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Bus Rapid Transit

Flexibility by Design

Offering Mobility Options
for Maryland



Achieving Our Vision of a More Mobile Maryland



The Ehrlich Administration has made a promise to Maryland's residents and businesses to make tangible, near-term transportation improvements throughout the State in order to achieve Governor Ehrlich's vision of a *More Mobile Maryland*. The State's transportation agencies are committed to easing the congestion that clogs our highways and constrains our transit services.



Maryland faces a number of challenges in providing the best possible transportation options. There are competing demands for funds due to a backlog of unfunded but important transportation projects – some deferred for a decade or more. This poses a hurdle for tackling congestion statewide, including in the critical I-270 Technology Corridor, on arterial highways in and out of D.C. and Baltimore, in the I-95 corridor, and throughout Southern Maryland.

To help address traffic congestion and improve customer service, the Maryland Department of Transportation (MDOT), Maryland Transit Administration (MTA), and Maryland State Highway Administration (SHA) are considering a new approach – **Bus Rapid Transit (BRT)**.

BRT – Combining the Service Quality of Rail with the Flexibility of Buses

Conventional bus and rail transit already play a vital role in Maryland's transportation network. Transit service reduces congestion, assists with efficient land use, supports economic development, and provides transportation access and mobility for the young, elderly, disabled, and those who do not own an automobile.

Bus Rapid Transit encompasses a variety of approaches designed to improve travel speed, reliability, and quality of transit services. In general terms, a BRT system is an integrated rapid transit system that combines the quality of rail with the flexibility of buses.

Bus Rapid Transit is not a one-size-fits-all solution, but rather a family of approaches that share common



features or principles. BRT solutions range from BRT vehicles operating in general-purpose travel lanes with preferential access and "queue jumping" at traffic signals, to full-fledged integrated systems operating in exclusive "running ways." There is a full continuum of BRT approaches between these two extremes.

Bus Rapid Transit systems may incorporate streamlined fare collection techniques, such as pre-pay systems, further supporting quicker boarding and exiting, as well as use of advanced information systems to improve customer convenience, speed, reliability, and safety.

Common BRT components are explained more fully on pages 4 and 5.

Principles of Bus Rapid Transit

- Move people as effectively as rail at a potentially lower initial capital cost
- Fully utilize existing roadways, rights-of-way, and station sites
- Take advantage of available technology (e.g., automatic vehicle location, passenger information, signal priority, and "Smart Card" type fare collection)
- Apply incremental system development, based on demand and funding
- Maximize operating flexibility
- Change the mindset for bus transit – from conventional bus fleet operations to state-of-the-art transit systems that are *convenient, reliable, attractive, and comfortable*



Components of a Bus Rapid Transit System

A BRT system combines flexible service and new technologies to improve customer convenience and reduce delays. While specific BRT applications vary, the components may include:

A Running Ways – exclusive guideways or dedicated lanes that allow BRT vehicles to be free of conflicting automobile traffic, parked or stopped vehicles, and other obstructions – maximizing BRT operating speeds. In some situations, BRT vehicles also may operate in general traffic, trading speed and reliability for flexibility. "Queue jumper" is a term that refers to short exclusive lanes at signalized intersections that are used to allow BRT vehicles to jump to the head of the line and bypass stopped automobiles and traffic.

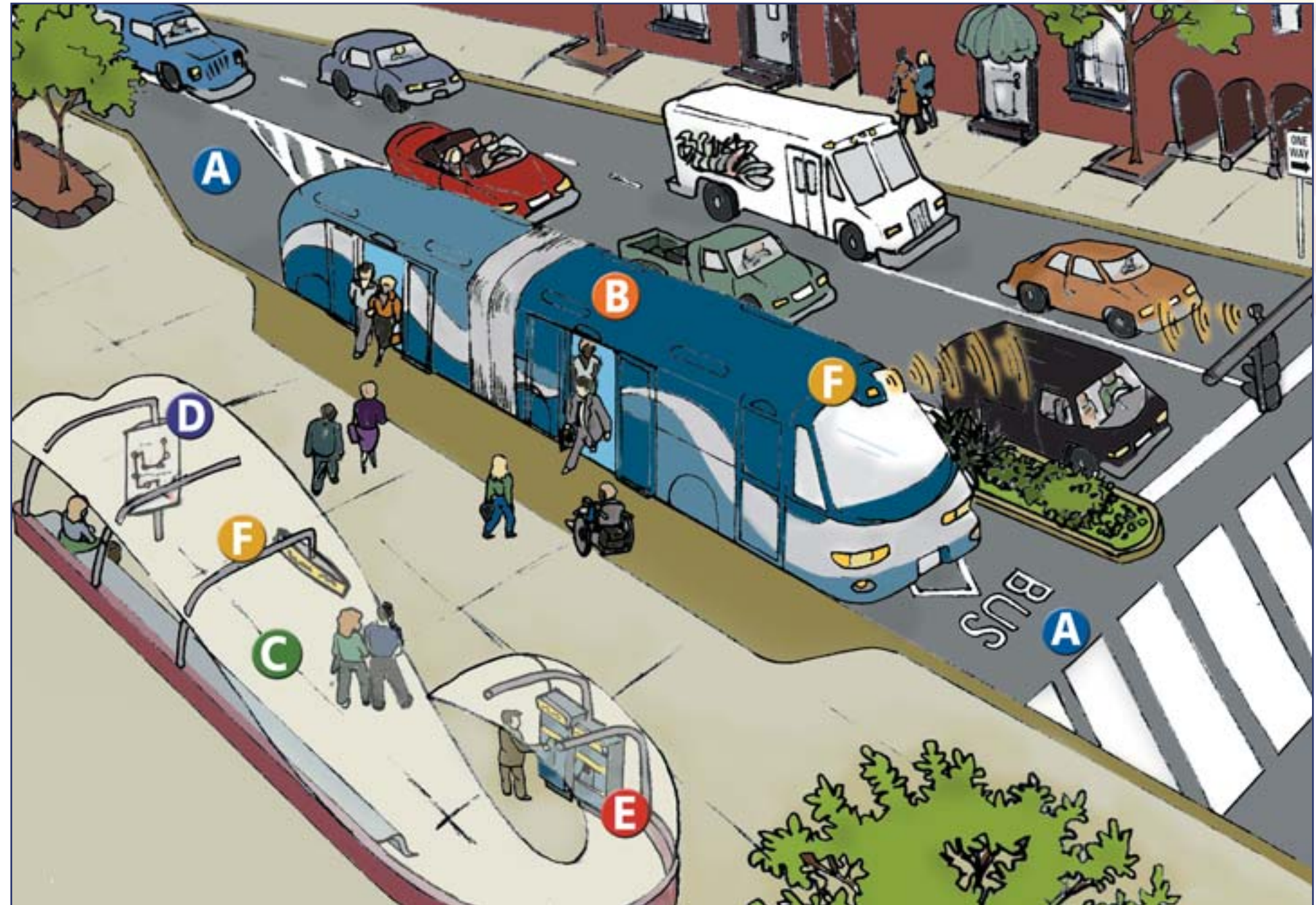
B Vehicles – modern, low-floor, high capacity rubber-tired vehicles that accommodate high volumes of riders and fast boarding and exiting. BRT vehicles often use clean fuels or alternative power.

C Stations – ranging from protected shelters to large transit centers, BRT stations are located within the communities they serve and provide easy access to the system.

D Route Structure and Schedule – established to maximize direct, no-transfer rides to multiple destinations and to create more flexible and continuous service (reducing the need for a schedule) for local and express bus service.

E Fare Collection – designed to make it fast and easy to pay, often before boarding the vehicle, BRT fare collection systems include the use of self-service proof-of-payment systems or pre-paid stored-value fare cards, such as a "Smart Card" system.

F Advanced Technology – the use of advanced technologies (or Intelligent Transportation Systems) to improve customer convenience, speed, reliability, and safety. Examples include systems that provide traffic signal preference for buses at intersections and cross streets, as well as Global Positioning Systems (GPS) to provide passenger information such as real-time bus arrival information.



Capturing the Benefits of Bus Rapid Transit

Bus Rapid Transit systems share many of the benefits of conventional bus and rail systems but also have a number of unique benefits.

For commuters and other travelers:

- **An easier commute** – By providing frequent service into neighborhoods and commercial areas, BRT systems can minimize walking and reduce the need for transfers from one mode to another (e.g., from bus to rail or automobile to bus or rail). Pre-boarding fare collection systems, such as the one shown in the photo on page 7, provide quick and easy access for commuters.
- **A fast and reliable travel time** – When operating in exclusive running ways or dedicated lanes, BRT systems can run at faster speeds than conventional buses in regular traffic and even as fast as light rail. By offering frequent service and avoiding traffic-related delays, BRT systems can provide riders with a more reliable travel time.
- **A more enjoyable trip** – BRT systems generally use rubber-tired, low-floor vehicles with wide doorways and aisles that are easy to board and comfortable to ride, as shown in the photo below. In some instances, BRT vehicles are designed to provide premium seating and amenities such as those found on a commuter train or commercial van or bus.



For the transportation system and the State:

- **A potentially less expensive transit alternative** – Depending on the specific system design, BRT capital costs can be lower than light rail systems with similar capacity and service level.
- **A quicker solution** – Based on a combination of design, construction, and cost factors, BRT systems can often be brought online faster than comparable rail systems. Also, because BRT systems can be implemented in stages as demand grows and funds become available, they offer an opportunity for incremental system development.
- **An opportunity to take advantage of underutilized rights-of-way** – Like light rail, BRT systems can take advantage of existing rights-of-way and areas for stations to maximize the efficiency of transportation solutions and minimize community and environmental impacts.
- **Community enhancements and economic development** – Accompanied by complementary land use and zoning policies, BRT systems can encourage compact, pedestrian- and transit-friendly developments that are integrated into the surrounding area.
- **Environmental stewardship opportunities** – Through the use of clean and alternative fuel vehicles and the reduction in automobile traffic and congestion, BRT systems can help achieve air quality and other environmental goals.

- **Operating flexibility** – Depending on the system design, BRT systems offer operational flexibility generally not afforded by rail systems, such as the ability to temporarily re-route BRT vehicles from dedicated lanes to general traffic lanes based on system conditions. And, BRT can operate express and local service on the same running way by having bypass lanes at stations.
- **A means to increase transit ridership in select corridors** – By making high-quality transit service more accessible and customer-friendly, BRT has the potential to increase overall transit ridership. It also can work as an impetus to increase ridership on other parts of the transit system.

By taking advantage of the principles of Bus Rapid Transit (described on page 3), BRT can achieve many important benefits for individuals using the system – i.e., fast, dependable, and convenient service – and for the State, a lower cost, more expedient solution to tackling congestion in some locations.



Quick Compare – BRT vs. Conventional Bus and Light Rail Systems

Following is a quick synopsis of the general comparison factors between BRT and conventional bus and light rail. In reality, these service types might be used as complementary services in an overall, integrated transportation system.

BRT vs. Conventional Bus Service

Factor	Bus Rapid Transit	Conventional Bus
Lower Upfront Cost		✓
Speed / Reliability	✓	
Operating Flexibility	Both have considerable operating flexibility	
Neighborhood Penetration		✓
Comfort / Amenities	✓	
Carrying Capacity	✓	

BRT vs. Light Rail Service

Factor	Bus Rapid Transit	Light Rail
Lower Upfront Cost	✓	
Speed / Reliability	Studies show BRT can equal LRT speeds and reliability	
Operating Flexibility	✓	
Neighborhood Penetration	✓	
Comfort / Amenities	Can be similar	
Carrying Capacity	Studies show this to be similar	





Exploring BRT Opportunities in Maryland

Bus Rapid Transit is being considered in a number of locations throughout Maryland. Project development studies are underway in the following corridors:

- **Bi-County Transitway** – A 14-mile corridor in Montgomery and Prince George's Counties connecting Bethesda, Silver Spring, Takoma Park/Langley Park, College Park, and New Carrollton. Exclusive running way and mixed flow (lanes shared with general traffic) BRT alternatives are being studied.
- **Red Line in Baltimore** – A study for this 10-mile Baltimore City and County corridor is evaluating exclusive and mixed flow BRT alternatives. The purpose is to provide better mobility in the east-west corridor from Woodlawn, to downtown Baltimore, to Fells Point and Patterson Park.
- **Green Line in Baltimore** – A study for this 4-mile Baltimore City corridor is evaluating exclusive and mixed flow BRT alternatives that would extend transit service from downtown Baltimore to northeast suburbs in the vicinity of Morgan State University and Good Samaritan Hospital.
- **I-270/US 15 Corridor** – This study is evaluating two alternatives for BRT service: one along the Corridor Cities Transitway as an exclusive running way from the Shady Grove Metro Station to Clarksburg, and the second Express Bus transit service within existing HOV and proposed Express Toll Lanes along I-270.

The State of Maryland and local communities are beginning to consider BRT as part of the solution in a number of other corridors throughout the State. BRT is by no means the only solution being considered, but rather one tool in the expanding toolbox to help address the State's transportation needs.

Learning from Experiences in Other Communities

Based in part on strong support from the federal government, the BRT concept is taking off as an alternative to be considered in a diverse range of locations and to address a variety of service needs.

National studies have concluded that BRT works – it can attract new riders, encourage transit-oriented development, be cost-effective, and, in many instances, provide greater operating flexibility than rail transit and better service than conventional bus systems. The vast majority of new, fully-integrated BRT systems have experienced the same type of ridership increases previously thought to be achievable only by rail transit.

While still a relatively new and evolving concept, BRT systems have been successfully designed, built, and now operated in a number of locations within the United States and worldwide. Following are just a few examples.

Silver Line – Boston, Massachusetts

An example of BRT in an urban corridor and connected to other transit services – much like what is being considered for the Green and Red Lines in Baltimore.



The Silver Line, Boston, Massachusetts

The Massachusetts Bay Transit Authority's (MBTA) new Silver Line is a BRT service connecting historic Roxbury to downtown Boston. The Silver Line uses dedicated transit lanes as well as mixed traffic operation. The MBTA also is constructing tunnels to provide direct connections to the subway, commuter rail, Amtrak, intercity bus, and Logan Airport.

The entire BRT system will provide 20 stations along seven miles. Current ridership is 80 percent higher than the predecessor conventional bus service.

A state-of-the-art Intelligent Transportation System is planned to improve mobility, safety, efficiency, and customer service by collecting real-time data transmitted from Silver Line vehicles. Using Global Positioning System satellites, the system will track bus locations and enable the MBTA's Control Center to respond to changing route conditions. This information also will be transmitted to digital message boards and "smart" kiosks at Silver Line stations.



Pittsburgh, Pennsylvania Busways

Busways – Pittsburgh, Pennsylvania

An example of BRT commuter service – similar to what is being considered for the I-270/US 15 Corridor.

The Port Authority of Allegheny County operates a series of busways, providing 18 miles of fast, reliable rapid transit service to downtown Pittsburgh. Easy pedestrian access, feeder services (buses and vans that bring riders to the busway system), and park-and-ride lots make it easy for commuters to leave their cars and ride into town. Within the city, BRT vehicles exit the busways and use city streets to deliver passengers to their destinations. The Pittsburgh Busways use direct connections into park-and-ride lots to improve travel time. In addition, the corridors take advantage of right-of-way adjacent to existing rail lines.



The Ontario Transitway, Ottawa, Ontario

Ontario Transitway – Ottawa, Ontario

An example of an integrated BRT system using available rights-of-way and operating in a combination of dedicated and mixed traffic environments – with some elements similar to the Bi-County Transitway.

The Ontario Transitway is a 20-mile system constructed primarily on rail rights-of-way, as well as exclusive bus lanes on city streets and a regional highway. A portion of the system (South Transitway) serves a very high-density residential corridor with stations every ½ - 1 mile. In the downtown area, buses use bus-only curbside lanes to load and unload passengers. Ottawa offers its users in-line stations with pedestrian overpasses to avoid conflicts with the high volumes of buses. Stations are integrated into their setting such as downtown business districts or suburban shopping malls.



Developing a Vision for BRT in Maryland

Bus Rapid Transit offers a way to rethink transit service – merging the service benefits of rail with the cost-effectiveness and flexibility of conventional bus service. BRT systems can be developed as stand-alone transit service or as part of an integrated transit system. Bus Rapid Transit, therefore, is one of a number of strategies being considered to address near- and longer-term travel demand, improve customer service, and expedite transportation improvements.

Maryland transportation agencies are considering the role BRT can play throughout the State and believe that the concept holds considerable promise. BRT's flexibility – the ability to tailor services to meet specific local needs as well as its potential lower upfront cost and thus quicker implementation – could help build transit ridership in targeted corridors and help address the State's congestion challenge.



FREQUENTLY ASKED QUESTIONS

Q: What are the differences between LRT and BRT?

A: BRT is sometimes referred to as a "rubber-tired Light Rail Transit (LRT) system" but with greater operating flexibility and potentially lower costs. BRT has some of the benefits of LRT at a fraction of the upfront capital cost. Key operational differences, however, include: the use of rubber-tired vehicles rather than rail cars; flexibility to take vehicles off dedicated lanes and into general traffic; better local access to stations for transit riders; and less need for transfers and multiple modes of transportation to complete a trip.

Q: Are people more likely to take rail than bus?

A: By incorporating many of the service amenities of rail with the added convenience of nearby, neighborhood-friendly stations, BRT has proven its ability to attract the ridership levels previously thought to be possible only with rail systems.

Q: What are the costs of constructing and maintaining BRT?

A: Capital costs of BRT are generally thought to be less than those for light rail. The actual costs of each individual system, however, depend on the local conditions and context in which the system will be operated. Capital items include the running way (busways or bus lanes), stations, park-and-ride facilities, communications and improved traffic signal systems, storage and maintenance facilities, and vehicles.

Like the capital costs, BRT operating costs vary and are dependent on factors such as the number and type of vehicles operated, service frequency, and number of stops.

Q: How is BRT different from a city bus?

A: BRT systems incorporate elements from both bus and rail. Key differences from city buses, however, include use of dedicated transitways or lanes for at least a portion of the route, vehicle design that provides easier and faster boarding and exiting, greater use of hybrid electric power, and stations within neighborhoods that provide not only shelter but a wide range of additional services and amenities.

Q: Will BRT service stop in my neighborhood?

A: Because BRT systems generally are able to provide more stops in locations that are within neighborhoods than rail systems, there is a much greater likelihood that service is directly accessible in your neighborhood – or within walking distance of it.

Q: Will the BRT vehicle get stuck in traffic?

A: BRT may rely on separated, dedicated lanes or access to HOV or Express Toll Lanes that are shared with toll-paying automobile traffic. In this way, BRT vehicles are able to provide reliable travel to many destinations.

Q: Could you convert a BRT to LRT or Metro at some point?

A: Yes. BRT systems may be designed to be converted to rail service at a future date – as ridership increases and funding is secured. Seattle, Washington, for example, is pursuing a partial conversion of its bus tunnel system to allow for shared use by both bus and light rail. The Seattle Bus Tunnel is one segment of a regional BRT system that also includes a network of exclusive transitways and HOV lanes.

