
Policies for ML networks

- HOV-3 or higher (Super-HOT)
- Guaranteed capacity for BRT service
- Registered carpools only
- Charge per mile, per segment
- Flyover connectors at principal-flow interchanges
- 2 lanes/direction, *where feasible*
- Direct access ramps, *where possible*



Conclusions

- ➊ Managed Lane networks differ considerably from stand-alone MLs.
- ➋ For economic feasibility, ML networks must operate as ML 2.0.
- ➌ Loss of HOV-2 carpools can be offset via much higher person throughput from BRT.
- ➍ Two lanes/direction, flyover connectors, and direct access ramps are preferable.
- ➎ Policy decisions are critical to the success of ML networks.



Questions?

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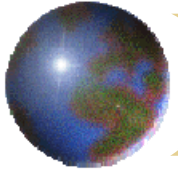
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Single-Lane ML examples

MLs in operation:

Seattle	SR 167
Salt Lake City	I-15
Minneapolis	I-394 and I-35W
Houston	US 290

Planned MLs:

Houston	5 freeway conversions
SF Bay Area	ML network