

ATLANTA REGIONAL MANAGED LANE SYSTEM PLAN

EMERGING ISSUES: INSIDE VERSUS OUTSIDE MANAGED LANES

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Atlanta Regional Managed Lane System Plan

Technical Memorandum 17A: Advantages and Disadvantages of Inside Versus Outside Managed Lanes

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INSIDE VERSUS OUTSIDE MANAGED LANES WHITE PAPER

Introduction

The purpose of this white paper is to explore the advantages and disadvantages of the placement of managed lanes on the inside or outside of the general purpose lanes of metropolitan Atlanta's Interstate highways. This decision is driven by managed lane design policies including precedent, access, costs, impacts and public perception. Appendix A summarizes the system differences addressed in this paper in a matrix.

Nationwide Precedent

The vast majority of managed lanes schemes in North America are inside systems. Safety reasons are a primary reason cited for this arrangement. In non barrier separated systems, pushing free-flowing managed lanes traffic to the outside often makes it more difficult for distressed motorists from the general purpose lanes to reach the shoulder. Motorists have to pass through the faster moving managed lanes when in distress or exiting the system. Additionally, emergency vehicles also must contend with the quicker moving managed lanes traffic when trying to reach emergencies or exit ramps.

Some outside managed lane bus systems exist in Minneapolis, Toronto, Ottawa and Vancouver (for example) in locations where flow on and off the highway is generally light, effectively preventing the need for the buses to cross over multiple lanes to reach a designated managed lane.

Thirty-one miles of the New Jersey Turnpike are currently configured in a dual-dual system of managed lanes. In this system, there are two sets of lanes moving in each direction. Each set of lanes has its own ingress and egress ramps at all locations. Trucks are forced to ride on the outside lanes while cars may choose to ride in either the inside or outside. An HOV system operates in the outside lanes during peak hours only. The benefit of this system of management is the reduction of turbulence between trucks and cars and the limitations on entrance and exit points producing a more steady flow of volume in each managed section.

Access

A 2000 paper submitted for the 10th International HOV Conference entitled *HOV Lane Evaluation and Monitoring and the Political Process in Washington State* found that outside managed lanes are generally better suited for a corridor with widely dispersed trip patterns. This type of arrangement is most common on suburb to suburb trips,

where cars and buses will generally only ride a short distance along the highway. In this arrangement remaining near the outside allows for easy access on and off the corridor for managed lanes users.

Alternatively, inside managed lanes were found to be well-suited to corridors with longer distance concentrated trip patterns. This type of arrangement is most common on highways serving trips to or from central business districts or large regional activity centers. This type of arrangement allows express buses and other regional commuters the ability to flow freely for longer distance away from the traffic merging on and off the corridor.

With regards to access, the inside system is well-suited to Atlanta's regional trip patterns. The Atlanta metropolitan highway system is primarily designed to transfer people over longer distances to and from large activity centers and the central business district. The longer trip distances make an inside system advantageous for many express buses and commuters and allow for easy on and off access for the short trip travelers without having to move through outside managed lanes.

Several inside HOV access points have already been implemented for part of the Atlanta region's HOV system along I-75 and I-85. The current HOV system would interface most readily with a regional inside HOV system at current access points along I-20, I-75, I-85 and the Downtown Connector. All the current HOV system in Atlanta operates on the inside.

In non-separated outside managed lanes systems, enforcement of policies becomes more difficult as all motorists are required to merge directly through the managed lanes system, requiring windows where any vehicle can legally be within the managed lanes system. In areas with short interchange spacing, this can often lead to long stretches of managed lanes that are compromised by vehicles entering and leaving the corridor.

Cost

Some outside systems are conceptually designed to minimize the impact to general purpose lane merging and maximize managed lanes access by placing a portion of their corridor on elevated structures. This method requires grade separations at all interchanges and limits access to the managed lanes system. In certain locations additional right-of-way would need to be acquired to construct the system of managed lane ingress and egress ramps, overpasses and interchanges required to provide access to the managed lanes, while still allowing for normal flow into and out of the general purpose lanes. This type of outside system requires a significant infrastructure investment with many additional ramps and fly-overs.

Financially, a build alternative with lanes split to the outside would be practical if access to managed lanes is to be provided at interchanges in the future, or if the construction of additional managed lanes is phased after completion.

The GDOT/GRTA I-75 Northwest Corridor Draft Environmental Impact Statement determined that year-of-expenditure costs would be \$245 million higher for Truck Only

Toll (TOT)¹ lanes on the outside than if they were constructed as inside managed lanes due to the inclusion of additional infrastructure to support the outside alternative.

Impacts

In locations where the existing Interstate footprint is not significantly impacted by the addition of inside lanes (i.e., center median with available right-of-way), potential noise impacts on surrounding communities are reduced when compared to outside lanes. This case is especially true when dealing with TOT systems. Forcing the largest vehicles on the highway to the outside and allowing them the free-flow benefits of a managed lanes system would maximize noise impacts on the adjacent land uses.

Outside systems often require more right-of-way investment than inside systems. This case is particularly true if they require additional fly-overs and access ramps, as is generally the reality of barrier separated outside managed lanes systems. In locations where additional right-of-way needs to be purchased for the construction of an outside system, there are a host of potential environmental and social impacts. These impacts range from the displacement of people and businesses adjacent to the roadways to the potential detriment of habitat and environmental quality. Additionally, the extra impermeable paved surface area associated with an outside system, especially a separated system, as compared to an inside system, can be detrimental to water quality and the mitigation of the urban heat island effect.

It is important to note that in some cases inside systems will have similar impacts as outside systems in terms of right-of-way investment and environmental and social impacts. In general, however, inside systems require less additional design, less impact to surrounding communities, and less impact on the environment in situations where an outside system would require the paving of more surface area.

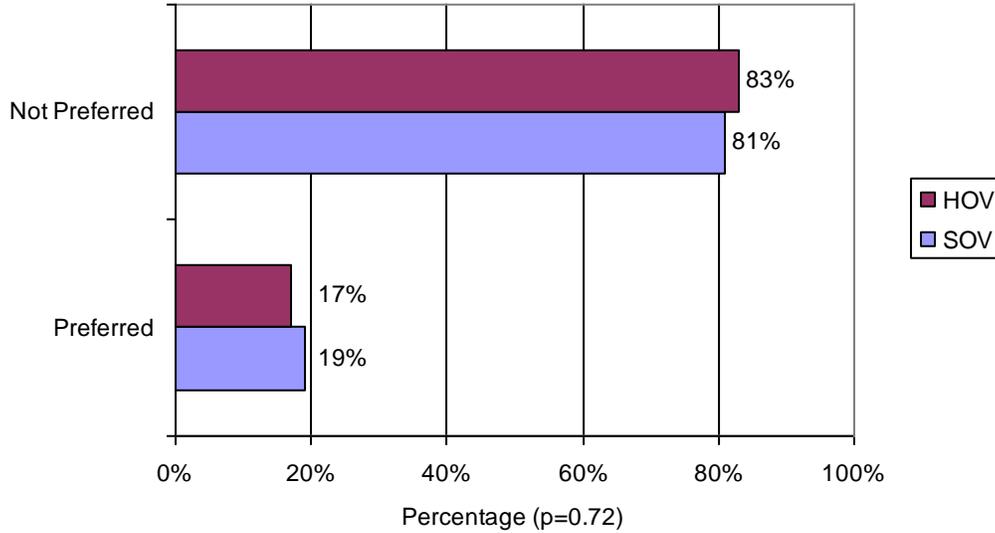
A barrier separated outside managed lane system would require a significant time frame for construction. The construction of this managed lanes alternative would have an effect on access to all overpasses and exits along the affected corridors.

Public Perception

A survey conducted by the Washington State Transportation Center, and published in their *HOV Lane Performance Monitoring: 1998 Annual Report*, found that respondents would prefer to travel in interior HOV lanes as opposed to exterior ones, as illustrated in Figures 1 and 2 below. The study indicated that this preference may be in part due to the public's desire to ensure that the general purpose lanes can be expanded outward in the future should the need and funding arise.

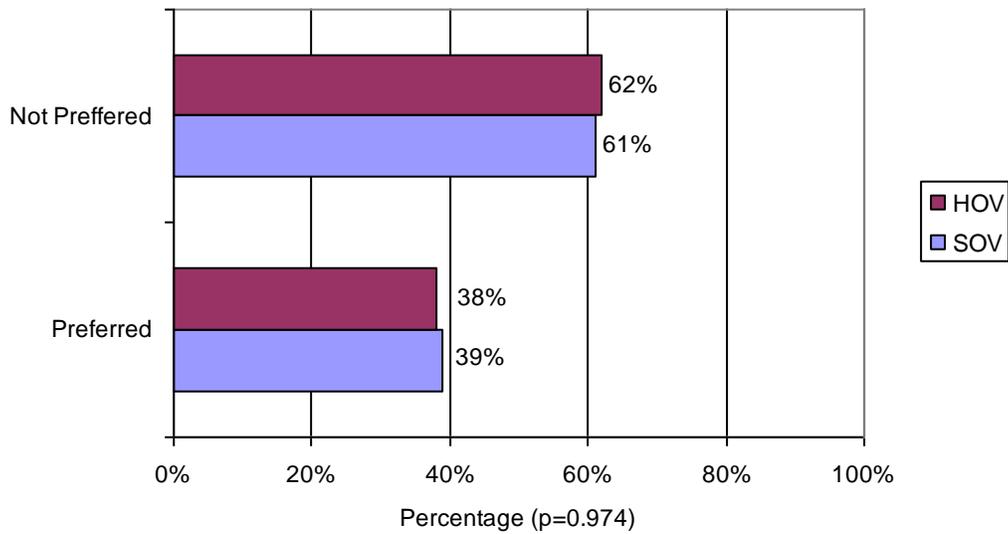
¹ TOT means the managed lanes are reserved for trucks willing to pay a toll.

Figure 1 - HOV Lanes on the Outside



Source: Washington State Transportation Center

Figure 2 - HOV Lanes on the Inside



Source: Washington State Transportation Center

Appendix A: Matrix of Advantages and Disadvantages of Inside versus Outside Managed Lanes Facilities

System Placement Alternative	Access		Design Specifications and Costs	
	Advantages	Disadvantages	Advantages	Disadvantages
Inside	<ul style="list-style-type: none"> Well suited to concentrated trip patterns (suburb to activity center) Well suited to longer managed lanes trips 	<ul style="list-style-type: none"> Vehicles wishing to ingress and egress the system must traverse multiple general purpose lanes, unless access is provided directly via a ramp 	<ul style="list-style-type: none"> Less expensive to implement Less right-of-way purchase, especially if a buffer separation system is utilized Easier to integrate into current highway systems Atlanta’s current HOV facilities are all on the inside Allows for the potential development of reversible managed lanes facilities 	<ul style="list-style-type: none"> Requires additional inside ramps and access to be fully efficient
Outside	<ul style="list-style-type: none"> Well-suited for widely dispersed trip patterns (suburb to suburb) Well-suited for short managed lanes trips Remaining near the outside allows for easier ingress and egress of the corridor 	<ul style="list-style-type: none"> In non-separated systems, other vehicles will have to merge through the facility to exit the highway to the right 	<ul style="list-style-type: none"> Separated outside systems can provide additional access points over time, minimizing total initial investment 	<ul style="list-style-type: none"> Separated outside systems are more expensive to design and build due to additional right-of-way and ramps In non-separated systems, distressed motorist will need to pass through the facility to reach a shoulder

System Placement Alternative	Impacts		Public Perception	
	Advantages	Disadvantages	Advantages	Disadvantages
Inside	<ul style="list-style-type: none"> Where a median exists, inside systems generally do not have large environmental or social impacts associated with the acquisition of adjacent right-of-way The fastest moving, and often the loudest, vehicles are placed towards the center of the highway, away from surrounding land uses 	<ul style="list-style-type: none"> Access often requires transition through multiple lanes, with associated risks and merging related congestion 	<ul style="list-style-type: none"> Generally considered the preferred alternative through public polling 	<ul style="list-style-type: none"> Can be more difficult to ingress and egress the system, depending on design specifics
Outside	<ul style="list-style-type: none"> Access often does not require transition through multiple lanes, with resulting lowered accident risk and merging related congestion 	<ul style="list-style-type: none"> The fastest moving, and often the loudest, vehicles are placed towards the outside of the highway, nearer to surrounding land uses If barrier separated, this system would take a long time to construct, and would affect overpasses and interchanges along the system 	<ul style="list-style-type: none"> Potentially easier to ingress and egress the system, depending on design specifications 	<ul style="list-style-type: none"> Generally not considered the preferred alternative through public polling Some people were concerned that an outside system would limit the State's ability to expand the general purpose lanes outward in the future