Picking Up the Pace:
An analysis of best practices for improving bus speeds and their potential applicability to Milwaukee
ABOUT THE PUBLIC POLICY FORUM

Milwaukee-based Public Policy Forum – which was established in 1913 as a local government watchdog – is a nonpartisan, nonprofit organization dedicated to enhancing the effectiveness of government and the development of southeastern Wisconsin through objective research of regional public policy issues.

PREFACE AND ACKNOWLEDGMENTS

This report was undertaken to provide citizens, policymakers, and business leaders in the Milwaukee area with information about potential strategies for improving the speed and efficiency of Milwaukee County Transit System bus services. We hope that policymakers and community leaders will use the report’s findings to inform discussions during upcoming policy debates, budget deliberations, and civic gatherings regarding public transportation services and strategies in our region.

Report authors would like to thank the leadership and planning staff of the Milwaukee County Transit System, Milwaukee County Department of Transportation, and the many other organizations throughout the country that provided us with information and insight. Those organizations include the Central Ohio Transit Authority, Chicago Transit Authority, Chicago Department of Transportation, Greater Cleveland Regional Transit Authority, Institute for Transportation and Development Policy, King County Metro Transit, Metropolitan Transit Authority (Nashville), Regional Transportation Commission of Southern Nevada, Southwest Ohio Regional Transit Authority, Southeastern Wisconsin Regional Planning Commission, and Spokane Transit Authority.

Finally, we wish to thank the Helen Bader Foundation for its grant to the Forum for workforce development research, which helped make this report possible.

Cover photo: Cleveland’s HealthLine BRT service features enhanced bus stops that allow for level boarding.
Executive Summary

The Public Policy Forum’s December 2013 report, Getting to Work, described the lack of viable mass transit options available to Milwaukee County residents wishing to access jobs in the suburbs.1 We found that many suburban job centers are not served by transit at all, while others only can be accessed via lengthy bus commutes of more than 60 minutes each way. The findings of that report led us to ask how other metro areas had addressed similar bus service challenges, as well as how they had responded to the general challenge of improving bus service effectiveness and attractiveness.

In this report, we focus on common strategies that transit systems around the country have utilized to enhance the speed and efficiency of their bus services, and consider the potential implementation of those strategies in the Milwaukee area. These strategies may hold promise to improve transit connections for the regional workforce and enhance its appeal to the general population, including those who currently do not use transit. Major sources for our analysis include research conducted by the Transportation Research Board (TRB) of the National Academies and conversations with transit system planners from around the country.

While many of the strategies we examine are relatively small changes that could be made to existing Milwaukee County Transit System (MCTS) bus routes, we also consider larger improvements, including some that could involve substantial capital investment. Among those are bus rapid transit (BRT), a faster and more comfortable type of bus service that can be comparable to light rail systems in speed and design, but that can be implemented at a much lower cost.

Strategies for Improving Bus Speeds

After a decade of service cuts and fare increases, MCTS has managed to stabilize bus services and make several significant improvements over the past few years. A new network of six express bus routes has been developed, for example, and an electronic fare card system recently was introduced that makes boarding and transferring faster and easier.

Milwaukee has not yet implemented many other common strategies that have been adopted in other U.S. metro areas, however, including the following:

- **Increased bus stop spacing.** Some transit systems have established minimum standards for bus stop spacing and eliminated stops as appropriate as a means of improving bus speeds. The Spokane Transit Authority’s Stop Consolidation Plan, for example, resulted in a 35% reduction of total bus stops system-wide. This approach has been found to modestly speed up service and improve on-time performance, though it does require some transit users to travel further to reach the nearest stop.

While MCTS has a stop spacing guideline of \(\frac{1}{8}\) mile for regular bus routes, it is used more as a target than a minimum. Our initial analysis found that 37% of the stop segments on MCTS bus routes are shorter than \(\frac{1}{8}\) mile; and that overall, 30% of stops could be removed without leaving any stops spaced further than \(\frac{1}{4}\) mile apart, which is considered a walkable distance by industry standards. There are legitimate reasons why some bus stops are spaced close together, however, and additional analysis and public input would be required to determine where stops could be removed without unacceptably harming service quality.

- **Limited-stop express service.** In many metro areas, stops on express bus routes are spaced \(\frac{1}{2}\) to \(\frac{3}{4}\) mile apart. For example, the Southwest Ohio Regional Transit Authority in Cincinnati recently introduced an express bus route called Metro Plus, which stops every \(\frac{2}{3}\) mile on average and reduces travel times by approximately 17% compared with regular bus service.

  Actual stop spacing on MCTS’ BlueLine, GreenLine, and RedLine express routes averages around \(\frac{1}{4}\) mile, which limits the distinction between those routes and regular bus service. Consequently, MCTS express bus routes typically offer passengers a time savings of only 5-10% compared with regular bus service. MCTS could consider modifying its policy to increase stop spacing further on express routes, but again must balance the desire for increased speed with accessibility concerns.

- **Transit signal priority technology.** Several transit systems equip buses and traffic lights with devices that grant priority to buses as they approach, producing 5-10% reductions in travel times. In Seattle, for example, transit signal priority has been shown to reduce average travel times on six “RapidRide” express bus routes by an average of 5.5% and to improve on-time performance.

  MCTS currently does not utilize transit signal priority technology, but is planning to do so for a short stretch of Wisconsin Avenue in the future. Implementing TSP on priority bus routes in Milwaukee may be a relatively easy and inexpensive system improvement, as the City already has some of the needed technology in place.

- **Bus-only lanes and bus-only shoulders.** Allowing buses to have exclusive use of certain traffic lanes or highway shoulders is a proven strategy for improving travel speeds and reducing delays on congested roads and highways. San Francisco, for example, has 15
miles of bus-only lanes and plans to add more in the future. Some are designated exclusively for buses at all times of day and night, while others are shared with taxis and/or are only “active” during peak periods. Regular vehicles also are allowed to use bus lanes to make turns.

The Minneapolis-St. Paul metro area, meanwhile, has developed a network of more than 300 miles of bus-only shoulders along arterial roads and highways. Buses are able to use the shoulders to bypass traffic, provided certain criteria are met. Many other metro areas are experimenting with bus-only shoulders as well, including Chicago.

In the Milwaukee area, the only bus-only lanes are on a roughly 5-mile stretch of Bluemound Road between 124th Street and the Goerke’s Corners park and ride lot. The right lanes on Prospect and Farwell Avenues also were once dedicated exclusively to buses and bicycles during weekday morning and afternoon rush hours, but those lanes were removed in 1995. Bus-only shoulders have never been introduced here, but could be considered for several express bus routes and Freeway Flyers.

Each of these strategies has the potential to improve bus speeds and reduce travel times to some extent. As we stated in Getting to Work, however, “to truly address the prohibitive travel times faced by many reverse commuters, more advanced and expensive strategies may be required.”

**Bus Rapid Transit (BRT)**

BRT combines a variety of bus system improvements to produce an enhanced level of service that offers substantial benefits to users in terms of speed, reliability, and accessibility. Below are several major elements that distinguish BRT from other bus services.

- **Running Ways** – BRT services typically operate in exclusive bus lanes. Some use dedicated curbside lanes, but the preference is use of center/median lanes, which allow buses to avoid right-turning vehicles and pedestrians.

- **Stations** – BRT stops and stations often allow for level boarding and include many passenger amenities, such as real-time vehicle arrival displays and ticket vending machines.
**Vehicles** – BRT vehicles often are articulated (extended) with three sets of doors, thus offering increased capacity and faster boarding. Vehicles typically include other features designed to improve speed and comfort as well, including wider doors and aisles and larger windows.

**Fare Collection** – Most BRT services feature off-board fare collection, which requires passengers to purchase bus tickets or fare cards before boarding. Off-board fare collection reduces “dwell time” associated with buses waiting for passengers to pay fares.

**Intelligent Transportation Systems (ITS)** are advanced communications technologies used to improve speed and function. In addition to transit signal priority, one example of ITS is precision docking, which assists with docking at stations to facilitate level boarding.

To provide perspective regarding how BRT services are being implemented in U.S. metro areas, we examined four distinctive examples that show the range of BRT options. Those options range from “BRT lite” (i.e. modest upgrades to express bus routes) to those that entail major capital investments that allow BRT buses to operate similarly to light rail trains. Local officials could consider this range of examples if they wish to explore the implementation of BRT services in Greater Milwaukee.

1. **Nashville** has implemented two lengthy “BRT lite” routes (12 and 14 miles). While the routes lack many key BRT features like dedicated lanes and off-board fare collection, they still provide a faster service than typical express bus routes. Both routes use wide stop spacing that averages 3/4 mile, while one uses transit signal priority and it will soon be added to portions of the other.

2. **Las Vegas** has implemented four BRT routes that have slightly different designs, but that together form a network of faster, higher-quality bus services. Three of the four routes serve downtown Las Vegas, including one that connects downtown with “The Strip.” This “Strip and Downtown Express” is categorized as “Basic BRT” under standards developed by the Institute for Transportation and Development Policy (ITDP). The other three routes do not meet the Basic BRT standard, but contain features that are much more advanced than typical express bus routes.

3. **Cleveland’s HealthLine** is a 7.1-mile BRT service that serves Cleveland’s two largest employment centers – downtown Cleveland and University Circle, where major regional healthcare facilities are located. The HealthLine is the only BRT route in the U.S. that has achieved a rating of “Silver” from ITDP. It operates 24/7 with service offered every 6-8 minutes during peak travel times. The line also features exclusive center/median lanes for most of the route; articulated, hybrid electric vehicles; raised platforms and a precision docking system; transit signal priority; and off-board fare collection.
4. **Chicago** established a “BRT lite” service called the Jeffery Jump in 2012. It is now planning a Central Loop BRT project that will speed up service for multiple bus routes traveling east and west through the Loop, as well as an Ashland Avenue BRT route that could become the most advanced BRT service in the country. The Ashland BRT service is expected to cut travel time by 45% compared with existing service and it will be comparable in speed to service on ‘L’ train routes.

It is very difficult to compare costs and benefits between services due to their varied features and the distinctive contexts in which they were developed. With that major caveat, the tables below summarize the specific features of the routes we examined, their total start-up costs, and their travel-time savings.

**Key features of BRT case studies**

<table>
<thead>
<tr>
<th>Location</th>
<th>BRT Service</th>
<th>Exclusive Lanes</th>
<th>Median or Curb Lanes</th>
<th>Avg. Stop Spacing</th>
<th>Transit Signal Priority</th>
<th>Off-Board Fare Collection</th>
<th>Level Boarding</th>
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</thead>
<tbody>
<tr>
<td>Cleveland</td>
<td>HealthLine</td>
<td>Yes</td>
<td>Median</td>
<td>1/5 mile</td>
<td>Yes</td>
<td>Yes</td>
<td>Yes</td>
</tr>
<tr>
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<td>Yes</td>
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<td>Las Vegas</td>
<td>Boulder Highway Express (BHX)</td>
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<td>Yes</td>
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<tr>
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<td>Sahara Express (SX)</td>
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<td>Curb</td>
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<td>Yes</td>
</tr>
<tr>
<td>Nashville</td>
<td>Gallatin Pike</td>
<td>No</td>
<td>Curb</td>
<td>3/4 mile</td>
<td>Yes</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Nashville</td>
<td>Murfreesboro Pike</td>
<td>No</td>
<td>Curb</td>
<td>3/4 mile</td>
<td>Planned</td>
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<td>No</td>
</tr>
<tr>
<td>Chicago</td>
<td>Jeffery Jump</td>
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<td>Curb</td>
<td>1/2 mile</td>
<td>Partial</td>
<td>No</td>
<td>No</td>
</tr>
<tr>
<td>Chicago</td>
<td>Central Loop (planned)</td>
<td>Yes</td>
<td>Curb</td>
<td>1/4 mile</td>
<td>Yes</td>
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<td>Yes</td>
</tr>
<tr>
<td>Chicago</td>
<td>Ashland (proposed)</td>
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</table>
Here in the Milwaukee area, “BRT lite” services have been proposed by both Milwaukee County and the City of Milwaukee in recent years, and the Southeastern Wisconsin Regional Planning Commission has included potential BRT routes in its long-range transportation plans. Yet, in part because of the lack of consensus over the optimal way to improve public transit in southeast Wisconsin, BRT services have never been implemented.

**Policy Implications for Milwaukee**

Strong arguments can be made for enhancing bus routes along several different corridors in Milwaukee County to provide faster and more reliable service. The corridors where MCTS’ five color-coded express bus routes and Route 30x currently operate, for example, appear to be prime candidates for further experimentation and investment, as they already provide faster service throughout the day and week.

Among those corridors, the east-west corridor may offer the most advantageous setting for exploring options for improvements. The segment of Wisconsin Avenue extending from Cass Street to 17th Street already is the busiest transit corridor in the region, so enhancements to infrastructure on that 1.7-mile stretch could speed up service for passengers on multiple bus routes, including three existing express routes (BlueLine, GoldLine, and Route 30x). The east-west corridor also functions as a transit spine for the region, providing connections to numerous north-south bus routes.

The east-west corridor also would be a logical place to introduce a BRT service, as all of the past BRT proposals for Milwaukee have included an east-west route. It also would be a strikingly similar route to Cleveland’s HealthLine, as it would connect the region’s two largest employment centers (downtown and the Regional Medical Center) and would directly serve the city’s two largest universities (UWM and Marquette). With several years of reconstruction planned for Interstate 94 in

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2 The layouts of Las Vegas’s BHX and SX routes are significantly different from any current or past local bus service, which makes travel time savings difficult to calculate.

3 Cleveland’s HealthLine required major corridor improvements beyond those specifically related to introducing BRT. Overall project costs were $28 million per mile, including $7 million for transit-specific components.
the near future, the timing also may be ideal for adding new BRT service in that area as a mitigation strategy.

Below, we lay out three scenarios for improving bus service in the east-west corridor, from small modifications to the introduction of a high-quality BRT system.

**Small Modification: Add Transit Signal Priority on Wisconsin Avenue**

One example of a small improvement in the east-west corridor would be to equip all intersections with traffic signals and all buses operating on Wisconsin Avenue with transit signal priority technology, which could be programmed to give buses priority depending on a set of pre-determined factors. Research indicates that transit signal priority systems have the potential to reduce bus travel times by 5-10%. Based on case studies from around the country, the cost of adding such improvements on Wisconsin Avenue likely would be in the $500,000 to $1 million range, but may be much lower if the County is able to utilize the City’s existing signal preemption system. MCTS already plans to experiment with transit signal priority on Wisconsin Avenue between 27th and 35th Street within the next five years.

**Larger Modification: Introduce bus-only lanes or bus-only shoulders**

Given the substantial number of MCTS bus routes that currently operate on any given block of Wisconsin Avenue between Cass Street and 17th Street, introducing dedicated bus-only lanes on part or all of that 1.7-mile stretch would be one option for significantly increasing the efficiency of bus travel through the east-west corridor. Other options could focus on improving travel times for the GoldLine, which travels from UWM to Brookfield Square, such as by extending the bus lanes that already exist on Bluemound Road in Waukesha County into Milwaukee County.

**Major Improvement: BRT in the east-west corridor**

If a BRT service were added to the east-west corridor, several important factors would need to be considered, including the number of routes that would use the BRT infrastructure, the length and precise layout of the route or shared infrastructure, and the specific set of features the system would include. All of these factors would influence the quality and cost of the system and its potential to reduce travel times and attract new riders.

For example, BRT infrastructure in the east-west corridor could be developed exclusively for an enhanced GoldLine, or could be shared by several bus routes. As shown in the map on the following page, express Route 30x and the BlueLine currently travel on Wisconsin Avenue for significant stretches and could share BRT infrastructure with the GoldLine where the routes overlap.
Express bus routes currently using the east-west corridor

As shown in the table below, converting the GoldLine to a full BRT service could make travel times competitive with driving. A “BRT lite” alternative for that stretch of the east-west corridor would have a more modest impact on travel times, but still could offer an attractive option for many Milwaukee County residents. Estimated travel times for both BRT options are based on the BRT case studies included in this report.

Approximate travel times from downtown Milwaukee to the Regional Medical Center

<table>
<thead>
<tr>
<th>Travel Mode</th>
<th>Travel Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Driving (current)</td>
<td>13-22 minutes</td>
</tr>
<tr>
<td>MCTS GoldLine (current)</td>
<td>28-32 minutes</td>
</tr>
<tr>
<td>GoldLine converted to &quot;BRT lite&quot; (estimate)</td>
<td>22-29 minutes</td>
</tr>
<tr>
<td>GoldLine converted to full BRT (estimate)</td>
<td>14-25 minutes</td>
</tr>
</tbody>
</table>

4 Calculations for current travel times are based on Google Maps estimates from Water Street and Wisconsin Avenue in downtown Milwaukee to Froedtert Hospital at the Regional Medical Center. Current driving travel times range from 13 minutes with no traffic via Interstate 94, to 22 minutes at peak times via Wisconsin Avenue.
While the exact costs of a potential BRT system would require much more extensive research, the case studies included in this report indicate that the total start-up costs could range from less than $1 million per mile for a “BRT lite” service like those in Nashville or Chicago’s Jeffery Jump, to as much as $7 to $10 million per mile for a Silver- or Gold-standard BRT route like Cleveland’s HealthLine or Chicago’s planned Ashland Avenue BRT service.

**Bus System Improvements in the Context of MCTS’ Fiscal Challenges**

In light of MCTS’ substantial long-term fiscal challenges, it will be challenging to maintain existing bus services, let alone implement major improvements such as BRT. Nevertheless, there are several potential federal capital funding sources, such as the Federal Transit Administration’s Small Starts program and the U.S. Department of Transportation’s TIGER discretionary grant program, which could be pursued.

Even if federal funding could be secured, substantial local funding also would be required to support large improvements like a new BRT service. Based on the case studies included in this report, Milwaukee could consider replicating Chicago’s use of tax increment financing (TIF) for BRT service, Las Vegas’ donation of city right-of-way, and Cleveland’s use of contributions from health care entities. Area universities and their supporters also may be a source of local contributions, given the potential benefits they would enjoy from new rapid transit service, and sponsorships or naming rights from businesses that would benefit from BRT station locations also could be pursued.

Other metro areas facing similar financial challenges have mustered up the resources to implement such improvements, in part because they researched and recognized the benefits that faster and more convenient bus service could bring to their citizens and local economies. In Milwaukee, where the notion of rapid transit either has been dismissed by those who do not support public investment in transit, or has focused exclusively on commuter and light rail, we have never seriously considered those benefits and what it might take to realize them. With years of major highway reconstruction on the horizon and the demand for workers in both downtown Milwaukee and the suburbs likely to grow, we would suggest that the time to start doing so is now.