

INTERIM REVIEW SUPPORT



# A Blue Print for Short Term Transportation Service Improvements in Miami-Dade County

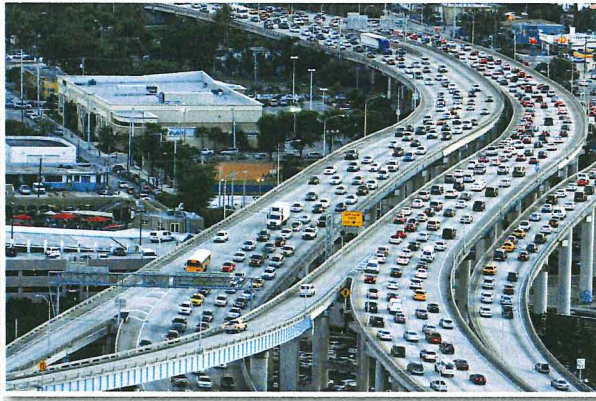


REVIEW DRAFT



## Introduction

Miami-Dade County is part of a heavily populated multi-county metropolitan area. The County encompasses approximately 2,000 square miles of land, and is the most populous county in the State of Florida. As of 2007,

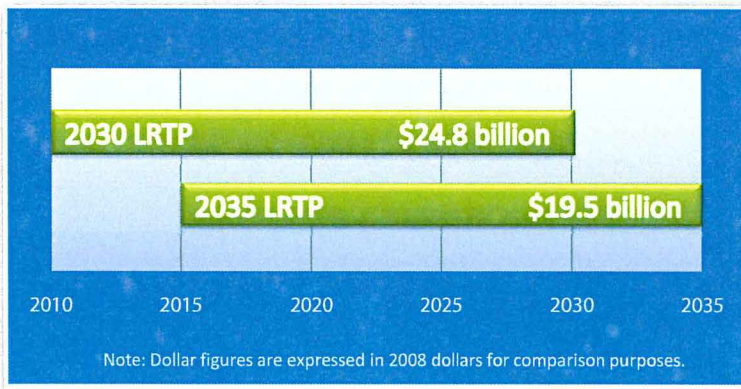


based on 2000 Census estimates, Miami-Dade County was the eighth most populous county in the United States<sup>1</sup>. According to the 2009 Urban Mobility Report, Miami-Dade County is the fifth most congested metropolitan area in the nation in terms of travel time. The financial costs of congestion experienced by Miami-Dade residents in 2007 amounted to approximately \$3.0 billion, and resulted in excess fuel consumption of 102 million gallons<sup>2</sup>; the average annual cost of congestion per Miami-Dade traveler was approximately \$955. As the population of Miami-

Dade County continues to grow, so does the demand on the existing transportation system, which requires innovative investments and collaborative strategies to curtail the rising costs of congestion.

The Metropolitan Planning Organization for the Miami Urbanized Area (MPO) recently adopted an update to the County's Long Range Transportation Plan (LRTP) to the year 2035. The LRTP must be updated every 5 years by law in order to maintain consistency with the most current population projections, revenue projections, and transportation system updates. The 2035 LRTP update represents a unique snapshot in long range planning, due in part to the revenue projections based on the economic downturn that has occurred over the last several years. Miami-Dade County transportation funding projections have declined more than 20% relative to the last LRTP update (to the year 2030), adopted in September 2004, as depicted in **Figure 1**. This decline has had a significant impact on planners' efforts to develop a cost feasible plan that responds to the transportation needs of the growing number residents and visitors in the County.

**Figure 1. 2030 versus 2035 LRTP Revenue Projections**



1. Population Division, U.S. Census Bureau (2008). *Table 7: Population Estimates for the 100 Largest U.S. Counties Based on July 1, 2007 Population Estimates: April 1, 2000 to July 1, 2007 (CO-EST2007-07)*. Washington, D.C.
2. Texas Transportation Institute (2009). *2009 Urban Mobility Report*. College Station, TX

One of the elements of the 2035 LRTP designed to address the shortage in revenue for the development of capital intensive solutions is the Congestion Management Process (CMP). The CMP includes a number of low-cost strategies that represent alternatives to roadway expansion improvements. It is included in the LRTP as a candidate list of facilities for congestion management treatments; a set of low-cost improvement strategies; and a financial set-aside in the plan committed to this type of improvement. The majority of the candidate facilities in the CMP are on non-freeway facilities. There are also planned improvements on the County's freeway facilities that consist of operational improvements to alleviate congestion. A comprehensive short range strategy that focuses on operational improvements to the County's core facilities (Freeways and Major Arterials) is discussed in greater detail below.

### National Trends in Alternative Transportation Improvement Strategies

As part of the National Strategy to Reduce Congestion on America's Transportation Network, also known as the Congestion Initiative, the United States Department of Transportation (USDOT) devised a four-prong strategy to manage the nation's burgeoning congestion. These strategies, collectively known as the 4T's, include **Tolling, Transit, Telecommuting, and Technology**.

The 4T's comprise a toolbox of alternative strategies to deal with growing congestion at a time when construction costs, limited right of way, and environmental factors play an increasingly prohibitive role in the traditional construction of new roads or expansion of existing roads. The dominant trends in these strategies include a number of operational improvements that are less costly, and in some cases, more effective than traditional expansion.

In August 2007, the USDOT selected the Miami-Area (Miami-Ft. Lauderdale region) as one of five metropolitan regions to participate in the Urban Partnership Program in an effort to utilize the 4T's concept to relieve urban congestion. Through this urban partnership agreement between the USDOT and the Miami-Area Urban Partner (consisting of the FDOT, Miami-Dade MPO, Broward MPO, Miami-Dade Transit, Broward County Transit, Miami-Dade Expressway Authority, and Florida Turnpike Enterprise) southeast Florida received \$62.9 million towards the conversion of high-occupancy vehicle (HOV) lanes into high-occupancy tolling (HOT) lanes along a 21-mile stretch of I-95, including additional transit services in both Broward and Miami-Dade counties. \$43.4 million has already been allocated towards the I-95 Express project, which provides variably priced tolling lanes connecting I-395 in Miami-Dade County to I-595 in Broward County.

A variety of strategies, consisting of both transit improvements and highway improvements, have been implemented in a number of locations throughout the United States and Europe, including the following cities/countries:

- Chicago, IL
- Los Angeles, CA
- Miami-Area, FL
- Minneapolis/St. Paul, MN
- San Francisco, CA
- Seattle, WA
- Denmark
- England
- Germany
- Greece
- Netherlands



Table 1 includes a summary of the congestion management strategies that have been implemented in the American cities listed above, relative to the USDOT 4T's. Other small scale improvements that are consistent with this framework have been implemented in these and other locations as well.

Table 1. 4T's Improvements Implemented in six American Cities

	Tolling			Transit				Telecommuting			Technology				
	Convert HOV lanes to HOT lanes	Priced dynamic shoulder lanes	Variably priced roadways	Expanded or enhanced bus service	Implement new or expand existing bus rapid transit	Transit on special lanes (express lanes, shoulders, etc.)	Transit traffic signal priority	Arterial street traffic signal improvements to improve transit travel time	Support increased use of telecommuting	Support increased use of flexible scheduling	Support /implement alternative commute programs (i.e. car and van pools)	Active traffic management	Freeway management (ramp meters, travel time signs, etc.)	Enhanced traffic signal operations	Regional multi-modal traveler information (i.e. 511)
Chicago					●										
Los Angeles	●			●			●			●					
Miami-Area	●		●	●	●	●	●		●	●	●		●	●	●
Minneapolis/St. Paul	●	●		●	●	●	●	●					●	●	●
San Francisco									●		●				●
Seattle			●	●					●	●	●	●			●



In 2007 the USDOT Federal Highway Administration (FHWA) published a document entitled *Active Traffic Management: The Next Step in Congestion Management*, which explores these strategies in the context of their implementation, operation, and/or planned implementation in selected countries in Europe. The report defines **Active Traffic Management** as “...the ability to dynamically manage recurrent and nonrecurrent congestion based on prevailing traffic conditions. Focusing on trip reliability, it maximizes the effectiveness and efficiency of the facility.”

**Managed Lanes or Special Use Lanes are other specific terms used to describe Active Traffic Management.** Managed Lanes are defined by the FHWA as “highway facilities or a set of lanes in which operational strategies are implemented and managed (in real time) in response to changing conditions to preserve unimpeded flow<sup>3</sup>”. The I-95 Express facility is an example of managed lanes, which makes use of several of the strategies listed in **Table 1**, including:

- Convert HOV lanes to HOT lanes
- Variably priced roadways
- Expanded or enhanced bus service
- Transit on special lanes (express lanes, shoulders, etc.)

The I-95 Express is a variably priced toll facility with the toll amount varying depending on the level of congestion. The ultimate result is that mobility can be purchased by motorists who are willing to pay the toll. The I-95 Express also features express bus services, including the existing 95X bus routes and added bus services between Broward County and downtown Miami. Another feature of I-95 Express is the free usage afforded to registered carpools, vanpools and motorists using hybrid vehicles.



**Managed lane improvements have proven to provide a cost-effective solution to congestion** and can take various forms to cater to constraints that vary from facility to facility. The I-95 Express is a multimodal, revenue-generating form of managed lanes that, as described below, provides the desired result of improving mobility with minimal encroachment into the previous operation of a major regional facility within southeast Florida.

### Benefits of Managed Lanes

#### System Performance

**The primary benefit of managed lanes improvements is the resulting travel time on the improved roadway. A secondary benefit is the revenue collected from the tolls.** These benefits are enhanced by the typically low cost of implementation, relative to the construction or expansion of roadways. Various tools have been developed to measure benefit/cost ratios of these improvements, including complex travel demand simulation models and economic benefit/cost models. The areas that have implemented managed lanes have also observed data on the operation of their facilities to assess performance.

3. Federal Highway Administration, US Department of Transportation (2007). *Active Traffic Management: The Next Step in Congestion Management*. Washington, DC



Orange County, California implemented managed lanes that are variably priced toll lanes on its State Route 91 facility. SR 91 represents the first fully automated toll road in the world and the first in the United States to utilize variable tolling indexed against congestion. The facility is 10 miles in length with two lanes operating in each direction. The facility has only two access points, one on each end of the 10-mile segment. Limiting access to the facility is an important feature of managed lanes, as access points typically result in choke points resulting from merging traffic. The speed of traffic on the SR 91 managed lanes averages 60 MPH during the rush hour periods, a 300% increase over the average speed on the adjacent general purpose lanes, which operate at an average 15 MPH. This translates to a time savings for commuters of 30 minutes for a one way trip.

The I-95 Express lanes in Miami-Dade County, which were opened to traffic in the northbound direction in June 2009 have also resulted in significant time savings for motorists, operating at an average 57 MPH during the rush hour, compared to 20 MPH on the formerly managed HOV lane. The general purpose lanes on I-95 have also experienced a mobility improvement from an average 20 MPH during rush hour to 41 MPH after the implementation of the Express lanes<sup>4</sup>.

#### *Revenue*

The benefit of the added revenue from managed lanes, while typically not enough to cover capital costs of implementation, decreases the cost impact and provides funding for operation and maintenance of the facility. The I-95 Express northbound lanes generated \$2.8 million in the first six months of operation, which represents a modest but significant source of revenue that covers approximately 90% of the cost of operation and maintenance of the facility<sup>4</sup>.

#### *Cost*

**The relatively low cost of implementing managed lanes on existing facilities represents a third and important benefit of this type of improvement.** The Georgia DOT has plans to implement managed lanes and has estimated that for conversion of general purpose lanes to managed lanes, the construction cost would be between 10% to 50% less than building new lanes. This is a significant cost savings that can be allocated to other important transportation improvements. The first phase of the I-95 Express between I-395 and the Golden Glades interchange is estimated to cost \$122 million<sup>4</sup>. No additional right-of-way needed to be acquired for this project. Right-of-way acquisition typically represents a significant cost, particularly in the area adjacent to I-95 in Miami-Dade County. It is estimated that the addition of one general purpose lane in each direction between I-395 and Golden Glades would cost more than \$500 million, given the extensive right-of-way acquisition that would be necessary and the high cost of constructing an elevated facility.

With the cost of converting existing facilities to managed lanes at a mere fraction of the cost of expanding roadways, and the documented mobility improvements associated with this type of improvement, the **implementation of managed lanes on a wider scale is a desirable strategy.**

---

4. Florida Department of Transportation, District Six (2009). *95 Express Midyear Report*. Miami, FL





**Miami-Dade County Core Network**

The core highway network in Miami-Dade County consists of 420 centerline miles of major arterial roadways and 256 centerline miles of freeways. These facilities serve as the backbone of the County’s roadway network.

The projected performance of the County’s transportation system in the year 2015, based on projected 2015 population and employment figures, was simulated in a travel demand computer model to forecast and analyze system performance for the next 5 years. The transportation networks in this simulation include improvements that are fully funded in the County’s five year Transportation Improvement Program (TIP). The County’s roadways are expected to accommodate more than 9 million trips in the year 2015 which, given the capacity of the roadways with committed improvements, will consume between 70% to 91% of the County’s core roadway capacity. **Table 2** includes the rush hour levels of service (LOS) on the core network simulated for 2015, which serve as a measure of congestion. LOS A signifies freeflow conditions, while LOS F signifies gridlock. The network was separated between north and south of SR 836, which indicates significantly higher levels of congestion in the south part of the County than in the north. This is due to the prevalence of residential growth expected in south Miami-Dade County.

The overall LOS for the major roadways in the south are approaching LOS E, indicating a strong need for improvements in that part of the County. In the north, the overall level of service is LOS C, indicating somewhat congested conditions, with a significantly lower level of service on the arterial facilities. **Figure 2** depicts the rush hour levels of service (LOS) on these facilities, with the warmer colors representing higher levels of congestion. This clearly depicts the problematic areas in the County with respect to traffic conditions.

**Table 2. Rush Hour Level of Service (LOS)**

	Centerline Miles	Volume/Capacity Ratio (North of SR 836)	Volume/Capacity Ratio (South of SR 836)
Freeways	256	0.70 (LOS B)w	0.86 (LOS D)
Arterials	420	0.79 (LOS C)	0.91 (LOS E)
Total	676	0.74 (LOS C)	0.89 (LOS D)





Figure 2. 2015 Level of Service (LOS) for Freeways and Major Arterials

**Legend**

- 0.00 - 0.70 (LOS A/B)
- 0.71 - 0.80 (LOS C)
- 0.81 - 0.90 (LOS D)
- 0.91 - 1.00 (LOS E)
- More than 1.00 (LOS F)



### Potential Short Term Improvements in Miami-Dade County

A combination of tolling, express lanes, and transit services similar to the operation of the I-95 Express managed lanes represents a cost efficient and cost effective strategy to meet the demand on the transportation system. At a relatively minimal cost of implementation in most cases, this strategy provides a feasible approach that has proven to yield the desired result of mobility improvements. Managed or special use lanes improvements can, however, be implemented and operated in a variety of ways, including the following:

- High Occupancy Vehicle (HOV) Lanes
- High Occupancy Toll (HOT) Lanes (i.e. I-95 Express)
- Variably Tolloed Lanes/Facilities
- Shoulder Bypass Lanes (i.e. for transit vehicles)
- Reversible Lanes

For the HOV and HOT lanes options, the optimal strategy is to convert existing general purpose lanes and/or shoulders to managed lanes, as is being done on the I-95 Express project. This strategy is relatively inexpensive, easy to implement, and highly effective, as demonstrated on I-95. The I-95 Express configuration, which preserves all general purpose lanes, converting only the shoulder and HOV lane to managed lanes, is not necessarily feasible on all core network facilities due to right-of-way constraints. General purpose lanes can also be converted to managed lanes, depending on projected volumes on a case by case basis.

In a 2005 Special Use Lanes study, the MPO identified a number of facilities for which special use lanes have been conceptualized. **The facilities recommended for managed lane improvements include major arterials and freeway facilities that typically exhibit high volumes of traffic in rush hour periods. Some of these facilities are candidates for transit service and HOV improvements, but not tolling,** due to the multitude of access points. **Figure 3** depicts these and other facilities which have since been identified as candidates for special use lanes improvements as part of the long range plan development. Also depicted are planned transit improvements and multimodal or park-and-ride facilities critical to the successful operation and use of transit services in the County.

Managed lanes in the 2035 LRTP comprise 99 centerline miles of improvements. Approximately 27% of those improvements are cost feasible in the long range plan, while 61% are cost feasible for pre-construction costs only (planning, design, right-of-way). The remainder of the facilities are unfunded. The improvements depicted in **Figure 3** include planned and conceptualized corridors for managed lanes improvements that have been studied and analyzed to varying degrees, with the exception of the section of the HEFT between SR 836 and US-1 in Florida City. While not proposed in the LRTP or special use lanes studies, improvements on this facility would provide critical mobility enhancements in one of the fastest growing sectors of the County, south of Kendall.





*Potential*  
**Figure 3. Planned and Conceptualized Corridors for Managed Lanes and Premium Transit Improvements**





The benefits of managed lanes improvements are clearly demonstrated in the performance of the I-95 Express lanes, which, when analyzed in terms of time savings, have proven to save commuters traveling the full 10 miles between I-395 and the Golden Glades Interchange between 11 and 15 minutes for a one-way trip<sup>5</sup>. This equates to annual time savings of 130 hours per motorist traveling on I-95 to commute to and from work. In economic terms, this time savings could provide 3 full work weeks of additional productivity in the workplace, a major economic and personal benefit. County residents were surveyed in a public feedback study on the I-95 Express project; almost 80% responded that the new managed lanes provide a more reliable option than the general purpose lanes and 60% of residents familiar with the managed lanes responded that they would like to see more managed lanes improvements in the County.

### Next Steps

**The implementation of Managed Lanes and associated transit service and infrastructure improvements can be accomplished in a short time frame,** given the relative simplicity of the improvements with respect to construction and implementation. Further study is required to identify those facilities that are most in need of improvement and have sufficient right-of-way to implement managed lanes with minimal encroachment into the existing general purpose lanes. Once the facilities are prioritized, LRTP amendments may be necessary to include the improvements in the plan and funds must also be allocated.



5. Ibid.



