Paying for Predictability

U.S. Managed Lanes Projects

Special Report

Building a Highway System for the Next Generation: The social and economic costs of further highway expansion in urban areas are high. A managed-lane (ML) approach allows policymakers to more effectively manage demand provided there are other transport alternatives. As congestion levels rise, Fitch Ratings expects to see more of these projects, coupled with improved transit options as ML projects by themselves may not be able to solve congestion over the longer term.

Driver Response to Pricing Demystified: At the early stage of development, a lack of data presented serious challenges to the financing of managed lane (ML) projects. Existing congestion levels are now better understood based on 16 years of history on the 91 Express Lanes project and data from the Federal Highway Administration (FHWA) and Texas Transportation Institute (TTI), which measure road performance on a regular basis. Recent empirical data also adds clarity on how drivers respond to changing conditions and price.

A Sound Foundation with Some Volatility: ML projects have a robust traffic base to build from, but will prove more volatile than a typical toll road. While urban roads are much more resilient to economic conditions and fuel prices than other types of toll roads, small changes in general purpose lane (GPL) volume leads to bigger changes in travel times, magnifying the impact on MLs.

Conservative Assumptions: Free flow capacity varies by roadway and is heavily influenced by traffic composition. Likewise, ML capture rates can also vary within a project, depending on roadway configuration. To account for these variances, Fitch will utilize conservative capacity thresholds, ML capture rates, and corridor growth rates when constructing base and rating case scenarios. Scenarios will also reflect performance differences by project segment.

Sensitivity Analysis Is Key: When analyzing ML projects, Fitch conducts various sensitivities. Fitch's analysis shows that changes in price and GPL volumes have bigger impacts on projected revenue than changes in capture rates.

Related Research

Fitch Affirms North Tarrant Express Mobility Partners, LLC Revs at 'BBB–'; Outlook Stable, Dec. 16, 2011

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Fitch Affirms Orange County Trans Auth's (CA) 91 Express Lane Rating at 'A', Dec. 7, 2011

Downshifting: U.S. Transportation Reacts as GDP Growth Flattens, Sept. 7, 2011

Fitch Affirms LBJ Infrastructure Group LLC Rev Bonds at 'BBB–'; Outlook Stable, June 2, 2011

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Urban Highway Expansion Is Becoming Costly and Complicated

Policymakers have dealt with growing urban congestion in phases over the last four decades. Phase I included a significant expansion of the highway system. Phase II focused on adding high occupancy vehicle (HOV) lanes to encourage more efficient use of the highway system given the social and economic cost of expansion.

As traffic volumes increase, policymakers continue to struggle with the cost of expansion versus rising congestion levels. The emerging phase III appears to build on phase II by converting existing HOV lanes into MLs — highway lanes where vehicles with one or two passengers (HOV2+/HOV3+) ride free and cars with a single occupant (SOV) pay a toll set to keep the MLs operating at free flow speeds. In many cases, existing HOV lanes are underutilized. Converting them into an ML configuration adds capacity and makes the asset more efficient for moving vehicles.

Many transportation officials see managed lanes as an increasingly viable option, particularly as state departments of transportation (DOTs) and regional transportation agencies experience declining resources for highway expansion and political appetite for increased transit funding is uncertain. In addition to this, urban street networks are at or above capacity. The Virginia Department of Transportation opted for a self-supporting ML application on Interstate 495 (I-495) with a capital cost of approximately $2 billion in lieu of a planned expansion of GPLs with a cost of $4 billion and no toll revenue to cover the additional operating expenses. According to the FHWA, there are many permutations of a ML application, including HOV lanes, value priced lanes, high occupancy toll (HOT) lanes, or exclusive/special use lanes. In this report, an ML project is one that utilizes some form of dynamic pricing on lanes immediately adjacent to free GPLs.

As state DOTs evaluate potential ML projects, each will have its own unique set of policy objectives and challenges that affect potential revenue generation. Some may allow bus rapid transit (BRT) on the MLs. This may be a low-cost public transportation solution that may ultimately move more people, but it will reduce ML capture rates and revenue since buses limit the SOV capacity that the project can sell and will also result in slower ML speeds, thus diluting the value to an SOV. Others may opt for an HOV2+ policy where cars with one passenger are free, again reducing the SOV capacity the project can sell, and possibly making violation enforcement more challenging. Finally, a tolling strategy that maximizes total corridor throughput rather than revenue may also be desired. It is important that project sponsors and lenders recognize that ML projects are not one-size-fits-all, and Fitch will evaluate each project on its own merits.

An ML Application Allows Policymakers to Manage Demand

The capacity of transportation assets is not infinite and each additional vehicle beyond free flow capacity does impose an economic cost. Shaping the price based on usage is an economic concept conceived to alleviate, if not eliminate, the economic loss associated with congestion. This is analogous to the pricing strategy employed by parking garages, airlines, major sports leagues, and even some transit systems. Under this model, high-value trips pay for certainty, while lower value trips either take longer due to congested GPLs or occur in off-peak hours. In the end, the true cost of a trip is revealed.

The primary goal of utilizing this strategy on a public highway is to encourage the most efficient use of a finite resource. Many urban highways operate at or above capacity during prime

Related Criteria

Rating Criteria for Infrastructure and Project Finance, Aug. 16, 2011

commuting hours, meaning their performance is poor. Given the urban nature of these facilities, adding more capacity can be costly because of right-of-way constraints. In addition, this may not be the most effective policy choice as the new capacity will encourage additional demand that the adjacent urban street network can not handle, resulting in congested conditions reappearing in the near future.

Implementing a pricing framework should result in lower value trips diverting to public transportation, taking longer or occurring in off-peak periods when there is sufficient roadway capacity. Higher value trips will opt for the certainty of the MLs, for a price. This approach has been embraced by DOTs as evidenced by the plethora of projects that have come along over the last several years (*see table below*). While MLs can provide congestion relief, improved transit options may be required over the longer term to allow economic growth to continue at historical rates.

Managed Lanes Project History

Facility	Location	Year of Opening	Configuration	Pricing Approach
91 Express Lanes	Orange County, CA	1995	2x2	Maximize Throughput and Meet Financial Obligations
I-394	Minneapolis	2005	2 Reversible	Maintain Free Flow
I-25	Denver	2006	2/3 Reversible	Maintain Free Flow
I-15	San Diego	2008	4 with Moveable Barrier	Maximize Total Throughput
I-95	Miami	2008	2x2	Maximize Total Throughput
I-10	Houston	2009	2x2	HOV/Transit Maximization
I-85	Atlanta	2011	1x1	Maintain Free Flow
I-495	Northern VA	Expected 2012	2x2	Revenue Maximization
I-595	Fort Lauderdale, FL	Expected 2014	2x2	Maximize Total Throughput
I-635	Dallas	Expected 2013–2016	2x2	Revenue Maximization
SR 820	Fort Worth, TX	Expected 2015	2x2	Revenue Maximization
US 36	Denver	Under Development	1 Reversible	Maintain Free Flow
I-95	Northern VA	Under Development	3 Reversible	Revenue Maximization
SR-91 Extension	Riverside County, CA	Under Development	2x2	Revenue Maximization

HOV – High occupancy vehicle.
Source: Fitch.

Existing Congestion Levels and Driver Behavior Better Understood

Macro Level Data Provides a Basis for Analysis

For more than a decade, the 91 Express Lanes in Orange County, CA, provided the only empirical evidence for highways supporting the concept of managing demand through price. And, since the project essentially serves as a land bridge, it was not viewed as an ideal comparator when looking at other stretches of congested urban highways with more ingress/egress options. As more projects entered the development stage, many in the marketplace felt that the lack of data presented a serious challenge to the viability of project financing. It has been Fitch's view that a close evaluation of asset performance, coupled with a growing source of data from the FHWA and TTI and empirical data from operating projects does provide information to help understand how drivers will respond to a managed lane configuration. What is less certain is how price-sensitive drivers will be.

Current projections and empirical data indicate pricing multiples of 3x for short distances or short periods of time relative to other tolled assets. However, there may be some relationship between average peak hour ML prices and rates on toll facilities that act as congestion relievers. Average ML rates well in excess of these rates may be difficult to justify. On a

number of toll roads in the U.S., toll rates are at or exceed 30 cents/mile, almost 3x the super peak rate of 98 cents/mile on the 91 Express Lanes.

Since the decision to take a managed lane is driven by price, understanding the value of the service provided (travel time savings and travel time predictability) is critical. The closer peak-hour speeds and travel times are to the free flow condition, the lower the value proposition to the user, which results in lower toll rates, lower revenue, and less public sector value from the investment.

There are a number of ways to evaluate road performance from a macro perspective, including more recent data collected by the FHWA. The FHWA looks at several measures to capture the level of congestion, including the planning time, the planning time index, and, the buffer index. Planning time is defined as the 95th percentile of observed travel times. The planning time index reflects how much larger the planning time, or "buffer," is compared with "free flow" travel time. The buffer index is the size of the buffer as a percentage of the average travel time, or the 95th percentile minus the average, divided by the average. This data can help analysts understand existing conditions and form a view of the macro picture.

In addition data showing the composition of traffic (heavy goods vehicles [HGVs] versus passenger cars) is important as a higher percentage of HGVs will affect driver behavior, acting to slow traffic. Where HGVs are present, traffic slows due to more limited sight and spacing between lanes that creates a passenger car equivalent (PCE) of 2.0x or greater depending on size of the HGVs and the grade of the road section. The introduction of BRT on a ML project could have the same slowing effect, within the ML, meaning fewer vehicles can be allowed into the ML.

The alignment of the road is also important since grades and curves can lead to lower free flow capacity as drivers naturally slow when going through a curve or driving up an incline. In addition, sections that involve weaving as a result of interchanges or exit ramps to critical arterials also act to lower free flow capacity and lead to queuing. An FHWA report on traffic and congestion reliability states that vehicle merging "has the most severe effect on traffic flow, with the exception of really bad weather." Likewise, downstream features of the road network, along with future roadway expansion and/or improvements, also need to be evaluated since they can also affect free flow capacity.

On the capacity side, FHWA reports indicate that a straight lane of highway with a posted speed limit of 55 miles per hour (mph) and ideal geometric and traffic conditions is thought to accommodate 2,200 passenger cars per lane per hour (v/l/h). Once roadway alignment, weaving, and HGVs are taken into consideration, the theoretical capacity of most urban highways can fall significantly, especially given the number of exit ramps and interchanges over short distances. In Fitch's view, 2,200 v/l/h is a conservative measure of capacity when developing volume/capacity ratios for projects with HGVs or a less than ideal configuration. Fitch may use a higher capacity measure for long, straight, and flat segments of road. Most ML facilities preclude the use of MLs by HGVs. Where HGVs are allowed to use the MLs, Fitch will closely analyze the value proposition as HGVs tend to be more price-sensitive.

Empirical Data More Readily Available

Beyond macro level data on general congestion levels, empirical data on other projects is now becoming available. Review of publicly available information on the Interstate 95 (I-95) MLs in Miami-Dade County, FL reveal that high-value trips do respond to congestion by switching to the MLs.

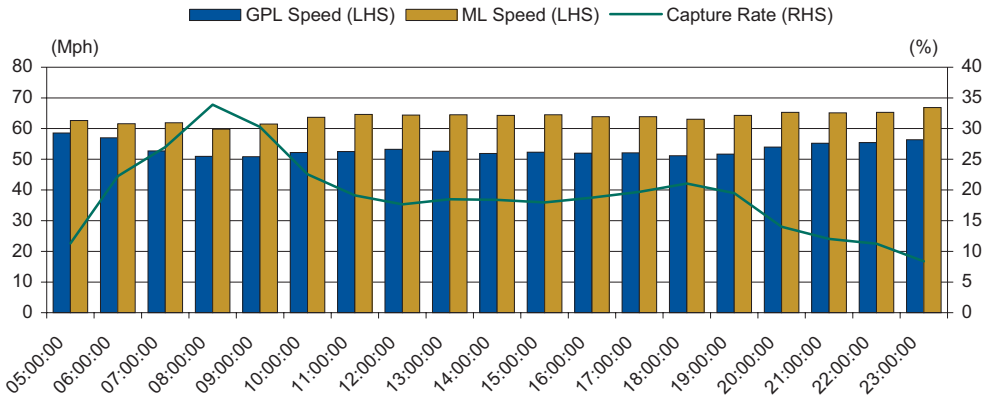
Fitch evaluated count data in 15-minute increments for GPLs and MLs at three locations in the southbound and northbound directions over a 12–14 moth period. Data selected was the first full week of each month over the 12–14 month time frame. Fitch also analyzed related GPL and ML speed data and calculated hourly volume-to-capacity (VC) ratios and capture rates. What can be seen in the charts on pages 6–7 is that at GPL speeds below 40 mph, ML capture rates approach and exceed 30%. What is also evident is how different performance can be by segment.

In the northern section, southbound traffic has a VC ratio of between 70% and 80% during the morning peak, with GPL speeds of just over 50 mph and capture rates of between 27% and 33%. In the middle segment, the VC ratio ranges between 113% and 117% during the same time and GPL speeds drop below 40 mph, but the capture rate is nearly identical. At the southern end, the VC ratio ranges between 101% and 123% with GPL speeds of between 47 mph and 62 mph and the ML capture rate still ranges between 29% and 31%.

GPL speed appears to be the most significant driver of behavior. As seen in the charts below, speeds remain at or above free flow conditions despite heavy volumes in the middle of the day. This may be due to different driver behavior during the middle of the day, with less weaving at major exit ramps, allowing for more vehicles at free flow speeds than during the morning and evening peak periods. However, it does indicate that drivers are willing to pay for predictability even when the GPLs are performing, since the ML capture rate does hover at 20% during the nonpeak period between the morning and evening rush hours.

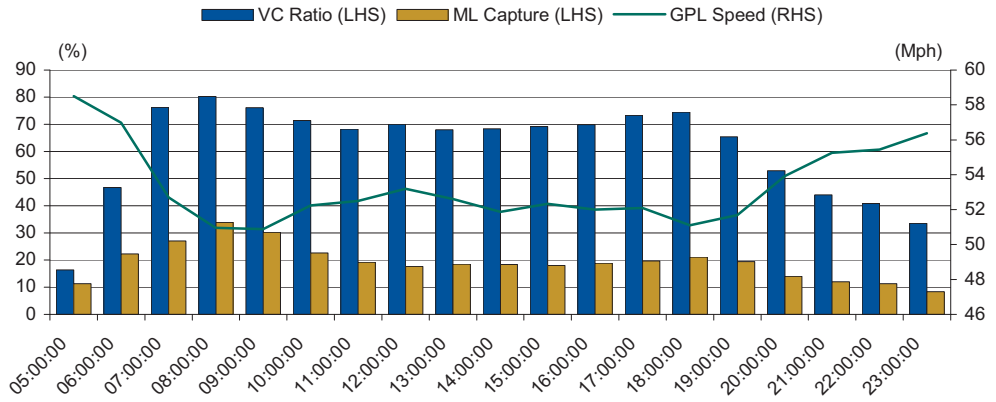
The toll policy embraced by the Florida Department of Transportation (FDOT) is set to maximize throughput of the overall corridor and not maximize revenue; the ML capture rates reflect this. They are also reflective of an “HOV2+ = free” policy. Under a revenue maximization scenario, ML capture rates would likely be lower, particularly in the shoulder and midday period as toll rates would likely be higher than what FDOT currently charges. Most importantly, the data is a second piece of evidence that congestion pricing does change behavior and can be used to manage demand.

Southbound Traffic at Northern End of Project



ML – Managed lanes. GPL – General purpose lane.
Source: Florida Department of Transportation.

Southbound VC Ratio and Capture Rates — Northern End

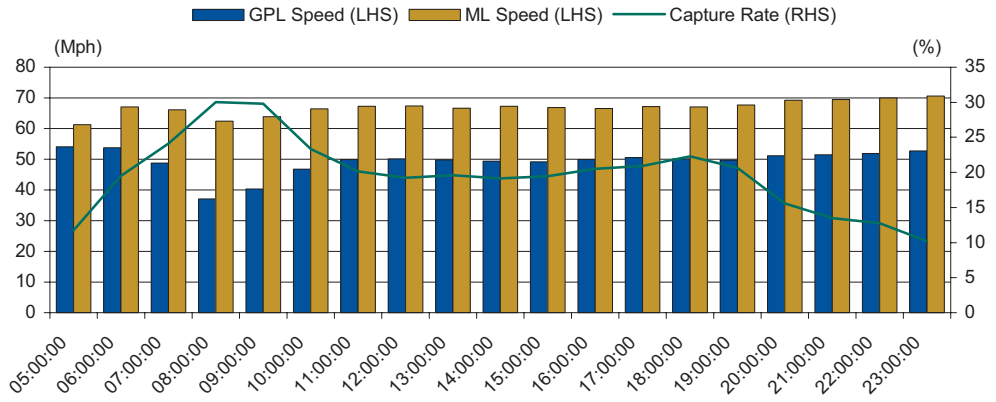


VC – Volume to capacity. ML – Managed lanes. GPL – General purpose lane.
Source: Florida Department of Transportation.

Southbound traffic on the northern end of the project exhibits different characteristics than the middle or southern segments:

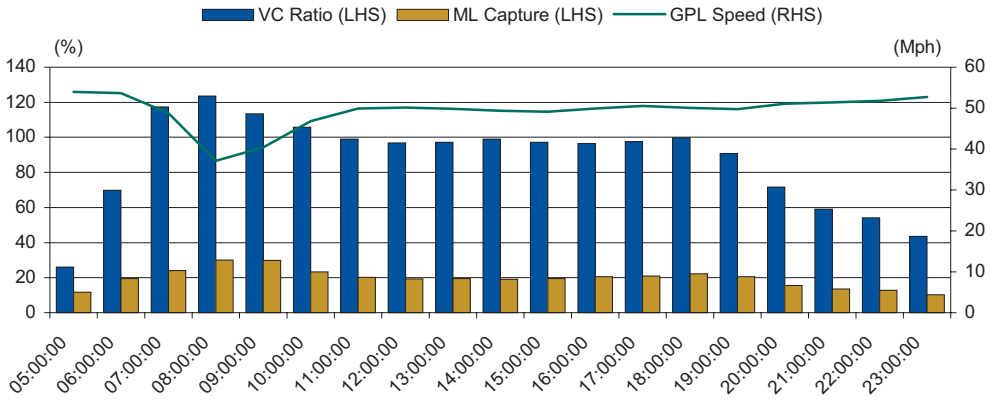
- ML speed consistently at or above 60 mph.
- In the morning peak, capture rates jump despite GPL speeds of 50 mph.
- Despite speeds in the low 50 mph range and reasonable VC ratios, capture rates remain at 20%.

Southbound Traffic at Middle of Project



ML – Managed lanes. GPL – General purpose lane.
Source: Florida Department of Transportation.

Southbound VC Ratio and Capture Rates — Middle Segment

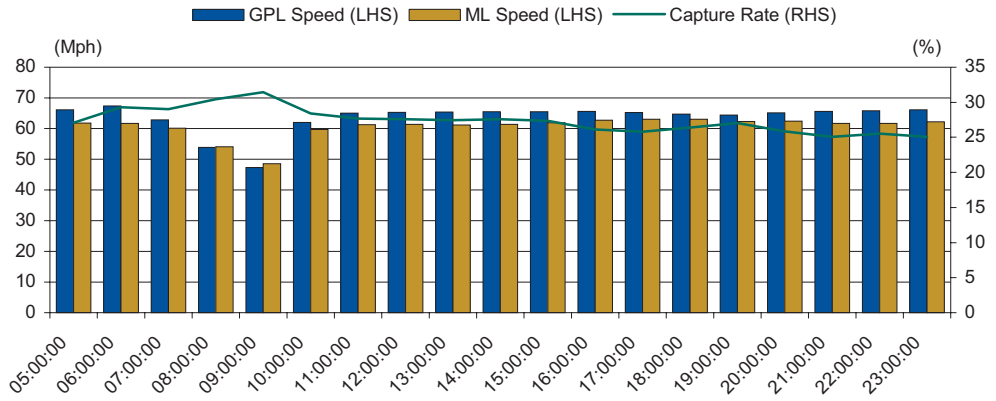


VC – Volume to capacity. ML – Managed lanes. GPL – General purpose lane.
Source: Florida Department of Transportation.

The middle segment is more congested during the morning peak, but ML capture rates are not that different:

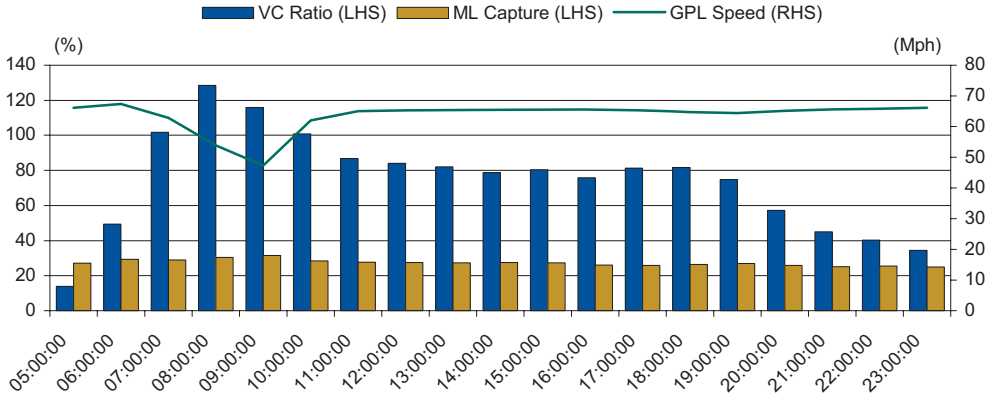
- The VC ratio is approximately 120% in the morning peak.
- GPL speed falls below 40 mph in the morning peak.
- Despite significantly slower GLP speed than in the northern section, ML capture rate does not exceed 30%.
- Similar to northern end, capture rates in the middle of the day stay at approximately 20%, possibly due to HOV usage.

Southbound Traffic at Southern End of Project



ML – Managed lanes. GPL – General purpose lane.
Source: Florida Department of Transportation.

Southbound VC Ratio and Capture Rates — Southern End



VC – Volume to capacity. ML – Managed lanes. GPL – General purpose lane.
Source: Florida Department of Transportation.

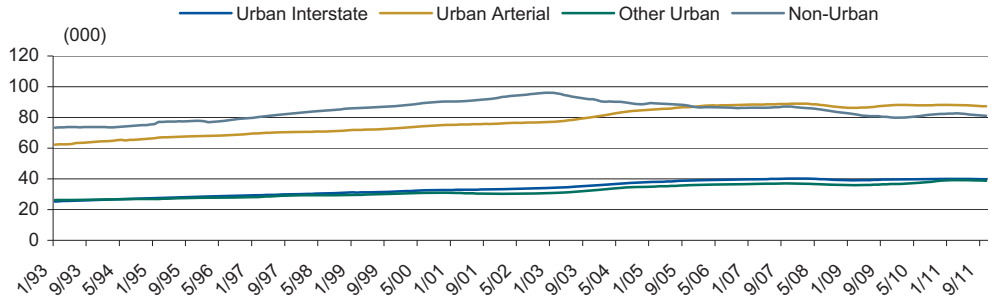
Both ML and GPL peak hour speeds are slower on the southern end, hinting at more congestion:

- The VC ratio hits a maximum of more than 120% in the peak period.
- Both ML and GPL speeds fall below 50 mph during morning peak, triggering the highest capture rates.
- Despite limited difference between GPL and ML performance in the middle of the day, the ML capture remains at 20%.
- Similar to northern end and middle segment, capture rates in the middle of the day stay at approximately 20%.

ML Projects Have Sound Foundation, but Will Be More Volatile

The impact of the global financial crisis and rising fuel costs were particularly harsh in Orange County, CA. Total 91 Express Lanes traffic dropped by 5.5% between 2007 and 2011, but ML traffic dropped by 17.2%, or three times as much. However, ML toll revenue is only down by 12.6% due in part to inflationary adjustments to nonpeak hour toll rates, the MLs ability to capture some GPL traffic at a lower price, and changes in the shoulder hour volume. In 2007, the highest super-peak rate was $10.25. As of February 2012, it is $9.75. GLP volume changes do have a significant impact on ML volumes, but drivers will still pay for travel time certainty; it is just a question of price.

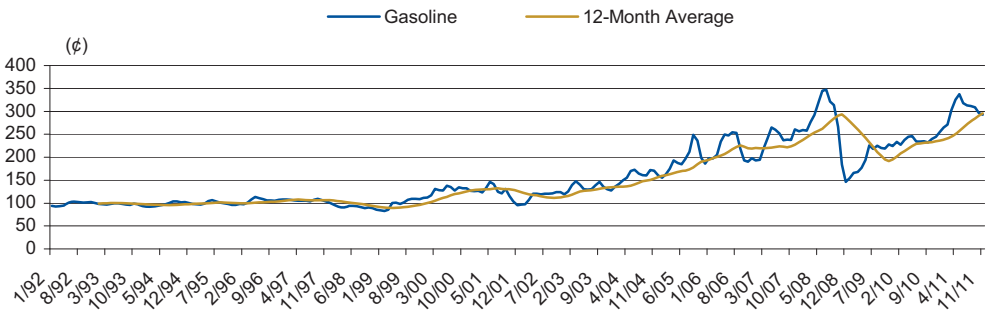
12-Month Moving Average by VMT Component
(1993 to Present)



VMT – Vehicle miles traveled.
Source: Federal Highway Administration.

As seen in the chart above, vehicle miles traveled (VMT) on urban road segments has shown slow but relatively steady growth over time (a CAGR of about 2.5%) and less volatility to high fuel prices and economic conditions. The chart below highlights just how much fuel prices have changed over the last eight years. In particular, the trend in urban VMT components has shown significant resilience relative to non-urban VMT. Meanwhile, according to the TTI, freeway lane miles have grown at a CAGR of only 0.7% between 1992 and 2010, leading to increasing congestion.

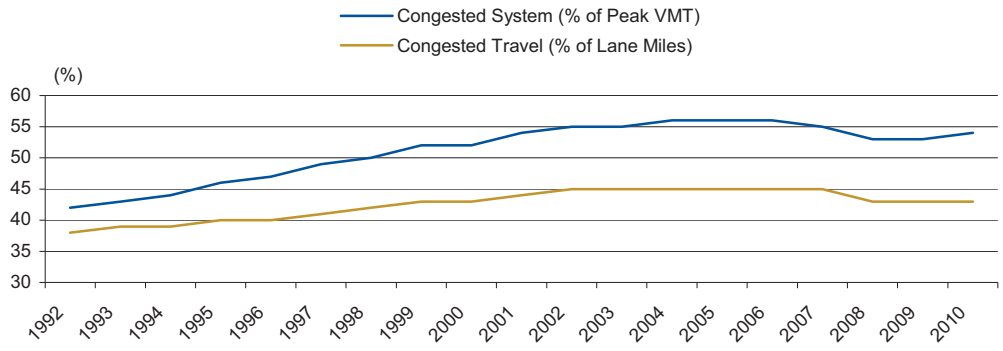
U.S. City Average Price Index for Gasoline



Source: Bureau of Labor Statistics.

The FHWA and TTI have been tracking different measures of congestion over time, with broader measures looking at the percentage of VMT occurring in the peak hours and the percentage of lane miles congested. Data collection on monthly delay hours in 20 U.S. cities began in 2007. While overall congestion levels have dropped from their peak in 2007 (*see the chart below*), congestion levels have begun to increase again, and Fitch expects this trend to continue as economic growth begins to take hold.

TTI Congestion Measurement



VMT – Vehicle miles traveled.
Source: Texas Transportation Institute (TTI).

Despite the resilience of urban traffic volumes over the past several years, the data from the Florida I-95 project and from the 91 Express Lanes indicate how sensitive ML traffic is to small changes in GPL performance. In the case of the SR-91, a combination of an additional GPL, fuel prices, and the implosion of the subprime lending business resulted in less corridor volume and higher speeds on the GPLs. This 1.6% reduction in total traffic in fiscal 2011 translated to a 9.6% reduction in overall ML volumes.

As shown in the table below, small changes in total volume on the I-95 project between 7:00 a.m. and 8:00 a.m. and between 3:00 p.m. to 4:00 p.m. lead to big changes in overall performance, causing congestion and stimulating ML demand. At 8:00 am, a 5.3% increase in total volume reduced GPL speed by 3.3% and increased the ML capture rate by 25.5%. In the afternoon, a 3.5% increase in total volume reduced GPL speed by 19.5% and increased the ML capture rate by 8.3%.

The key takeaway here is that while urban roads are generally more resilient to economic conditions and fuel prices than other types of toll roads, small changes in volume lead to bigger changes in performance, meaning ML projects will experience significant changes in volume and pricing power. At GPL speeds above 50 mph, capture rates and pricing power is much more limited than at speeds of 35 mph to 40 mph.

Northern End of Project

Time	v/l/h	Cumulative % Change	GPL Speed	Cumulative % Change	ML Capture	Cumulative % Change
Southbound						
07:00:00	1,676		52.7		27.0	
08:00:00	1,765	5.31	51.0	(3.30)	33.9	25.52
09:00:00	1,675	(0.10)	50.9	(3.44)	30.2	11.97
Northbound						
15:00:00	1,788		55.2		25.5	
16:00:00	1,850	3.48	44.4	(19.46)	27.6	8.25
17:00:00	1,790	0.14	34.5	(37.48)	28.2	10.70
18:00:00	1,875	4.86	33.8	(38.83)	28.3	11.14

v/l/h – Passenger cars per lane per hour. GPL – General purpose lane. ML – Managed lanes.
Source: Florida Department of Transportation.

Fitch's Analytical Approach Utilizes Conservative Assumptions

From Fitch's perspective, ML projects are brownfield not greenfield, and therefore, are more dependent on organic economic growth in the urban area, particularly employment. Once a view on economic growth has been formed, Fitch will focus its traffic analysis on understanding the combination of "price" and the point at which GPL speeds and VC ratios trigger drivers to switch to the MLs. As described above, these decision points are influenced by a number of factors, including: road alignment; the percentage of HGVs on the road; the presence of major interchanges; overall economic conditions; planned improvements to the road network; and most importantly, level of service goals and HOV/BRT policy choices. Fitch's analysis will be tailored to each project as these factors can lead to very different revenue profiles and thus need to be accounted for on an individual basis.

The approach to evaluating traffic and revenue sensitivity is somewhat top-down. Fitch starts by analyzing employment patterns in the area, along with overall growth on the facility since employment and urban VMT can be highly correlated. Fitch assumes that future corridor growth will continue, albeit slowly given the trends outlined earlier, and that growth will be influenced by expectations for employment. That said, highways do have capacity limits and Fitch may assume that growth rates in the peak hours slow over time, especially where VC ratios are in excess of 100% and speeds are below 40 mph.

Fitch recognizes that the addition of MLs may increase overall road capacity and can induce some traffic and, thus where there is a strong and clear argument Fitch may reflect a small one-time increase in overall corridor volume when the facility comes online. Fitch will utilize a conservative estimate of highway capacity (i.e. 2,200 v/l/h) when applying capture rates at specific volume to capacity ratios. Capture rates (the percentage of corridor traffic that chooses the ML) at specific VC ratios will be developed on a case-by-case basis, but will be informed by empirical data from other facilities and HOV/BRT policy. Fitch may also assume that HOV3 vehicles utilize the MLs at greater rates over time. It is Fitch's expectation that ML revenue will behave like a derivative, meaning as GPL volume grows, ML revenue will grow at faster rates. Likewise, when the amount of GPL traffic declines, ML traffic and revenue will drop more.

Given this volatility, higher liquidity levels throughout the life of the debt are critical to help support cash flow during periods of economic weakness. All else being equal, an ML project rated 'BBB' needs to have more financial flexibility either in the form of structured liquidity or a highly flexible debt structure than a typical toll road given the potential volatility in annual cash flows. However, if congestion levels truly exist, ML project risk is more a function of finding the right price point.

Sensitivity Analysis Is Key

In thinking about sensitivities, Fitch will look at a 25% or more reduction in price across peak and interpeak periods. Additionally, Fitch will run a shock test during the operational phase to see how the facility responds to a significant reduction in volume (approximating the impact of a network improvement or economic slowdown) with slow growth thereafter. Sensitivities on ML capture rates will also be conducted. The charts below visually demonstrate a hypothetical Fitch traffic analysis.

The "base" assumption is a 4x4 GPL facility with two MLs in each direction and toll policy set to allow free passage for HOV3+. There is no BRT application and HOV usage is limited. Traffic is generally balanced in both directions with strong morning and evening peak periods. Chart 1 below demonstrates how total corridor growth evolves over a 40-year period, and how this growth affects ML growth and market share.

ML Capture Rates

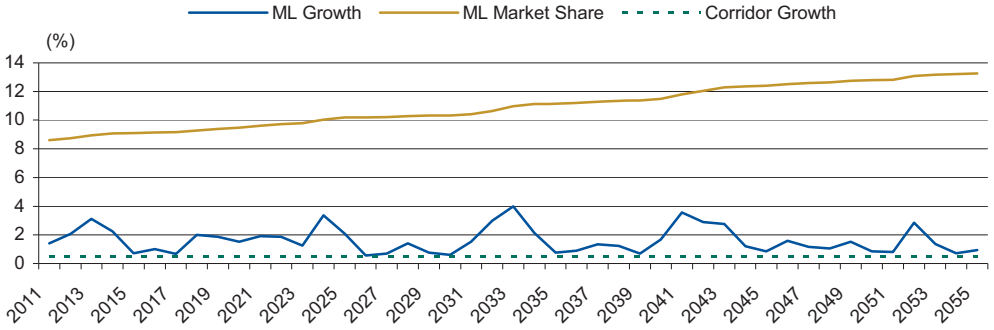
(%)

VC Ratio	Capture Rate
5.00	0.00
10.00	0.50
15.00	1.00
20.00	2.00
25.00	2.50
30.00	3.00
35.00	3.00
40.00	3.00
45.00	3.50
50.00	4.00
55.00	5.00
60.00	6.00
65.00	6.50
70.00	7.00
75.00	9.00
80.00	10.00
85.00	10.50
90.00	12.00
95.00	12.00
100.00	15.00
105.00	17.00
110.00	20.00
115.00	26.00
120.00	26.00
125.00	27.00

ML – Managed lanes. VC – Volume to capacity.
Source: Fitch.

The ML Capture Rates table to the left highlights the VC ratios and related capture rates used to develop the hypothetical base scenario and are based on empirical data. A key assumption behind these rates is an assumed toll policy set to maximize revenue. If an HOV2 or a BRT policy is utilized, capture rates for tolled vehicles could be lower.

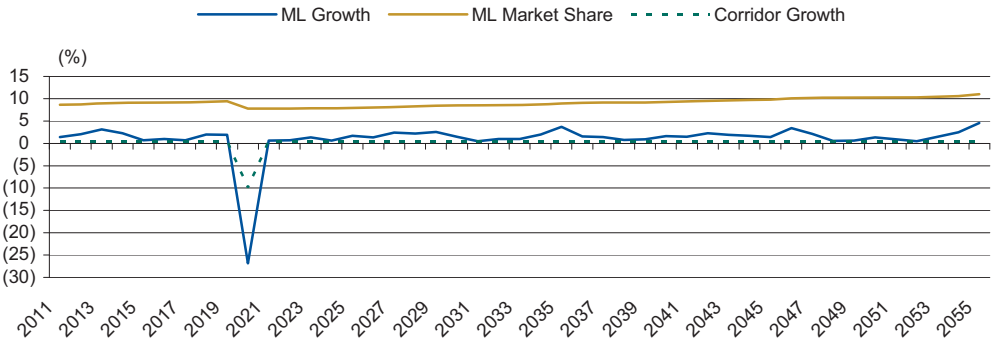
Chart 1: Base Scenario — Managed Lanes vs. Corridor Growth Rates and Market Share



ML – Managed lanes.
Source: Fitch.

Chart 2 reflects the same assumptions as Chart 1, except it demonstrates the impact of a one-time drop in corridor traffic of 10%, approximating a significant change to the network, an economic downturn, or a change in commuting patterns. Chart 3 shows the impact of a 10% reduction in the base capture rate assumptions shown above while Chart 4 shows the gross revenue line associated with the base scenario and three sensitivities: the 10% reduction in growth; the 10% reduction in capture rates; and a 25% reduction in opening year toll rates.

Chart 2: 10% Reduction in Corridor Volume



ML – Managed lanes.
Source: Fitch.

Under the base scenario, total corridor traffic grows at 0.05% and capture rates remain constant throughout the 40-year period. This reveals that over time, the growth on the MLs is much higher than total corridor traffic. However, total projected ML volume never exceeds 14% of total corridor traffic (market share). Eastbound ML market share on the SR-91 reached 13% in 2007, but the addition of another GPL and the impact of the global financial crisis reduced this to 12.8% in 2011.

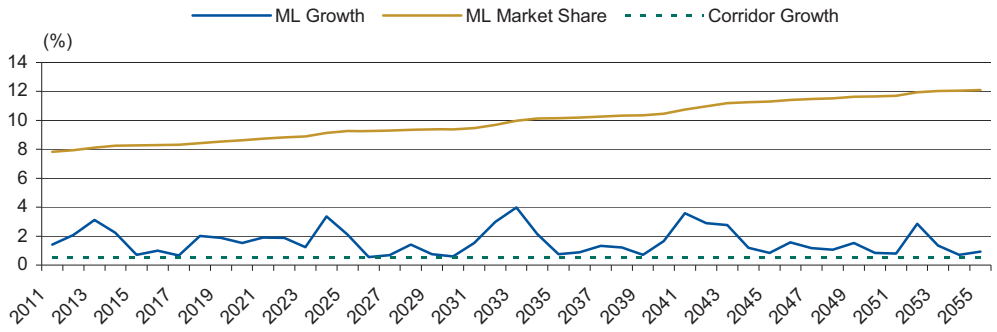
The uneven jumps in ML growth rates indicate periods where the VC ratio triggers the use of the next highest capture rate, meaning that while overall corridor traffic remains the same, more cars are diverting to the MLs. See the table above on the left to see how capture rates change

significantly as the VC ratio moves from 40% to 80% and then again from 100% to 125%. Fitch's approach is conservative in that toll rates simply grow at 1% above inflation, when in reality, rates in peak periods would continually be adjusted higher to maintain free flow conditions in the ML.

Chart 2 below shows the effect of a 10% reduction in total corridor volume in 2020 with all other assumptions remaining the same. The impact of this change results in a more than 25% reduction in ML volume, and ML market share only approaches 10% in 2051. This sensitivity also results in a 48% reduction in revenue from the base scenario. In this situation, management has two options: leave toll rates relatively high and have much less volume, or bring toll rates down significantly to maintain volume. Either way revenue will be greatly reduced.

Chart 3 demonstrates ML sensitivity to changes in capture rates. A 10% reduction in the ML capture rates shown above reduces the ML market share from the base scenario. Essentially, ML market share grows at a slower rate, achieving a market share of nearly 12% by 2051 compared with the base scenario market share of approximately 13%. While the capture rates are not that different, this does result in a 10% reduction in revenue by 2051.

Chart 3: 10% Reduction in ML Capture Rates

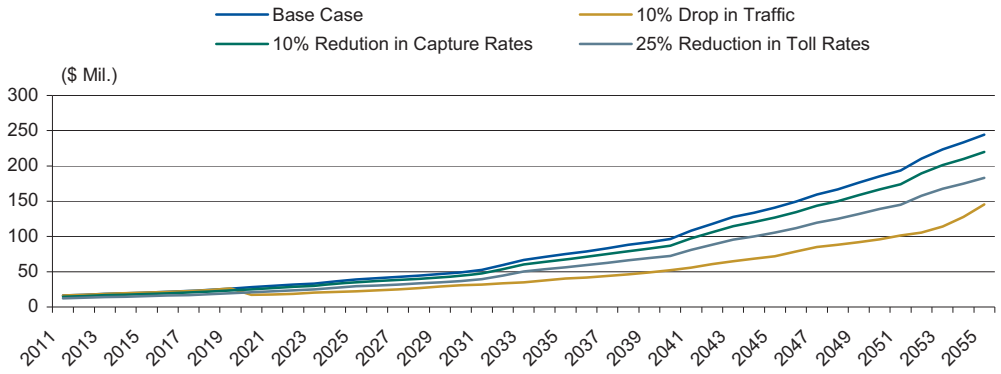


ML – Managed lanes.
Source: Fitch.

The final sensitivity is a 25% reduction in the initial toll rates from the base scenario, with future increases left unchanged. This results in a 25% reduction in revenue in 2051. Chart 4 below shows gross revenue associated with each of the sensitivities. What is clear is that the one-time drop in 2020 corridor volume has the greatest impact on revenue as 2051 revenues would be 48% below the base case. Such a drop in traffic will also result in a drop in pricing power. However, as demonstrated in the VMT data at the beginning of this report, and in other reports published by Fitch, volume on urban roads tends to be much more resilient to economic downturns, meaning that corridor traffic loss is less likely to exceed 10% and should be followed by subsequent growth. However, more fundamental changes in the network due to additional GP lanes, elimination of downstream bottlenecks, and shifts to transit would be permanent.

ML projects aren't the solution to all congestion problems, especially where reversible GPL lanes or transit are cost-effective alternatives. Depending on the situation and long range transportation plan, Fitch may assume a future network change or lower capture rates and pricing power over time to reflect these risks. Where transit and reversible lanes are not viable options, ML capture rate assumptions will be held constant. If BRT and HOV2 policies are utilized, the capture rates and starting place will likely be lower than the hypothetical base case above. Also, Fitch may assume that bus and HOV usage grows over time.

Chart 4: Revenue Scenarios — Assuming Fitch Rating Case



Source: Fitch.

For more information on Fitch's toll road criteria, please see Fitch's Web site at www.fitchratings.com.