Executive Committee

Information Item IV-A

September 24, 2020

Framework for Transit Equity: Metrobus Service Guidelines

Washington Metropolitan Area Transit Authority

Board Action/Information Summary

○ Action ◉ Information	MEAD Number: 202202	Resolution: ○ Yes ◉ No

TITLE:

Framework for Transit Equity: Metrobus Service

PRESENTATION SUMMARY:

Information item to present Bus Transformation strategies in the context of the Framework for Transit Equity and provide a briefing on the draft Metrobus service guidelines, which is one of the recommendations from the Bus Transformation Project (BTP).

PURPOSE:

The Board will receive an update on the recommendations and accomplishments from Bus Transformation and how those efforts advance the Framework for Transit Equity in the context of Metro's regional demographics. Additionally, the Board will receive a briefing on the draft Metrobus service guidelines and the process for their use, which will guide how Metro plans and schedules service.

DESCRIPTION:

With the Board's Bus Transformation Project endorsement in January 2020 (Resolution 2020-01), staff has been advancing many of the recommendations. This presentation will provide data about our bus customers and how improving Metrobus is essential to advancing Metro's Framework for Transit Equity. A briefing will be provided to update Metrobus service guidelines, which was Recommendation A in BTP. Guidelines are a basic element of bus service planning. They establish measures and targets to enable clear and formalized decision-making when deciding where to add, adjust, or remove service. Metrobus's current guidelines were adopted in 2000 and are narrowly focused on crowding, productivity, and cost effectiveness. Updating the service guidelines will facilitate the provision of more equitable service, incorporate customer experience guidelines and targets, and align Metrobus with regional partners and peers across the industry.

Contractors and Interested Parties Involved in the BTP Work: **AECOM, Boston Consulting Group (BCG), Foursquare Integrated Transportation Planning, and NeoNiche Strategies**

Key Highlights:

• Metrobus Service guidelines are fundamental to ensuring equitable service across the region and are one of the main building blocks for service planning, budget decisions, and conducting a network redesign. Metrobus Service guidelines have not been updated since 2000.
• Recent months have demonstrated how integral the region's bus system is to the

success and resilience of the region.
• Improving Metrobus directly helps address longstanding inequities in the region.
• Metro is advancing many of the Bus Transformation Project recommendations, some in partnership with our local jurisdictional partners.
• Updating Metrobus service guidelines, a BTP recommendation widely supported by our jurisdictional partners, will create a clear and formalized approach to routing, service, and budget decisions.
• Service guidelines are fundamental to ensuring equitable service across the region and are one of the main building blocks for service planning, budget decisions, and conducting a network redesign.

Background and History:

In September 2018, Metro, its partner jurisdictions, and local transit agencies launched BTP with the goal to create a bold, new vision and a collaborative action plan for the future of bus in the region. Extensive engagement with the general public, project stakeholders, local jurisdictions, regional transportation boards, and the WMATA Board formed the basis for the recommendations by the Executive Steering Committee. The Bus Transformation Strategy was released on September 5, 2019 and an Action Plan followed in December 2019. In January 2020, the WMATA Board endorsed the plan and identified ten (10) recommendations for early action. The full strategy and Action Plan, along with other project documents can be found at www.bustransformationproject.com.

Discussion:

The Covid-19 pandemic has brought the importance of the region's bus system into clearer focus and has highlighted the longstanding inequities of the Washington region. Minority and low-income communities are not distributed evenly in the service area. While the region is about 60 percent minority, the vast majority of those residents live on the east side of the region. Additionally, 9% of households in the Compact Area live at or below the poverty line as defined by the US Census. The poverty line varies by household size and is $20,578 for a household of two adults under 65 and one child, for example. Low-income areas are also clustered on the east side of the region. Finally, residents who live the southeastern quadrant of the region have a larger concentration of commute trips over 60 minutes compared to the region. Recent studies have shown that transportation plays a vital role in fostering upward economic mobility. (Chetty, Raj, Hendren, Nathaniel. "The Impacts of Neighborhoods on Intergenerational Mobility," (Harvard University, 2015), https://scholar.harvard.edu/files/hendren/files/nbhds_paper.pdf. Improving Metrobus service and the region's bus system overall, as BTP outlines, has clear benefits for minority and low-income residents of the region.

The BTP Strategy incorporates four key recommendations: Frequent and convenient bus service; Bus priority on roadways; Customer experience; and a Task Force to implement the Strategy. Within the key recommendations, a set of 26 more specific recommendations were provided. These recommendations will transform the bus system into the system that the region's residents and civic and advocacy groups have asked for: a fast, frequent, reliable, affordable system that feels unified. The Strategy was developed by the project's Executive Steering Committee and was based on

extensive engagement with the bus customers, the general public, elected officials, jurisdictional partners, advocates, and other stakeholders across the region. (All project committee members, including members from funding partners and bus providers can be found on the last page of the Strategy Summary and the last page of the Action Plan Summary both of which are available at www.bustransformationproject.com.)

Metro staff and our jurisdictional partners have been working on many of the recommendations from BTP, even during the pandemic. Below is a table that provides progress to date by Metro or our local partners. It is notable that Metro and the District Department of Transportation (DDOT) have worked closely on a number of bus priority initiatives, including the expansion of bus priority lanes (red painted lanes). As of August 2020 there were approximately 2 miles of bus priority lanes in 2 corridors in the District and projects underway to expand to a total of approximately 10 miles of bus priority lanes in 6 corridors.

BTP Recommendation and Progress to Date

Frequent and Convenient Bus Service

- Establish regional standards across bus systems: Proposed Metrobus service guidelines for September 2020 Board discussions
- Assess Metrobus' current service definitions and funding allocation formula: Under development
- Leverage existing efforts to operate flexible on-demand services: RideOn Flex completed one-year pilot

Bus Priority on Roadways

- Support implementation of bus priority projects: DDOT/WMATA Bus Priority partnership resulting in close coordination to expand TSP, queue jumps, camera enforcement, and bus priority lanes described above
- Implement enforcement policies that support bus priority: DDOT piloting stationary cameras for bus lanes

Customer Experience

- Mobile fare payment launched September 1, 2020: Allows convenient and contactless payment for customers
- Integrate major bus routes and Metrorail system in regional transit map: Under development
- Provide free transfers between bus and rail: Partially included in FY2021 budget, but implementation on hold due to pandemic
- Provide low-income fare product: District pilot on hold due to pandemic
- Develop pass products across all providers: Incorporated in FY2021 budget, but on hold due to pandemic
- Improve safety for everyone on board: Implemented collision avoidance technology pilot on buses
- Improve comfort and cleanliness: Increased cleaning of vehicles to include daily vehicle sanitization
- Test and evaluate zero emission buses: Completed Zero-Emissions Bus Update document and received $4.2M grant to purchase new electric buses/equipment

Service Guidelines

Over the past 25 years, WMATA Board actions have empowered Metro to plan and operate a bus system that is coordinated and integrated with local bus service. Service guidelines, Recommendation A in BTP, establish parameters to enable clear decision-making when deciding where to add, adjust, or remove service. Metrobus's current guidelines were adopted in 2000 and are narrowly focused on crowding, productivity, and cost effectiveness and do not reflect the customers' experience. The current classifications of service, radial, crosstown, and express do not provide sufficient granularity to differentiate between service types. Updating the service guidelines will create a clear and formalized approach to service and budget decisions, which our jurisdictional partners have requested, assist in the provision of more equitable service, incorporate customer experience in addition to productivity and cost effectiveness, and align Metrobus with peers across the industry and our local partners.

It is necessary to underscore that these guidelines are aspirational. That is, the guidelines provide the targets to move bus service towards a fast, frequent, reliable, affordable service. But their adoption should not be construed as a financial action for bus service to meet the guidelines from the outset. Decision on which routes to modify and how, will be made within the constraints of available funding.

Service Classifications and Activity Tiers

Service guidelines start with classifying the service to allow consistent application across the region. The service types are as follows:

- **Bus Rapid Transit:** High frequency routes that have dedicated right-of-way or other traffic priority measures
- **Framework Routes:** Backbone of bus service with moderate to high frequency and little circuity that riders can rely on throughout the day
- **Coverage Routes:** Low frequency service in lower density areas, especially areas with poor street network
- **Commuter Routes:** Peak period service that connects residential areas or park and rides to areas of high employment density

Because the region has diverse land use characteristics and leading to differing demand and service, routes are also assigned to different activity tiers based on density. Density is calculated as the number of people, jobs, and/or commuter lot parking spaces near stops. These tiers enable different service guidelines targets to be set, even within the same route type. This means that a Framework route in Tier A may have a different target than a Framework route in Tier C, allowing for an apples to apples comparison of like service for planning and budgeting purposes, as well as for customer expectations.

Proposed Density Tiers for Service Classifications

Tier A Densely Populated

- BRT, Framework and Coverage Routes: Over 50 percent of bus stops along a route have population plus employment of 20 or more per acre
- Commuter Routes: Above or the routes serve over 2,000 park and ride spaces

Tier B Densely Populated

• BRT, Framework and Coverage Routes: Between 15 percent and 50 percent of bus stops along a route have population plus employment of 20 or more per acre
• Commuter Routes: Above or the route serves over 1,400 park and ride spaces

Tier C Densely Populated
• BRT, Framework and Coverage Routes: Less than 15 percent of bus stops along a route have population plus employment of 20 or more per acre
• Commuter Routes: Above or the route serves less than 1,400 park and ride spaces

Service Guidelines and Performance Targets

Draft service guidelines and performance targets have been developed by the service classifications and tiers listed above. The full draft Service Guidelines are appended to this document and listed below is a summary table comparing our current bus service guidelines with the updated draft Metrobus Service Guidelines. These guidelines reflect peer best practice and what many of our local partners have adopted as their guidelines. Additionally, performance measures for the entirety of the network are proposed to set targets and evaluate accessibility, equity, safety, complaints, and passenger amenities across the WMATA Compact Area.

Application of Guidelines and Targets for Decision Making

Once data for each line/route is developed across the service and performance metrics, service planners will be able to identify which routes do not meet the guidelines, noting which routes could be modified or potentially discontinued or where service could be added. Service planners will be able to identify the possible capital or operating improvements to meet the guidelines. For example, if a route is exceeding crowding targets, artic buses could be added or perhaps the headway needs to be reduced. For another route, if ridership is low, perhaps there is a parallel route that is drawing ridership and those two routes could be merged.
It is important to recognize that not all routes serve the same purpose. With the recognition that bus service provides critical transportation to many of our region's most vulnerable residents, there are a number of routes that serve transit dependent populations or provide unique access for certain areas or to certain destinations. Alternatively, some routes serve high numbers of riders and are the heavy haulers of the bus system. Still others are feeders from neighborhoods to feed rail stations or transit centers, providing extensive transferring opportunities. Therefore, as a companion to the service guidelines data above, each route will receive a Route Benefit Score, which is a composite index of ridership, population served, and network value. the network value is acombination of Transfers (from teh route to teh rest of the system); Unique access for people (percentage of ridership on unique segments of a route that are not served by any other route, including local jursidictional partners; and Access to destinations (the number of jobs and other destinations served by the route). Each component receives a weight based on annual priorities set prior to the service planning activity. That is, if it is decided that routes that serve high ridership should be prioritized, the weight for ridership would be higher than population and network value. If ensuring quality service to transit dependent populations or routes that have a more unique role in the system are the priorities, the population served and network value weights would be set higher. This scoring allows the transit agency to manage its bus network as a portfolio and to understand how individual line/route decisions may be

related to the overall network's value to the region's residents.

Finally, applying these guidelines within an environment of limited resources requires a framework for how to determine which lines/routes may see improvements, restructuring or possible elimination. A Line Performance Report will be developed annually for each line/route to report on the service, accessibility, and performance data, as well as its benefit score. The line/route performance measures listed below demonstrate the productivity and efficiency targets that provide staff with the justification to add, restructure, or reduce service to improve performance and assure adequacy of service to the riding public. By evaluating all lines/routes against targets, it is possible to identify lines/routes where additional service will benefit passengers, as well as lines/routes where a reduction of service could enhance economic return to the region.

All combined, establishing the full set of guidelines and performance targets, along with understanding each line/route's network value, and reporting through a Line Performance Report will provide the framework to propose service changes that are based in on-the-ground conditions, comparison to similar service types, and priorities of the Authority.

Summary of Proposed Service Guidelines/Routes

Reliability
Service Guidelines (Adopted 2000):
N/A

Proposed:
- **On-Time Performance**
  - o Percentage of service delivered on-time by timepoint
- **Customer Journey Time**
  - o Compare number of journeys complete on time to the total number of journeys

Comfort
Service Guidelines (Adopted 2000):
- **Load Factor**
  - o Max number of passengers on the bus at the maximum load point
  - o Standard: 100% seated load peak, 120% off-peak

Proposed:
- **Load Factor**
  - o Max number of passengers on the bus at the maximum load point
- **Crowding**
  - o Percent of passenger time spent in crowded conditions

Availability
Service Guidelines (Adopted 2000):
N/A

Proposed:
- **Span of Service** (Minimum)
  - o Measurement: First stop of the first trip to the last stop of the last trip

• **Service Headway** (Maximum)
o Mode of time riders must wait between buses at the control timepoint, by time period
• **Stop Frequency** (Maximum)
o Average number of stops per mile on a route, balancing accessibility and travel time

Route Design
Service Guidelines (Adopted 2000):
N/A

Proposed:
• **Deviations** (Maximum)
o Percent of travel time added by the deviation. A deviation is when a route deviates from the main corridor to a specific area of location. (E.g. the H2/4 serving Washington Hospital Center)

• **Patterns**
o Number of boardings on the branches of the route divided by the total number of boardings on the route. A branch follows a main corridor, but branches of the corridor to serve specific origins or destinations. (E.g. Columbia Pike (VA) has a trunk of the 16 line, with 16A, 16C service branching beyond Rt 7)

• **Circuity**
o Compares distance of the most direct route a bus could take from origin to destination vs. the distance the route actually travels. Calculation should not use limited access roads unless the route itself uses the roads

• **Parallel Corridors**
o Distance (in miles) between parallel corridors to identify duplicative service

Line/Route Performance Measures

Existing Measure:
• **Passengers per Revenue Hour:** Unlinked passenger trips ÷ revenue hours
• **Passengers per Revenue Mile:** Unlinked passenger trips ÷ revenue miles
• **Cost per Passenger / Cost per Mile:** Operating costs ÷ number of passenger boardings / revenue miles
• **Cost Recovery:** Passenger fares ÷ operating costs

Proposed Measure:
• **Passengers per Revenue Hour:** Unlinked passenger trips ÷ revenue hours
• **Passengers per Revenue Trip:** Unlinked passenger trips ÷ revenue trips
• **Passengers per Revenue Mile:** Unlinked passenger trips ÷ revenue miles
• **Operating Cost per Passenger Trip:** Total operating cost ÷ number of passenger trips
• **Cost Recovery:** Passenger fares ÷ operating costs
• **Unique Segment Ridership:** Total boardings on unique segment ÷ total boardings

Network Performance Measures

Accessibility
• **Frequent Service Accessibility:** Percent of high density (jobs + population) areas that are within a half mile of frequent transit (e.g. BRT, Framework, Metrorail)
• **Base Coverage:** Percent of area above threshold within a quarter mile of a bus stop or transit station
• **Equity Emphasis Area Accessibility:** Percent of Equity Emphasis Areas within a quarter mile of a bus stop or transit station
• **Funding Allocation Goal:** Distribution of funds for BRT/Framework service to funding for all fixed-route bus service

Safety
• **Customer Complaints:** Number of validated complaints received to system ridership
• **NTD Reportable Bus Collisions:** Total number of NTD reportable collisions (e.g. collisions that result in injuries requiring transport; towing of involved vehicle; damages over $25,000)
• **Bus Collisions:** Total number of collisions by preventability rating
• **Bus Customer Injuries:** Total number of customer injuries compared to total riders

Facility
• **Passenger Amenities:** Inventory of stop amenities based on stop type, defined by daily passenger volumes
• **Priority Treatments:** Inventory of bus priority treatments on BRT and Framework routes

The next steps in the process are to first engage the jurisdictions and local bus providers on the proposed Metrobus service guidelines and then to return to the Board for adoption of the guidelines.

FUNDING IMPACT:

There is no impact on funding from providing this information.

TIMELINE:

Previous Actions	January 2019 – Bus Transformation Project Update July 2019 – Bus Transformation – Draft Strategy December 2019 – Bus Transformation Project Update January 2020 –Bus Transformation Project (Resolution 2020-01) July 2020 – Framework for Transit Equity
Anticipated actions after presentation	Fall 2020 – Jurisdictional and local bus provider engagement on service guidelines December 2020 – Board adoption of Metrobus service guidelines

RECOMMENDATION:

This is an information item. No Board actions are recommended in this presentation.

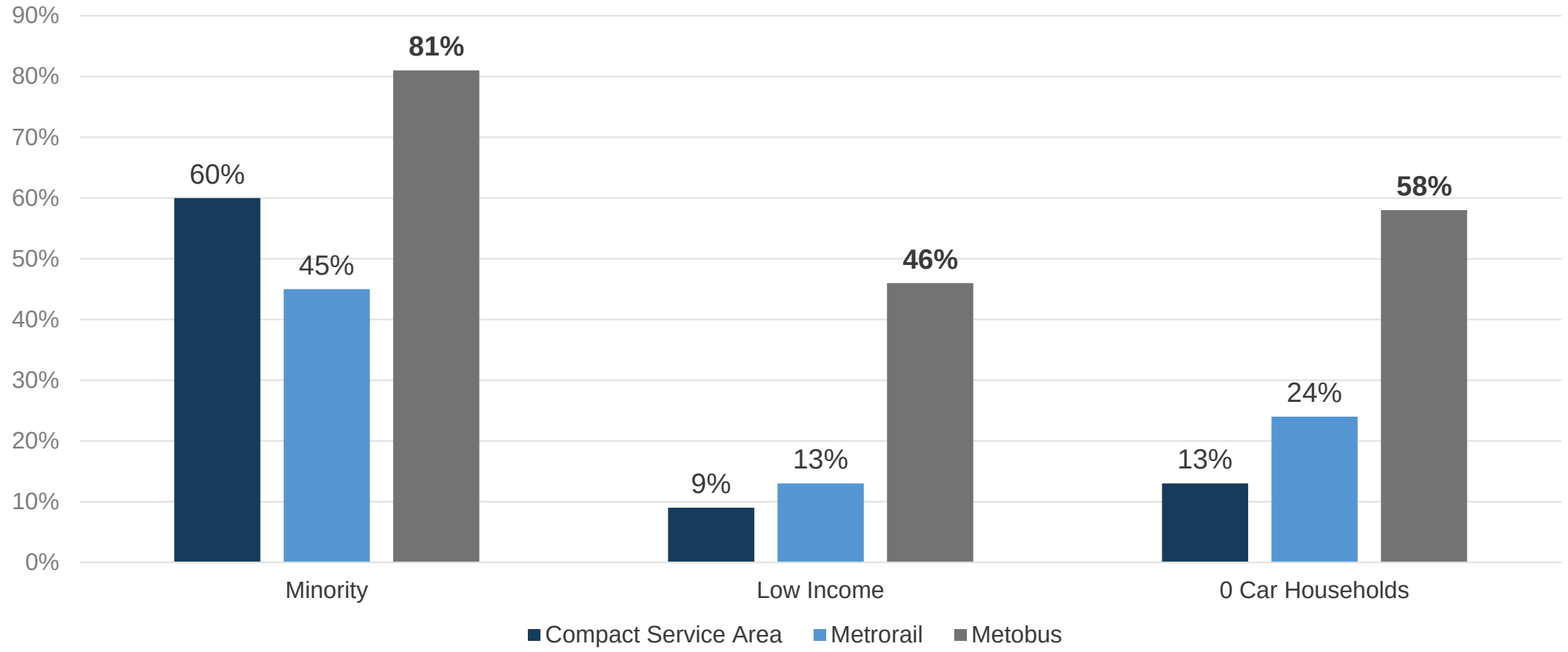
Framework for Transit Equity: Metrobus Service Guidelines

Executive Committee
September 24, 2020

Purpose

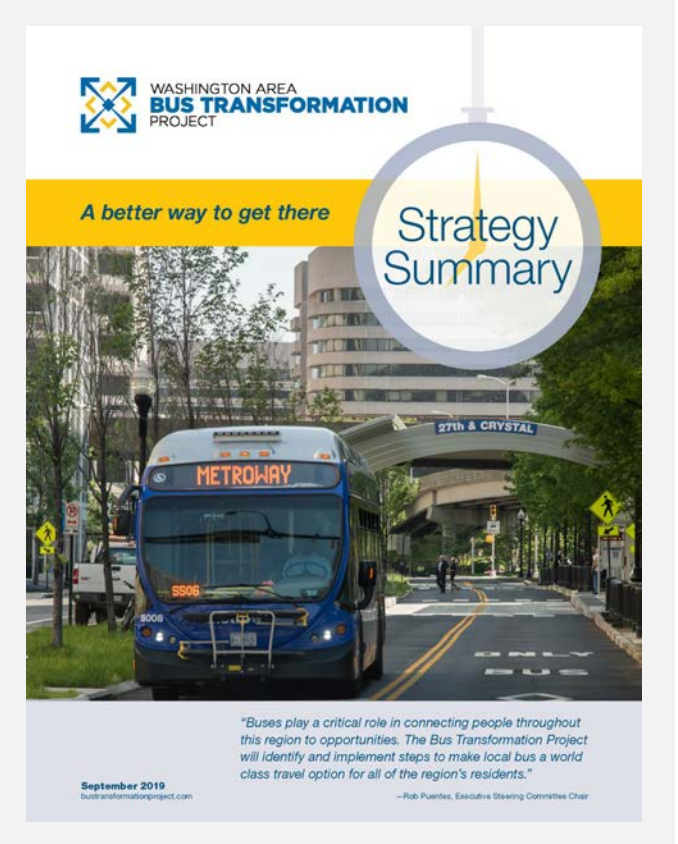
- **Connect Bus Transformation Strategies with the Framework for Transit Equity**
- **Briefing on updated Metrobus service guidelines**
  - Create clear and formalized approach to bus service changes
  - Help ensure equitable service across the region
  - Align with peer best practice

Metrobus and Metrorail | **Who's On Board?**



Bus Transformation Project | **Strategies**

1	**Frequent and Convenient Bus Service**	Provide frequent and convenient bus service that connects communities and promotes housing affordability, regional equity, and economic growth
2	**Bus Priority on Roadways**	Give buses priority on roadways to move people quickly and reliably
3	**Customer Experience**	Create an excellent customer experience to retain and increase ridership
4	**Task Force to Implement the Strategy**	Empower a publicly appointed Task Force to transform bus and lead the implementation of a truly integrated regional system



Metrobus Service Guidelines | **Purpose**

- Create **clear and formalized approach** to routing, service, and budget decisions
- Develop **apples to apples comparison** for similar service
- Help ensure **equitable service** across the region
- Expand current guidelines to evaluate the **customer experience**
- **Align Metro's service guidelines (last updated in 2000) with the industry** – both local partners and national systems

Peer Comparison of Service Guidelines

	Metrobus **Current**	**Peers**
Availability		X
Route Design		X
Reliability		X
Comfort	X	X
Productivity	X	X
Cost Effectiveness	X	X

Service Classifications | **Proposed**

1 Bus Rapid Transit high frequency routes that have dedicated right-of-way or other traffic control measures

2 Framework Routes are the backbone of bus service, serving various purposes for riders

3 Coverage Routes often connect riders to more frequent service

4 Commuter Routes provide peak period only trips during periods when commuters would use the services

1 Service Classifications group routes by the **purpose** they serve

2 Service Tiers group routes by the **density** in which they operate in

A | densely populated corridors such as 16th Street in the District

B | moderate density areas such as Arlington Blvd. in Fairfax County

C | lower density residential areas such as Bowie or Burke

Service Guidelines | **Proposed**

Customer Experience

how accessible, available, reliable and comfortable, is our service to customers?

Availability

- Span of Service
- Service Headway
- Stop Frequency
- Service Accessibility

Route Design

- Deviations – travel time
- Patterns – boardings
- Parallel Corridors - distance
- Circuity – distance

Reliability

- On-Time Performance
- Customer Trip Time

Comfort

- Crowding
- Vehicle Load Factor*

Productivity and Cost Effectiveness

how effectively and responsibly are we delivering the guidelines?

Productivity

- Passengers per Revenue Hour/Trip*
- Passengers per Revenue Mile*
- Unique Segment Ridership

Cost Effectiveness

- Operating Cost per Passenger Trip
- Cost Recovery*

Safety & Security | Quality Service | Financial Responsibility

*indicates existing measure

Service Guidelines | **Local Bus Providers + Peers**

	Year	Span of Service	Service Headway	Stop Frequency	Coverage	Route Design	Reliability	Comfort	Productivity	Effectiveness
Metrobus	2000							X	X	X
DC Circulator Washington, DC	2014		X	X			X		X	X
ART Arlington County	2016	X	X	X	X		X	X	X	X
CUE City of Fairfax	2017	X			X		X		X	X
DASH City of Alexandria	2019				X		X			X
Fairfax Connector Fairfax County	2016	X	X	X			X	X	X	X
Loudoun County Transit Loudoun County	2019	X	X	X			X	X	X	X
Ride On Montgomery County	2017		X		X		X	X		
TheBus Prince George's County	2017	X	X			X			X	
MTA Baltimore, MD	2017		X		X		X	X		X
SEPTA Philadelphia, PA	2020	X	X	X	X	X	X	X	X	X

Guidelines | **Examples**

Span of Service

Zone	BRT	Framework	Coverage	Commuter
Weekday				
Tier A	6:00 a.m.– 12:00 a.m.	6:00 a.m.–12:00 a.m.	6:00 a.m.–9:00 p.m.	Minimum of one trip that arrives by 7:00 a.m., and one trip that leaves on or after 6:30 p.m.
Tier B	5:30 a.m.– 10:00 p.m.	6:00 a.m.–10:00 p.m.	6:00 a.m.–8:00 p.m.	
Tier C	5:30 a.m.– 10:00 p.m.	6:00 a.m.–10:00 p.m.	6:00 a.m.–8:00 p.m.	
Saturday				
Tier A	6:00 a.m.– 12:00 a.m.	7:00 a.m.–12:00 a.m.	7:00 a.m.–9:00 p.m.	-
Tier B	6:00 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	
Tier C	6:00 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	
Sunday				
Tier A	6:00 a.m.– 10:00 p.m.	7:00 a.m.–12:00 a.m.	7:00 a.m.–9:00 p.m.	-
Tier B	6:30 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	
Tier C	6:30 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	

Service Headway (Min)

Zone	BRT		Framework			Coverage		Commuter
	Peak	Off-peak	Peak	Off-Peak	Rapid	Peak	Off-peak	
Weekday								
Tier A	10	15	20	30	12	30	60	Varies based upon demand.
Tier B	15	30	30	30	20	30	60	
Tier C	30	30	60	60	30	60	60	
Saturday								
Tier A	20	20	30	30	12	60	60	-
Tier B	30	30	30	60	20	60	60	
Tier C	30	30	60	60	30	60	60	
Sunday								
Tier A	20	20	30	30	12	60	60	-
Tier B	30	30	60	60	20	60	60	
Tier C	30	30	60	60	30	60	60	

Route Value | **Proposed**

Not all routes serve the same purpose, even within the same classification
Develop route benefit score by comparing each route to three key characteristics

Ridership

Average weekday ridership, measuring demand for route

Population Served

General Population | BRT + Framework
% of the population within a half mile of a bus stop

Transit Dependent | Coverage

% of the transit dependent population within a quarter mile of a bus stop with transit dependent defined as low-income or zero-car households

Commuters | Commuter
% of the labor force within a quarter mile of a bus stop on the origin end of a route or within one mile from a Park and Ride served by the route

Network Value

Transfers
# of transfers (bus/bus and bus/rail) from that route to the rest of the network

Unique Access for People

% of ridership that occurs on unique segments of a route that are not served by other routes

Access to Destinations

# of jobs and other destinations the route serves, estimated from the Longitudinal Employer-Household Dynamics (LEHD) data

Equity oriented measures

Service Guidelines | **Application**

(1) **Classify each route** by type and tier

(2) Identify routes that do not meet guidelines

(3) Identify **capital or operating improvements** to meet guidelines

(4) **Prioritize routes** based on ridership, population served, and network value

(5) Develop **bus service package** of improvements, changes, or reductions

1 Classification			2 Guidelines							
Route	Classification	Tier	Min Span	Max Headway peak/off-peak	Max Stop Freq per mile	Min Distance btwn Parallel Corridors	Max Circuity	Min Pax/Rev Hr	Max Capacity/Load Peak/Off-Peak	Operating Cost/Pax Trip
			6a-12a	**20/30**	**4-8**	**0.5 miles**	**1.75**	**30**	**1.2/1.0**	**$5.00**
Route A	Framework	A	5a-1a	15/20	5.2	0.3	1.3	45	1.3/1.1	$4.35
Route B	Framework	A	6a-10p	30/45	7.8	1	1.7	25	0.8/0.7	$4.95
Route F	Framework	A	6a-12a	20/30	5	1	1.5	32	1.0/0.9	$4.50

Outcome | **Results Oriented Bus Service Planning**

- Numerous challenges confronting bus service today
- Detailed service analysis
  - Trade-offs on where to strengthen or adjust service
  - Equity in Metrobus's service offering across the region
- Applicable to COVID recovery and resilience planning, future budgets, SOGO, and network redesign

Next Steps

- **Engage jurisdictions and local bus providers** on proposed Metrobus service guidelines
- **Return to Board for adoption** of Metrobus Service Guidelines

Appendix

Service Guidelines | **Peer Comparison**

	Year	Span of Service	Service Headway	Stop Frequency	Coverage	Route Design	Reliability	Comfort	Productivity	Effectiveness
Metrobus Current	**2000**							**X**	**X**	**X**
MBTA Boston, MA	2017	X	X		X		X	X		
MTA Baltimore, MD	2017		X		X		X	X		X
NYCT New York, NY	1986		X	X	X		X	X	X	X
SEPTA Philadelphia, PA	2020	X	X	X	X	X	X	X	X	X
LA Metro Los Angeles, CA	2019	X	X	X		X	X	X		
MARTA Atlanta, GA	2018	X	X	X	X		X	X	X	X
CTA Chicago, IL	2014		X	X	X		X	X		
MDT Miami, FL	2009	X	X	X	X	X	X	X	X	X

WASHINGTON AREA BUS TRANSFORMATION PROJECT

metro

Bus Service Guidelines - Metrobus

Draft

September 2020

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Table 16 | Minimum Cost Recovery Target 29

1. Introduction

The Bus Transformation Project's first recommendation is to provide "frequent and convenient bus service that connects communities and promotes housing affordability, regional equity, and economic growth." This recommendation identifies the need to establish regional guidelines across bus systems to provide consistent bus service, tailored by location and time of day across the region, where all services must work together. Metro is taking the first step to update its decades-old Metrobus service guidelines as outlined in this document.

The intent of service guidelines is threefold: first, to provide customers with clear expectations of service; second, give Metro a formal and transparent approach to determine when and where to add, adjust, or remove service; and third, to provide a balance of consistency and flexibility to address various public transportation needs across the region and at different times of day. The purpose of this document is to create a guide to equitably and consistently classify Metro's bus service; enable local partners to consider these in their planning processes; give guidance on network, corridor, and line/route design and goals for level of service and service coverage; and inform service performance targets.

It is important to note that these guidelines are aspirational. They set the direction for where Metrobus service wants to go. It also provides the framework to make decisions within the realities of limited resources.

By adopting these guidelines, Metro will:

- Create transparent and formalized approach to routing, service, and budget decisions;
- Develop apples to apples comparison for similar types of service;
- Help ensure equitable service across the region;
- Expand current guidelines to evaluate the customer experience; and
- Align Metro's service guidelines with the industry – both local regional partners and national systems

If Metro's jurisdictional partners choose to leverage these guidelines, a more regional approach to bus service will be enabled, allowing:

- Consistent and appealing service across the region as a result of cohesive planning, operations, and performance;
- Greater communication among agencies;
- Increased number of customers who use bus region-wide to access key destinations-regardless of where they live and what times they travel;
- Greater transparency associated with "regional" services-where riders benefit from the clearer distinctions of how services are planned and allocated;
- Meeting riders' growing expectations of transit and travel across the region through forms of bus that are flexible and cost effective; and
- Stronger connections between bus and land use, where people can access employment centers, key goods and services, and amenities and live affordably.

These guidelines have been developed with bus operators and external stakeholders in mind. With analysis informed by these guidelines, operators are also enabled to more rigorously consider

proposals for future service that may not meet the established thresholds. The public and elected officials will gain an understanding of where bus service is viable (since service is tightly tied to the surrounding land use and commute patterns) and why service updates/changes are proposed.

The following key elements will be addressed in the following sections.

- **Service Classifications** identify the types of transit services that are suitable throughout the region. This section provides a high-level overview of how and where these services should be operated. Routes serving different areas have different requirements; routes are categorized by "activity tier" based on area characteristics.
- **Service Guidelines** outlines design guidelines by service classification, focusing on level of service and alignment design. This will provide a basis for ensuring similar services are being operated consistently across the region.
- **Service Accessibility and Performance Target**s contains two parts:
  - *Network Performance*, which recognizes key metrics for the entire transit network across the WMATA Transit Zone measuring service regardless of operator to ensure equitable distribution of resources.
  - *Line/Route Performance*, which provides guidelines for measuring key criteria at the line/route-level and informs the evaluation process to determine whether a service needs to be re-examined, improved, or considered for discontinuation.
- **Route/Line Value** provides a rubric on how to assess a routes value to the bus network.
- **Performance Improvement Plan** details how to monitor service, justify service changes, and conduct post-implementation review.

In addition to planning, these guidelines will support Title VI monitoring for on-time performance, crowding, availability, and headways, and they can also be used to inform annual budget analyses. External stakeholders can use the guidelines to better understand why service changes are proposed and to advocate for service improvements.

2. Service Classifications

The first step in establishing regional guidelines is to classify service types that can be consistently applied to services across the region. This section establishes a shared set of service types that were developed based upon industry best practices and an assessment of regional needs. The five service types proposed are: Bus Rapid Transit (BRT), Framework, Coverage, Commuter, and Gap. This section provides a summary of each service type; specific service guidelines and metrics for each service type follow in **Sections 2.2 and 3.4.1**, respectively.

Because the Washington, D.C. region is made up of diverse land use characteristics and various levels of transit demand that require varying levels of service, routes are also assigned to different activity tiers based on the number of people, jobs, and commuter lot parking spaces near route stops.

2.1. Service Classifications

2.1.1. Bus Rapid Transit

Bus Rapid Transit (BRT) involves the strategic application of coordinated strategies for design of routes, services, facilities and technology. The components of a BRT system can include dedicated lanes; specially designed and identifiable clean-fuel vehicles; special stations; high-frequency service; simplified route structure; fewer stops than conventional bus routes; off-vehicle fare collection; and, the use of Intelligent Transportation Systems (ITS) to improve bus operating speed and reliability.

BRT Routes are designed to provide riders with enhanced bus service that allows them to reduce travel time and in some cases are the result of upgrading service and street infrastructure of a Framework Route (see below). BRT routes often travel in dedicated lanes or busways or include various forms of priority treatments for some or all of their service pattern, allowing them to bypass traffic and/or gain an advantage at intersections and as a result faster travel times and more reliably. BRT is best-suited to operate along mixed-use, densely populated corridors. These routes typically have higher frequencies in both peak and off-peak periods compared to typical bus services and create a rail-like service on the roadway. Service tends to operate throughout the day and on weekends to serve a variety of riders and trip types. To help minimize trip time, BRT routes have little circuity and serve areas with demonstrably high levels of demand.

2.1.2. Framework Routes

Framework Routes are the backbone of bus service, allowing riders to travel along major corridors/streets and access the region. Framework Routes and BRT form the equivalent of the rubber-tire rail network. Framework Routes connect centers of activity, spokes of the Metrorail system, and provide transfers numerous bus routes. Framework Routes tend to have more frequent stops than BRT, providing more access to riders' origins and destinations. Framework Routes have moderate to high frequency, giving riders the added convenience that a bus will show up when needed. Service extends throughout the day, accommodating many trip types including commuting, errands, education, and social purposes. Depending on the circumstances the route may operate less on weekends and/or evenings. Finally, Framework Routes should have little circuity and should not divert to serve areas with low demand.

A **Rapid Route** is a Framework Route that operates as an overlay. Rapid Routes should only be operated where both the Rapid and the underlying Framework Route each have a service frequency of 12 minutes or better. Rapid Routes have fewer stops and are sometimes called "Limited Stop", and therefore offer a faster trip for passengers. Rapid Routes may serve the entire length of the underlying Framework Route or may operate a shorter pattern. Rapid Routes may operate all day or only during peaks, as demand allows, and peak-only Rapid Routes may be peak-direction only. These differ from BRT in that they lack bus priority elements.

2.1.3. Coverage Routes

Coverage Routes deliver service deeper in to neighborhoods or commercial districts, especially areas with poor street network connections. These routes tend to have more stops per mile, lower service frequency, shorter span of service, and can be more circuitous, especially in neighborhoods that contain cul-de-sacs or barriers such as freeways, water, or railways. These routes often provide a level of service for the selected populations or specific destinations who depend on the route, and often connect to other more frequent routes/modes at a transit hub. Low-density areas may also make sense for Coverage Routes that include on-demand service.

On-demand Service operates similarly to a Coverage Route in lower density areas, but typically does not have a defined route and people book trips in advance using a smart phone app or telephone.

2.1.4. Commuter Routes

Commuter Routes are designed to connect residential areas or park and rides to areas of high employment density during peak periods. These routes are designed to have one or more pickup locations in close proximity to each other, before running non-stop, often via a highway, to one or more destinations. In some cases, they can provide a direct trip (one-seat ride) during high-ridership periods that can otherwise be made with a transfer in other time periods. Stop spacing may vary widely on Commuter Routes, but will typically have stop spacing typical of coverage routes in residential areas and an express segment or limited stop portion connecting those residential areas to high density corridors or major activity centers. Commuter Routes may operate in the peak direction only.

Airport Express Routes are a variant of the Commuter route, running between areas of transit demand, whether a dense area, a transit hub, or a park and ride, to an airport. Many characteristics are the same as Commuter Routes, though service is generally provided more frequently, and for longer spans of service, as people travel at various times, and airport employees work on all shifts.

2.1.5. Gap Service Routes

Gap service is run for a specific purpose, such as serving a school or other destination with focused demand, replacing rail service overnight, providing shuttle service only during the hours of a major tourist attraction, meeting weekend-only needs, or other purposes that do not align with the more general service types. These routes should be designed to fit the needs of the situation and are not governed by standardized guidelines.

2.2. Activity Tiers

Outside of the general service classifications, every route will be assigned to an activity tier. Throughout the Washington, DC region there are diverse land use characteristics and various levels of transit demand, and transit serving these areas requires the appropriate level of service and design elements to serve these areas effectively. For example, a line/route that runs every 30 minutes in a downtown area may be considered as providing coverage levels of service, whereas in a less urban area this same level of service might be considered part of the framework backbone.

Therefore, the following service guidelines have been tailored to three "Activity Tiers." Service has been categorized into three activity tiers: Tier A (the densest) to Tier C (the least dense). Lines/routes that serve more dense activity, whether that is residential population or job density, are grouped together and compared against each other, and vice versa for routes that serve less dense areas. Commuter routes are categorized based upon the number of park and ride spaces served. Service has been categorized into three activity tiers: Tier A (the densest) to Tier C (the least dense).

- **Tier A**
  - BRT, Framework and Coverage Routes: Over 50 percent of bus stops along a route have population plus employment of 20 or more per acre
  - Commuter Routes: Over 50 percent of bus stops along a route have population plus employment of 20 or more per acre, or the route serves over 2,000 park and ride spaces
- **Tier B**
  - BRT, Framework and Coverage Routes: Between 15 percent and 50 percent of bus stops along a route have population plus employment of 20 or more per acre
  - Commuter Routes: Between 15 percent and 50 percent of bus stops along a route have population plus employment of 20 or more per acre, or the route serves over 1,400 park and ride spaces
- **Tier C**
  - BRT, Framework and Coverage Routes: Less than 15 percent of bus stops along a route have population plus employment of 20 or more per acre
  - Commuter Routes: Less than 15 percent of bus stops along a route have population plus employment of 20 or more per acre or the route serves less than 1,400 park and ride spaces

3. Service Guidelines and Level of Service Targets

This section details service guidelines and level of service targets by service classification and tier. It focuses on ways to enhance connections; reduce duplication between lines/routes; equitably serve transit demand; improve service efficiency; and leverage the improvements in bus running ways that are happening throughout the region. The purpose of having guidelines – which differ depending on the type of density and land use throughout the region – is to create consistency between offerings in different parts of the region so that customers experience a more consistent and cohesive service regardless of where they are in the region.

These guidelines build on existing service guidelines currently in place, but have been enhanced to allow for services that will create the best customer experience and meet expected demand. Guidelines vary based on service type, geography, and in some cases, time of day or day of the week. The Guidelines apply to the BRT, Framework, Coverage, and Commuter service types.

For the sub-classifications such as Rapid, On-Demand and Airport Express, unless stated otherwise the minimum service guidelines and target performance metrics of the overall service classification apply. For example, as Airport Express routes are a variation of Commuter routes, they do not have their own set of guidelines, but instead follow the guidelines for Commuter routes.

3.1. Span of Service

The span of service establishes when transit service will begin and end each weekday, Saturday, and Sunday. When determining the span of service for specific lines/routes, a transit agency must consider the tradeoff between a longer span of service, which allows a route to capture more riders with different trip purposes across various periods throughout the day, and efficiently allocating resources to the most productive time periods. It is important that spans of service for different routes and services be coordinated to ensure that the transit network will meet the needs of riders throughout the service day.

How to Calculate: Calculated from the first stop of the first trip to the last stop of the last trip.

Table 1 | Minimum Span of Service

Zone	BRT	Framework	Coverage	Commuter
Weekday				
Tier A	6:00 a.m.– Midnight	6:00 a.m.–Midnight	6:00 a.m.–9:00 p.m.	Minimum of one trip that arrives by 7:00 a.m., and one trip that leaves at or after 6:30 p.m.
Tier B	5:30 a.m.– 10:00 p.m.	6:00 a.m.–10:00 p.m.	6:00 a.m.–8:00 p.m.	
Tier C	5:30 a.m.– 10:00 p.m.	6:00 a.m.–10:00 p.m.	6:00 a.m.–8:00 p.m.	
Saturday				
Tier A	6:00 a.m.– Midnight	7:00 a.m.–Midnight	7:00 a.m.–9:00 p.m.	-
Tier B	6:00 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	
Tier C	6:00 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	
Sunday				
Tier A	6:00 a.m.– 10:00 p.m.	7:00 a.m.–Midnight	7:00 a.m.–9:00 p.m.	-
Tier B	6:30 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	
Tier C	6:30 a.m.– 9:00 p.m.	8:00 a.m.–9:00 p.m.	8:00 a.m.–8:00 p.m.	

3.2. Service Headway

Service headway is the amount of time scheduled between bus arrivals.[1] Much like with span of service, transit agencies must consider that while low headways reduce the time customers must wait for a route to arrive and shortens their travel time, they also increase costs by requiring more buses and operators for the line/route. They must also consider that these periods of time will occur multiple times for customers who transfer to other routes to complete their trip.

How to Calculate: The mode of the time between trips at the control timepoint on a route during the relevant time period.

Table 1 | Maximum Service Headway (Minutes)

Zone	BRT		Framework			Coverage		Commuter
	Peak	Off-peak	Peak	Off-Peak	Rapid	Peak	Off-peak	
Weekday								
Tier A	10	15	20	30	12	30	60	Varies based upon demand
Tier B	15	30	30	30	20	30	60	
Tier C	30	30	60	60	30	60	60	
Saturday								
Tier A	20	20	30	30	12	60	60	-
Tier B	30	30	30	60	20	60	60	
Tier C	30	30	60	60	30	60	60	
Sunday								
Tier A	20	20	30	30	12	60	60	-
Tier B	30	30	60	60	20	60	60	
Tier C	30	30	60	60	30	60	60	

[1] Rapid Routes can only be implemented along Framework routes with headways of 12 minutes or less (Tier A), 20 minutes or less (Tier B), and 30 minutes or less (Tier C).

3.3. Stop Frequency

Stop frequency refers to the average number of bus stops per-mile on a route. Establishing stop frequency requires transit agencies to evaluate the trade-offs between customers' stop proximity and overall travel speeds and time. Locating bus stops closer together allows potential riders to access bus service more easily, since their origin or destination may be close to a stop. However, closely-placed bus stops increase travel time by requiring the bus to make more stops. As the distance between stops increases, travel time on board the bus typically decreases, but it requires a longer distance to access the service for many riders.

How to Calculate: Divide the total number of bus stops along a route by the round-trip route length for each segment of the route (between each timepoint pair.)

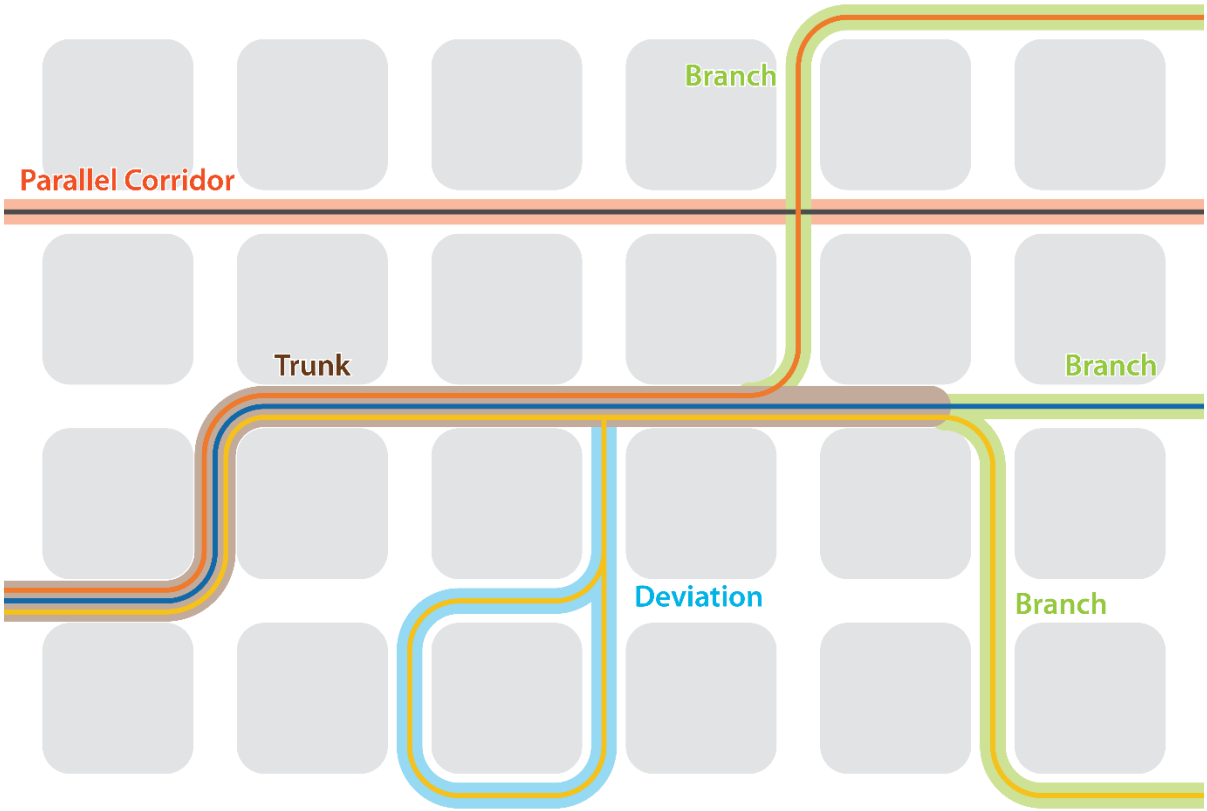
Table 2 | Average Stop Frequency (per Mile)

Zone	BRT	Framework	Coverage	Commuter
Tier A	2–3	4–8	4–5	-
Tier B	1–3	4–5	4–5	-
Tier C	1–3	4–5	4–5	-

3.4. Route Design

Routes can interact and influence each other in many ways: multiple routes (or branches) can join together on the same stretch of road; a route or a variant of a route can have a deviation that leaves the main route alignment; or two routes may run a short distance apart as parallel routes. **Figure** 1 illustrates various types of route design that can be operated along a route.

Figure 1 | Route Patterns



3.4.1. Deviations

When a route deviates from the main corridor in which it is operating to serve a specific area or point, it is considered a deviation. Deviations increase the travel time of a route but are often included because of specific demand generators. Deviations should be evaluated based on how much travel time they add to the route or how productive they are compared to the rest of the route.

How to Calculate: To calculate the percent of travel time, divide the one-way trip travel time with the total travel time for the deviation. To calculate the time per passenger, divide the total time added by the segment by the number of passengers boarding the segment.

Table 3 | Deviation Guidelines

Zone	BRT	Framework	Coverage	Commuter
Tier A	No more than 5% of travel time.	No more than 15% of the in-vehicle travel time No more than three minutes per passenger	No more than 25% of the in-vehicle travel time No more than three minutes per passenger	No more than 10% of in-vehicle travel time No more than two minutes per passenger
Tier B	No more than 10% of travel time.	No more than 20% of the travel time No more than three minutes per passenger	No more than 25% of the travel time No more than three minutes per passenger	No more than 15% of travel time No more than three minutes per passenger
Tier C	No more than 10% of travel time.	No more than 25% of the travel time No more than three minutes per passenger	No more than 25% of the travel time No more than three minutes per passenger	No more than 20% of travel time No more than three minutes per passenger

3.4.2. Patterns / Line Groups

Patterns There are certain areas in the WMATA Transit Zone where a route may have multiple patterns that share the same common primary alignment (trunk), but branch off at the ends of the route to serve various destination or origin points. The combined frequency and span of all the patterns along the trunk should be considered together when evaluating whether the service meets the service guidelines.

Routes and Lines WMATA historically has named patterns as routes, combining a package of route patterns into a line to support ease of scheduling and to some extent, ease of service legibility for customers whose trip is within a primary corridor.

Defining Patterns, Routes and Lines As part of the service guidelines, lines are defined as a group of complementary routes serving the same trunk. One route or pattern providing a significant number of trips on the line shall be considered the core route pattern. All other route patterns shall operate at least 60% of their route miles on shared segments with the core route pattern to be considered part of that line group. Exceptions can be made for extensions of routes/lines needed to serve the system at times of the day/night while Metrorail is not operating. Routes that do not meet this criteria should be considered separate lines.

While multiple patterns can help create higher effective frequencies on trunks, they can also lead to operational issues such as bus bunching or on-time performance issues due to delays on certain branches. Multiple patterns also increase confusion and legibility of the system for customers. Routes that have lower productivity on branches should be considered for conversion to feeder routes that will operate from the original destination to the trunk of the route and allow riders to transfer to higher-performing routes or into the main pattern.

How to Calculate: Divide the number of boardings on the unique segments of a line, or unique branches of the route, by the total number of boardings on that route.

Table 4 | Minimum Branch Productivity

Zone	BRT	Framework	Coverage	Commuter
Tier A	20% of passenger volume	15% of passenger volume	10% of passenger volume	10% of passenger volume
Tier B	20% of passenger volume	10% of passenger volume	10% of passenger volume	10% of passenger volume
Tier C	15% of passenger volume	10% of passenger volume	10% of passenger volume	10% of passenger volume

3.4.3. Parallel Corridors

When two bus routes run on nearby parallel corridors for significant distances, it can create duplicative service. This prevents transit agencies from operating the most cost-efficient and effective transit network, since two routes are effectively providing the same service and competing for passengers. **Table 5** shows the minimum distance between corridors that operate routes of each service type.

How to Calculate: Measure the distance between parallel corridors; parallel sections should be at least one mile long.

Table 5 | Minimum Distance Between Parallel Corridors

Zone	BRT	Framework	Coverage	Commuter
Tier A	1 mile	0.5 mile	0.5 miles	0.5 mile
Tier B	1 mile	0.5 mile	1 mile	1 mile
Tier C	1 mile	1 mile	1 mile	2-5 miles

3.4.4. Circuity

Circuity refers to how much diversion there is in a route, and is calculated by comparing the distance the bus travels on its route to the most direct path. Lower circuity means a more direct route for passengers on the route. Limited-access roads such as interstates should not be used in the

calculation unless the route travels on them. Lower circuity means a more direct route for passengers on the route.

How to Calculate: Using a GIS program, find the most direct, non-limited access path to connect the origin and destination of the bus route and compare to the distance of the bus route. If a route does not use limited-access highways, the comparison evaluation should not use them either. Divide the first number by the second to find circuity.

Table 6 | Maximum Circuity

Zone	BRT	Framework	Coverage	Commuter
Tier A	1.75	1.75	-	-
Tier B	1.75	1.75	-	-
Tier C	1.75	1.75	-	-

3.5. Vehicle Size

Vehicle size should be based on a number of factors:

- Service type: commuter vehicles should have high back seats, on-demand services should consider vans/sedans;
- Street geometry: where vehicle size is limited by the turning movements of the vehicles; shorter (30-foot) vehicles may be needed on neighborhood streets;
- Articulated buses are appropriate on high frequency routes that have very high ridership (lines/routes that run at least every 10 minutes during peak periods and every 15 minutes during off-peak periods). Either two-door or three-door articulated buses may be used, depending upon the future procurement needs as defined by the agency; and
- All other services should operate with standard-sized (40-foot) buses.

4. Network and Line/Route Performance Measures and Targets

The following section details Network Performance measures that apply system-wide and Line/Route Performance measures that are applicable at the line/route level. The Network Performance measures establish accessibility and customer service metrics applicable across the region. The Line/Route Performance measures establish productivity, reliability and cost effectiveness targets defined by service types and zones to allow for a normalized route comparison regardless of provider.

The following measures were derived from a review of the existing local agency bus guidelines and were updated to reflect more customer-centric services.

4.1. Network Performance Measures

Network Performance measures are not specific to a given route or operator. Instead, they set targets for accessibility, comfort and safety, and passenger amenities across the WMATA Transit Zone. The purpose of these metrics is to evaluate the network as a whole, rather than focusing on specific lines/routes or operators.

4.1.1. Accessibility Guidelines

This section will lay out targets for accessibility. Accessibility in this context refers to the ability for residents, workers, and visitors to access transit with varying levels of service regardless of operator. One important aspect of access is availability of higher frequency services in locations with higher activity densities (population plus jobs per acre). Certainly, serving areas with high concentrations of low income and/or high minority populations is an important priority. Transit providers may also consider how much of their resources should go to high ridership routes as opposed to routes that may not have as many riders but cover a larger service area**.** This section will lay out targets for accessibility. For the purposes of these analyses and based on industry evidence, one quarter mile is the maximum acceptable distance a passenger will travel to access to a local or coverage route, while one half mile is the assumed distance a passenger will travel to access a higher frequency routes, such as a BRT Route, Priority Corridor, or Metrorail.

Service Accessibility: Frequent Service

High-frequency transit service, equivalent to the BRT/Framework Routes service classifications, should be provided to at least 80 percent of dense census blocks (jobs[2] + people[3] of at least 25 per acre) within the WMATA Transit Zone on both weekdays and weekends.

How to Calculate: Identify census blocks with at least 25 jobs + people per acre (**Figure 2**). Assess the percentage of these census blocks within a half mile of a BRT/Framework Route bus stop or a Metrorail station.

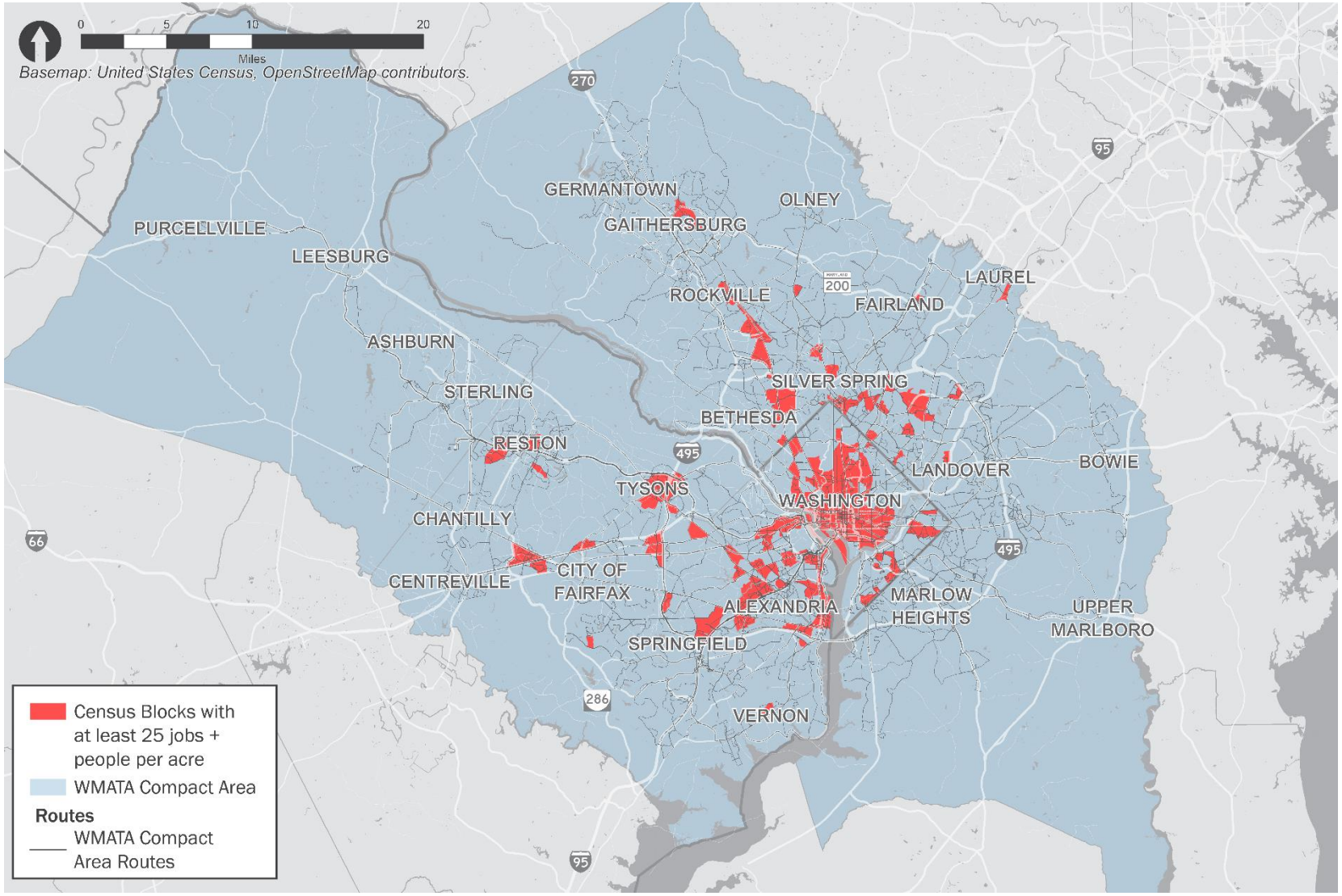
[2] Calculated using Longitudinal Employer-Household Dynamics (LEHD) Data
[3] Calculated using the 2017 American Community Survey (ACS) five-year estimate

Service Accessibility: Base Coverage

Combined, transit providers in the WMATA Transit Zone should serve 90 percent of census blocks with three or more households per acre and/or four or more jobs per acre.

How to Calculate: Identify census blocks with three or more households per acre and/or four or more jobs per acre. Assess the percentage of these census blocks within one quarter mile from a bus stop, rail station or access point to public transportation.

Figure 2 | Census Blocks With at Least 25 Jobs + People per Acre



Data source: (U.S. Census Bureau, 2017) (U.S. Census Bureau, 2015)

Equity Emphasis Areas Accessibility

The Metropolitan Washington Council of Governments developed Equity Emphasis Areas (**Figure 3**) to identify small geographic areas that have significant concentrations of low-income, minority populations, or both.[4] Combined, transit providers in the WMATA Transit Zone should provide some level of transit service within one quarter mile of 95 percent of the Equity Emphasis Areas.

How to Calculate: Assess the percentage of Equity Emphasis Area census blocks within one quarter mile from a bus stop, rail station or access point to public transportation.

Funding Allocation Goal

Transit providers should also consider how much funding resources should go to higher levels of service routes that are more focused on corridor services (such as BRT), as opposed to routes that may have lower levels of service but cover a large area (other route types). Because different transit providers serve areas with different densities, this guideline differs by geography. This metric should be used as a goal and should not limit the ultimate design of a network utilizing the service guidelines detailed in **Section 2.2**.

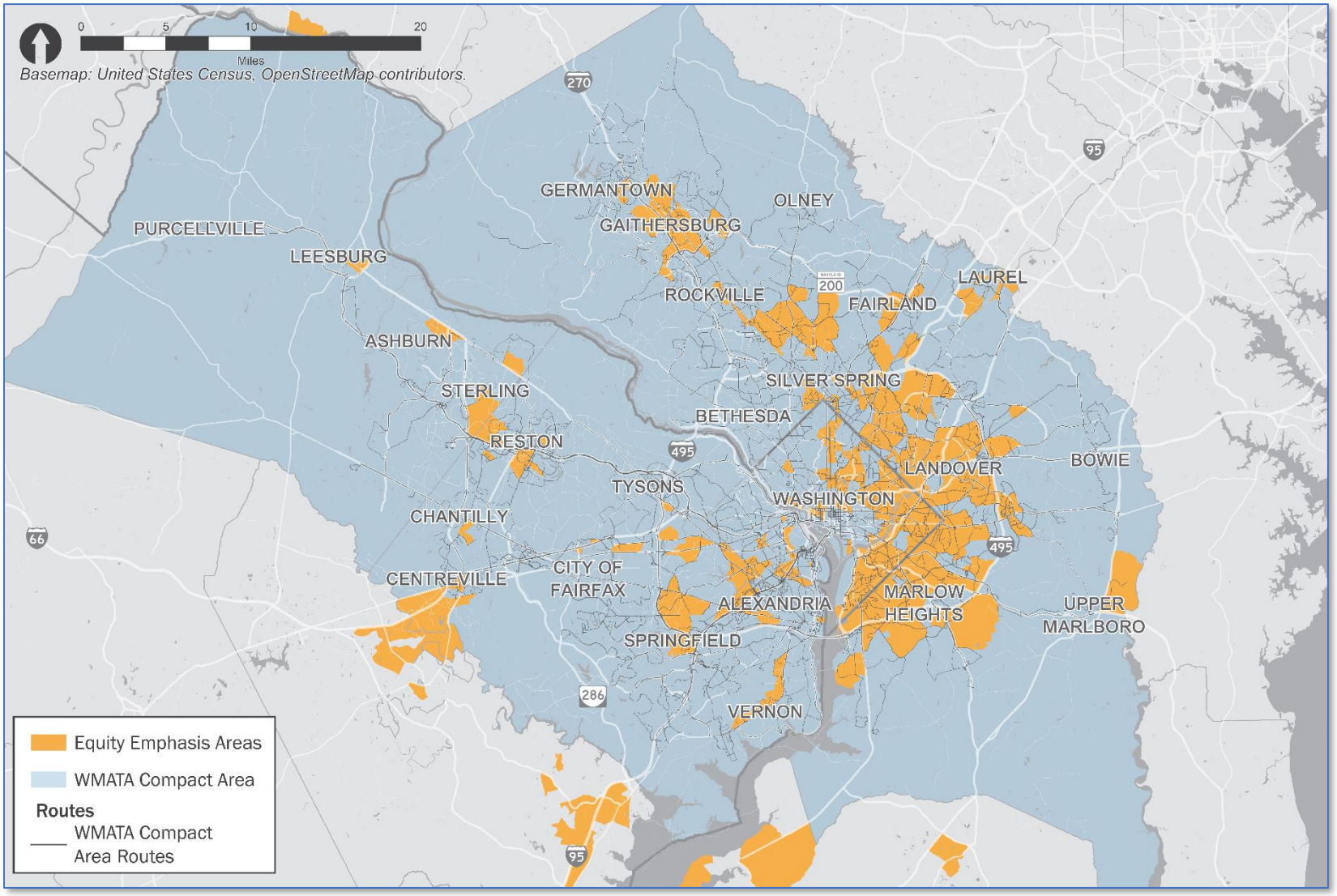
How to Calculate: Operating funds for BRT and Framework Routes divided by total operating funds for fixed-route bus service.

Table 7 | Funding Breakdown Goal

Zone	BRT/Framework Routes	Other Bus Routes
Tier A	85%	15%
Tier B	80%	20%
Tier C	75%	25%

[4] As defined in Visualize 2045 (Metropolitan Washington Council of Governments, 2018)

Figure 3 | Equity Emphasis Areas



Data source: MWCOG Open Data (Metropolitan Washington Council of Governments, 2018)

4.1.2. Safety Guidelines

National Transit Database (NTD) Reportable Bus Collisions

Measuring the number of serious crashes helps transit agencies identify streets, intersections, or routes that are dangerous and may need to be redesigned; it may also identify operators that require additional training.

How to Calculate: Track the total number of NTD reportable collisions. NTD reportable collisions are a subset of the Bus Collision Rate and is based on National Transit Database (NTD) reporting criteria. It reflects bus collisions that result in injuries requiring transport for any involved vehicle or pedestrian, towaway of any involved vehicle, or total damages that cost $25,000 or more

Target NTD Reportable Bus Collisions: *Zero*

Bus Collisions

Measuring the number of crashes by preventability rating helps transit agencies identify streets, intersections, or routes that are dangerous and may need to be redesigned; it may also identify operators who require additional training.

How to Calculate: Track the total number of collisions by preventability rating. Collisions includes all incidents where the transit vehicle comes in contact with another vehicle, object or person, regardless of fault.

Target Bus Collisions: *Zero*

Bus Customer Injuries

The number of passenger incidents help identify which lines/routes are not providing high-quality service for riders or are unsafe for both passengers and operators. This performance measure covers all incidents for which an incident report was filed and includes injuries for bus passengers. Because the number of incidents is just as important regardless of the type of route, the passenger incident target is the same regardless of route type.

How to Calculate: Divide the total number of customer injuries each month by the total number of riders and multiply that number by 10,000.

Maximum Allowable Passenger Incidents*:* *20 per 10,000 riders*

Customer Complaints

Evaluating the number of validated customer complaints can help transit agencies determine what routes are not providing a sufficient quality of service to riders. To best evaluate all lines/routes, the number of validated complaints should be compared to a standard number of riders, so that lines/routes with more riders are not penalized. Additionally, response time to customer complaints should occur in a timely manner.

How to Calculate: For total complaints, divide the total number of validated complaints received each month by the total system ridership. For response time, subtract the complaint received date by

the response date for every complaint within a month. The average response time should be less than three days.

Table 8 | Customer Complaint Metrics

Measure	Metric
Total complaints	Less than 0.95 validated complaints per 10,000 riders
Response time	Respond to customer complaints within 24 hours Address customer complaints within three business days

4.1.3. Facility Guidelines

Passenger Amenities

The WMATA Transit Zone has nearly 14,000 bus stops with various levels and quality of passenger amenities. There are also numerous owners of the facilities and contracts for their maintenance. To create a uniform experience among bus stops in the area, every bus stop should provide a few key passenger amenities. Bus stops with higher ridership merit additional amenities as shown in the enhanced stop type below. Agencies in the WMATA Transit Zone are encouraged to define their bus stops as basic, enhanced, or transit center.

How to Calculate: Inventory the amenities at all WMATA Transit Zone bus stops.

Table 9 | Passenger Amenities Metrics

Stop type	Metric	Amenities
Basic stop	<50 daily passengers	▪ Bus stop sign ▪ ADA 5'x8' landing pad ▪ Sidewalk (accessible pathway) ▪ Bus stop ID number tactile plaque ▪ Lighting during evening service hours
Enhanced stop	≥50 daily passengers, but not located at a Metrorail station or bus transfer center served by ≥5 bus routes	All amenities listed in the basic stop type, plus: ▪ Expanded boarding & alighting area (rear-door access) ▪ Shelter ▪ Seating ▪ Trash receptacle ▪ Information case ▪ System map ▪ Real-time information
Transit center	Located at a Metrorail station or a bus transfer center served by ≥5 bus routes	All amenities listed in the enhanced stop types, plus: ▪ Bus Bays ▪ Multiple shelters as needed

Priority Treatments

There are four types of bus priority treatments that should be considered on a case-by-case basis.

- Movement priority: Improves the travel of transit vehicles on congested roadways by using exclusive bus lanes which are applied where bus volumes exceed 20 per hour (about 1,000 passengers per hour), bus-only streets, and bus use of freeway Bus-on-Shoulder, HOV, or HOT lanes
- Bypass priority: Allows buses to bypass a specific, localized congestion point through queue-jump lanes at intersections, shoulder use by buses, and bus bypass lanes on freeway entrance ramps.
- Exemptions and special handling: Exempts transit vehicles from specific traffic regulations in order to provide more efficient service. These could include turning privileges where the movement is prohibited to other vehicles, mandatory turn lane exemption so the transit vehicle may proceed straight, and priority merge requiring other vehicles to yield to buses pulling away from bus stops.
- Signal system priority: Gives transit vehicles priority at signalized intersections. Passive priority systems take transit operations into account when designing fixed-time signal plans while active priority plans extend the green phase or terminate the red phase of a traffic signal as needed to improve transit operations. Responsive mode systems prioritize all transit vehicles while intelligent mode systems only prioritize those that are behind schedule.

4.2. Line/Route Performance Measures

Performance in this section is measured at the line/route-level and by service type and tier. Comparisons should be made within the type and tier. The purpose of this section is to identify deficiencies in performance that can be addressed at the line/route level.

4.2.1. Productivity

Passengers per Revenue Hour / Trip

Passengers per revenue hour helps compare productivity across lines/routes. In some instances, lines/routes with higher ridership may have longer spans of service or provide more trips throughout the day. Examining the number of riders per revenue hour normalizes line/route performance to allow for comparison between multiple lines/routes with different spans of service, frequencies, or travel times.

How to Calculate: Divide average daily unlinked passenger trips by revenue hours (total time between the first and the last stop of the day). Average is taken from lines/routes within the same service type and zone.

Table 10 | Minimum Passengers per Revenue Hour Target

Zone	BRT	Framework	Coverage
Tier A	35	30	20
Tier B	25	20	15
Tier C	20	15	10

Passengers per trip compares productivity across services that provide long-haul trips that generally carry more passengers across longer distances, with longer stretches of the line/route not allowing passengers to board or alight.

How to Calculate: Divide average daily unlinked passenger trips by daily number of one-way trips. Average is taken from lines/routes within the same service type and zone.

Table 11 | Minimum Passengers per Trip Target

Zone	Commuter
Tier A	20
Tier B	15
Tier C	10

Passengers per Revenue Mile

The passengers per revenue mile metric allows agencies to evaluate the productivity of lines/routes with different route lengths. It can also be helpful when comparing lines/routes that operate in areas with higher levels of congestion to those that do not, since the time each route spends in traffic is not factored into the passengers per revenue mile. This performance measure may not effectively represent longer, limited stop routes that are often longer distance routes.

How to Calculate: Average daily unlinked passenger trips divided by revenue miles (total miles between the first and the last stop of the day). Average is taken from lines/routes within the same service type and zone.

Table 12 | Minimum Passengers per Revenue Mile Target

Zone	BRT	Framework	Coverage	Commuter
Tier A	5.0	4.0	4.0	1.5
Tier B	2.0	2.0	2.0	1.0
Tier C	2.0	1.0	1.0	1.0

Unique Segment Ridership

Unique segment ridership is a measure of the percentage of ridership that occurs on unique segment of a route that is not served by another route. The table below shows the recommended percentage of unique segment ridership for each service classification.

How to Calculate: Total boardings on unique segment divided by the total boardings on the route.

Table 13 | Minimum Percent of Unique Ridership Target

Zone	BRT	Framework	Coverage	Commuter
Tier A	25%	10%	10%	15%
Tier B	25%	10%	10%	15%
Tier C	20%	10%	10%	15%

4.2.2. Reliability

On-Time Performance

On-time performance is an indicator of the reliability of a line/route and affects customer satisfaction. It illustrates how closely delivered service adheres to published schedule, measured as schedule-based or headway-based depending on the scheduled service headway.

For schedule-based service, it refers to the percentage of trips that depart a certain timepoint relative to their scheduled departure time. A schedule-based performance measure involves defining “on-time” based on a window that usually defines when a trip is too early or late relative to its scheduled departure.

For headway-based service, it refers to the percentage of trips that depart a certain timepoint relative to the scheduled service headway. A headway-based performance measure involves defining “on-time” based on a buffer that usually defines when a trip is late relative to the scheduled service headway.

How to Calculate: Percent of timepoints delivered on-time. All timepoints should be examined, not just the beginning or end of the route.

Schedule-based service is measured as the percent of timepoint pull-outs that are between two minutes early and seven minutes late. The last timepoint of the route is considered on-time if the bus arrives no greater than seven minutes late.

Headway-based service is measured as the percent of timepoint pull-outs that are no greater than the scheduled service headway plus three-minutes after the pull-out time of the bus ahead.

Minimum On-Time Performance Target: Current target is 79 percent, however Metro’s Office of Transit Performance Management reviews this target annually with the intention to improve this target measure.

Customer Trip Time

Customer trip time is an indicator of how well service meets the schedule and customers reach their destination on-time. It illustrates how closely service adheres to the published schedule, measured as the percentage of customers who complete their trip within 5-minutes of the scheduled time.

How to Calculate: Divide the number of customer trips completed on-time by total customer trips. A customer trip is considered on-time if excess wait time plus additional travel time is less than or equal to 5-minutes.

Excess wait time is measured as the actual wait time (actual headway divided by 2) minus the scheduled wait time (scheduled headway divided by 2) for BRT and Framework Routes and as actual arrival time minus scheduled arrival time for all other services.

Additional travel time is measured as the end-to-end travel time that exceeds the schedule.

Minimum Customer Trip Time Target: Once this measure is established, it will be launched as a pilot measure. After one year of baseline data is collected, Metro's Office of Transit Performance Management will review performance and establish an annual target.

Crowding

Crowding evaluates which lines/routes may not be safely and/or comfortably transporting riders due to overcrowding by evaluating the percentage of passenger time spent on vehicles that exceed crowding guidelines. The target vehicle load often varies based on trip frequency and between the peak and off-peak periods: higher transit demand deserves more service, but riders may be more likely to tolerate standing, especially if their trip distances are relatively short.

Generally, headways of more than 20 minutes should have maximum load of 100% of seated capacity, while service with shorter headways can allow 120% of seated capacity. This is reflected in general in **Table 12**, though lines/routes should be evaluated individually. For example, Tier B Framework Routes have a maximum headway of 30 minutes (**Table 1**), and such a line/route would have a target maximum vehicle load factor of 100% of seated capacity; if a particular line/route, however, had headways of 15 minutes during the peak period, it would have a target maximum vehicle load of 120% of seated capacity.

How to Calculate: Divide the number of crowded passenger minutes by the total number of passenger minutes.

Maximum Crowding Target: Current target is 5 percent, however Metro's Office of Transit Performance Management reviews this target annually with the intention to improve this target measure.

Vehicle Load Factor

The vehicle load factor evaluates which lines/routes may not be safely and/or comfortably transporting riders due to overcrowding. The target vehicle load factor often varies based on trip frequency and between the peak and off-peak periods: higher transit demand deserves more service, but riders are more likely to tolerate standing. Generally, headways of more than 20 minutes should have maximum load factor of 1.00, while frequencies below this can allow 1.20. This is reflected in general in **Table 12**, though lines/routes should be evaluated individually. For example, Tier B

Framework routes have a maximum headway of 30 minutes (**Table 1**), and such a line/route would have a target maximum vehicle load factor of 1.00; if a particular route, however, had headways of 15 minutes during the peak period, it would have a target maximum vehicle load factor of 1.20.

How to Calculate: Divide the average maximum number of passengers that a trip is carrying by the total seated passenger capacity of the vehicle that is making the trip.

Table 14 | Maximum Capacity/Load Target

Zone	Time Period	BRT	Framework	Coverage	Commuter
Tier A	*Peak*	1.20	1.20	1.20	1.00
	Off-peak	1.00	1.00	1.00	
Tier B		1.00	1.00	1.00	1.00
Tier C		1.00	1.00	1.00	1.00

4.2.3. Cost Effectiveness

Operating Cost per Passenger Trip

Operating cost per passenger trip helps agencies compare the amount of funding needed to operate a certain line/route to the use of the service. Lines/Routes with more frequent service have higher operating costs, since they require more buses and operators, but can have a lower operating cost per passenger trip due to their relatively high number of riders.

How to Calculate: Divide total operating cost for the line/route by the number of passenger trips on the route. Average is taken from lines/routes within the same service type and zone.

Table 15 | Maximum Operating Cost per Passenger Trip Target

Zone	BRT	Framework	Coverage	Commuter
Tier A	$3.50	$5.00	$5.00	$7.00
Tier B	$4.50	$5.00	$5.00	$7.00
Tier C	$4.50	$7.00	$7.00	$7.00

Cost Recovery

Cost Recovery measures the portion of operating expenses that is covered by passenger fares. Lines/Routes with low cost recovery ratios may have low ridership or operating costs that are too high to support the current ridership levels in a cost-effective manner.

How to Calculate: Divide passenger fares by operating costs.

Table 16 | Minimum Cost Recovery Target

Zone	BRT	Framework	Coverage	Commuter
Tier A	30%	25%	25%	25%
Tier B	20%	20%	20%	20%
Tier C	20%	20%	20%	20%

4.3. Additional Evaluations

Transit providers regularly evaluate additional data beyond the metrics provided in the previous sections. Evaluating routes for not only ridership but also transfer opportunities and origin-destination movement along a route can highlight potential areas of improvement. Assessing ridership on road segments across multiple routes can provide a clearer picture of corridors where transit utilization is high. While further operational analyses can highlight areas where service can be more efficient and reliable, the following sections introduce additional analyses that can be conducted at both a route and network level to assist in the development of transit services throughout the Washington, DC region.

4.3.1. Service Analyses

After utilizing the above metrics in Chapters 3 and 4 above, Metro may choose to pursue additional enhancements to provide a deeper understanding of what is occurring along a route that makes it successful or hinders its productivity. The following is a list of potential enhancements for consideration and support of Metro's commitment to a culture of continuous improvement for Metrobus.

Travel Analyses

Ridership by Road Segment

This metric looks at the total number of people riding buses on a road segment, regardless of route. This can be a useful statistic in evaluating potential for bus priority measures along the roadway and at intersections.

Origin-Destination Matrix

Systemwide origins and destinations show where there is demand within the current system and help transit providers on a planning level. This is useful in understanding how passengers are moving along a line/route, as well as throughout the system and region, and can be used to design more direct connections.

Top Transfer Locations/Services

Riders often have to spend time at transfer locations; therefore, these are locations to consider focusing on for customer comfort and wayfinding infrastructure and services. This metric also identifies areas that should be evaluated for capacity as new services are added/adjusted.

Operational Analyses

Revenue versus Non-Revenue Hours/Miles

Revenue versus non-revenue hours/miles is a comparison of the total hours/miles operated in revenue (or in service) to the total number of non-revenue hours/miles (travel between the garage and start/end of the route). The intent of this metric is to understand how efficiently service is being operated, in particular regarding garage assignment, run cutting, and route design. This analysis can be conducted at both the network and route level.

Passenger Miles per Revenue Mile

Whereas peak load shows the maximum number of people on a bus, passenger miles per revenue mile show how the route performs overall in terms of usage. For example, are passengers using the route for short trips or longer trips.

Operating Cost per Passenger Mile

Total operating costs for the route divided by the number of passenger miles on the route. This metric evaluates how productively a route is operating based upon how it is being used (i.e., for shorter trips or for longer trips).

Service Delivery

Unfortunately, not every scheduled trip occurs. Whether this is because of a driver scheduling error, driver absence, or bus malfunction, trips can be cancelled, which makes service more unpredictable and the bus a less attractive option to riders. This statistic shows the ratio of daily trips delivered and daily trips scheduled.

5. Line/Route Value and Benefit Score

Complementing the application of service guidelines, above, it is often valuable to examine individual lines/routes in context of their relative contribution to the overall network, as not all lines/routes serve the same purpose. This allows the transit agency to manage its bus network as a portfolio and to keep an eye towards how individual line/route decisions may be related to the overall network's value to the region's residents.

The section below provides a method for comparing Lines/Routes with the above context in mind and should be used as a companion evaluation annually. It may identify strengths and weaknesses in the interrelationship between lines/routes and also provide decision-makers with a way to assess their relative performance versus one another when considering their contribution to the entire bus network.

This line/route evaluation rubric is a way to easily measure and compare the performance of each route based on ridership, demographics, and the network value of the route. It results in a benefit score for each line/route on a variety of factors and visually displays the results in an easy to understand graphic **(Figure 4).** The purpose of this rubric is to provide a mechanism to visually compare routes and identify and prioritize investments and improvements when resources are limited.

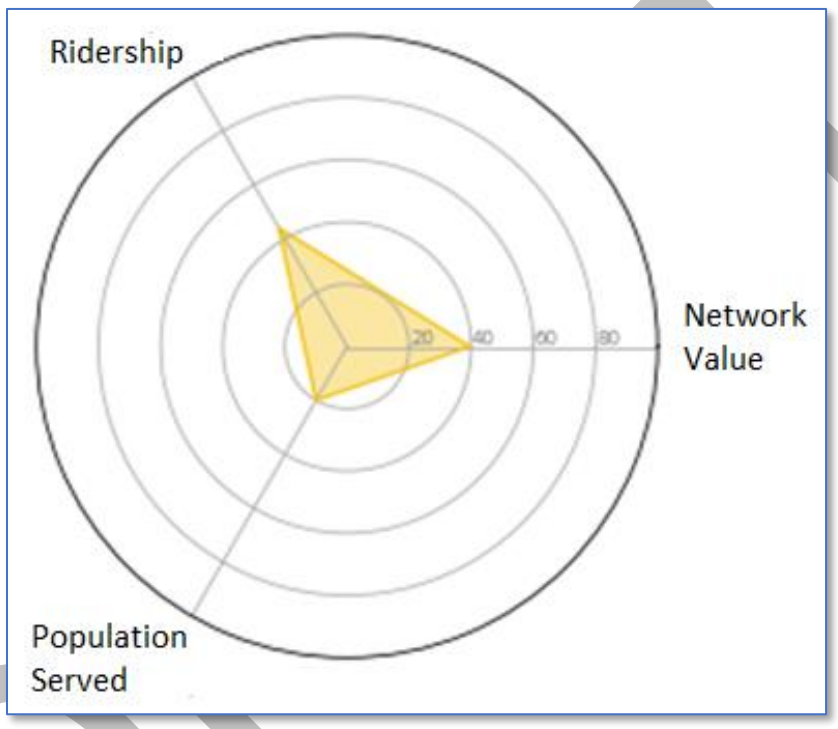
For this evaluation, each route will be compared to three key characteristics:

- **Ridership:** Total average weekday ridership measures the demand for the line/route.
- **Population Served:** Not all line/routes have the same purpose. Each service type has its own function within the transit network. Therefore, each service type will be measured against access by one of the populations below:
    - **General Population (BRT/Framework Services):** Providing access to high frequency service to as many people as possible is important to the success of a region's transit network. This metric is measured by the percentage of the population (using Census data) within a half mile of a bus stop.
    - **Transit-Dependent (Coverage Services):** Access to routes for transit-dependent[5] populations is a way to value social equity. A line/route provides greater benefit if it provides access to people with limited transportation options. This metric is measured by the percentage of the transit-dependent population within a quarter mile of a bus stop.
    - **Commuters (Commuter Services):** Commuter ridership is a way to evaluate routes focused on providing efficient transportation options to employment opportunities. This metric is measured by the percentage of the labor force within one quarter mile of a bus stop on the origin end of a route or within one mile from a Park and Ride served by the route.
- **Network Value:** The value of the route to the network acknowledges that each bus line/route does not stand alone; bus services comprise a critical element of the overall transit network. This component includes three subcomponents: transfers, unique access for people, and access to destinations.

[5] Transit dependent is defined as low-income or zero-car households.

- **Transfers:** The number of transfers (e.g. bus to bus or bus to rail transfers) from that line/route to the rest of the transit network gives the line/route credit for its role as a feeder into the system.
- **Unique Access for People:** This metric examines the percentage of ridership that occurs on unique segments of a line/route that are not served by other lines/routes, including local jurisdictional partners.
- **Access to Destinations:** The number of jobs and other destinations the line/route serves, estimated from the Longitudinal Employer-Household Dynamics (LEHD) data.

Figure 4 | Example Framework Route Evaluation Graphic



Once these individual metrics are evaluated, then a **Line/Route Benefit Score** will be developed for each line/route. This score will enable Metro to prioritize the line/routes that should to be addressed during the planning process. With limited resources, not all lines/routes will be able to be brought up to meet the guidelines.

This score is a composite index of the ridership, population served, and network value scores. Each component can be weighted. The weights can be revised annually by Metro, prior to annual service planning. For example, if Metro feels that ridership is the most important indicator of a line's/route's value, a distribution of the weight could be as shown below. This would result in routes with high ridership receiving a high benefit score. Those with low ridership might be considered for restructuring or elimination.

- **Ridership:** 70 percent
- **Population:** 15 percent
- **Value to the network:** 15 percent

Alternatively, if Metro felt that population served and network value were on par with ridership, the following weights could be as follows:

- **Ridership:** 30 percent
- **Population:** 35 percent
- **Value to the network:** 35 percent

6. Performance Improvement Plan

Establishing guidelines and applying them to improve service are two differing things – the latter will take time and continuous attention to bus route/line performance. While the service guidelines provide Metro with an understanding of how specific lines/routes meet a variety of metrics, they do not provide the necessary guidance on how to determine which lines/routes may see improvements, especially when resources are limited. This section identifies the framework to modify existing service or for adding new services.

6.1. Annual Line Performance Reports

Annually, Line Performance Reports for each line should be prepared to provide a reporting of level of service, accessibility, and performance data as well as an update of its Line/Route Benefit Score. Typically, the level of service and accessibility data are unlikely change year over year unless there has been a significant change to the line/route. However, service performance can change and those measures should be reviewed according to the metrics and targets outlined above. The Annual Line Performance Report should provide information to allow for immediate actions that can be made to modify service (frequency or alignment changes).

6.2. Justification of Service Changes

The Line/Route Service Performance Measures (Chapter 4.2) demonstrate the productivity and efficiency targets that provide staff with the justification to add, restructure, or reduce service to improve performance and assure adequacy of service to the riding public. By evaluating all lines/routes against targets, it is possible to identify lines/routes where additional service will benefit passengers, as well as lines/routes where a reduction of service could enhance economic return to the region. For lines/routes that are within 80 percent of the target or better, the lines/routes would be considered acceptable. For lines/routes that are below 60 percent of the target, the lines/routes would be considered unacceptable and be considered for major changes or elimination. Those between 60 and 80 percent will be reviewed for possible modifications.

6.2.1. Major Restructuring or Elimination of Existing Services Justifications

Line/routes that are below 60 percent of the established targets and have a low Line/Route Benefit Score should be evaluated for restructuring or elimination. Depending on the situation, restructuring might include:

- Alignment/stop adjustments
- Level of service changes
- Changes to service type
- Other operational changes.

Any subsequent restructuring should be conducted in accordance with Metro's public involvement processes, including Title VI, Environmental Justice, and other applicable equity analyses and measures.

6.2.2. Adjust Existing Services Justifications

For changes to existing service the following factors should be assessed:

- Added travel time for existing passengers
- Transfer connections

These factors give a good indication of the potential success of a proposed new service or adjustment to existing service. There may be a strong political push that a new service be implemented, or an adjustment be made to an existing service regardless of the outcome of the New Service Evaluation. The goal of the evaluation is not to make the decision if a service change should be implemented, but to provide our professional judgment regarding the potential success of a proposed service change.

6.2.3. New Service Justification

In addition to restructuring, there may be a need to add new service. In such instances, any requests for new services should be evaluated based on the following criteria:

- Transit potential (people plus jobs) index
- Projected ridership
- Projected operating costs
- Projected fare revenue
- Key characteristics and demographics of the market

6.3. Post Implementation Review of Service Requests

After a recommended new service or existing service change is implemented its performance should be reviewed. At the end of 18 months, when ridership on the new or adjusted services will generally have approached its "mature state," passenger counts should be taken, and the performance of the route reviewed. Based on its performance a decision concerning its future should be made.

In most cases, service changes which have a minimal cost do not require a detailed review. If the new service is found to be meeting its goal, then it is deemed to be fulfilling a public need at no significant additional cost. Unless its implementation has resulted in operational difficulties, its confirmation as a permanent service should be recommended.

In contrast, new or major service changes are subject to a more detailed performance review at the conclusion of the eighteen-month trial period. If the minimum threshold target is not being achieved, or if the actual ridership of the route is below that forecast, the service is either recommended for elimination or changed to improve its performance. The agency may also consider giving it additional time to improve if ridership trends indicate that it may achieve the minimum threshold. Services which have met or exceeded the minimum threshold are recommended as permanent.

7. Summary of Peer Transit Agency Service Guidelines

Below are two tables that reflect the service guidelines from many of Metro's peer agencies, both nationally (**Figure 5**) and within the Washington region (**Figure 6**) and how Metro's current guidelines compare. As shown below, Metro's peers tend to have significantly more guidelines that reflect the customer experience. Additionally, the majority have been updated in recent years, likely to reflect advancement in data availability and analysis skills. Our local partners also tend to utilize guidelines that reflect the customer experience. All have been updated since 2014, with many more recently, typically as part of their Transit Development Plan.

Figure 5 | Peer Comparison for Bus Service Guidelines

	Year	Span of Service	Service Headway	Stop Frequency	Coverage	Route Design	Reliability	Comfort	Productivity	Effectiveness
Metrobus Current	2000							X	X	X
MBTA Boston, MA	2017	X	X		X		X	X		
MTA Baltimore, MD	2017		X		X		X	X		X
NYCT New York, NY	1986		X	X	X		X	X	X	X
SEPTA Philadelphia, PA	2020	X	X	X	X	X	X	X	X	X
LA Metro Los Angeles, CA	2019	X	X	X		X	X	X		
MARTA Atlanta, GA	2018	X	X	X	X		X	X	X	X
CTA Chicago, IL	2014		X	X	X		X	X		
MDT Miami, FL	2009	X	X	X	X	X	X	X	X	X

Figure 6 | Comparison of Local Bus Provider Service Guidelines

	Year	Span of Service	Service Headway	Stop Frequency	Coverage	Route Design	Reliability	Comfort	Productivity	Effectiveness
Metrobus Current	**2000**							**X**	**X**	**X**
DC Circulator Washington, DC	2014		X	X			X		X	X
ART Arlington County	2016	X	X	X	X		X	X	X	X
CUE City of Fairfax	2017	X			X		X		X	X
DASH City of Alexandria	2019				X		X			X
Fairfax Connector Fairfax County	2016	X	X	X			X	X	X	X
Loudoun County Transit Loudoun County	2019	X	X	X			X	X	X	X
Ride On Montgomery County	2017		X		X		X	X		
TheBus Prince George's County	2017	X	X			X			X	

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