

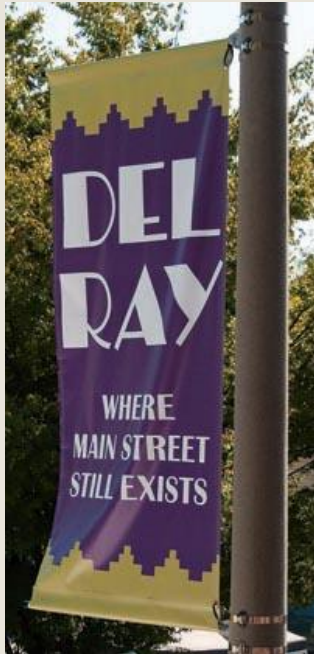
Metrobus Service Evaluation Study

10A, 10E – Hunting Point - Pentagon Line,

10B – Hunting Point - Ballston Line

Final Report

December 2013



Study Purpose

- *The primary study purpose is to review capacity, productivity, and quality of service indicators, identify the need for customer facilities, and prepare recommendations to improve service delivery for the Hunting Point – Pentagon and Hunting Point – Ballston Lines.*

Project Scope of Work

- *Transit Service Assessment*
 - Develop a detailed assessment and “snapshot” of the Hunting Point-Pentagon and Hunting Point-Ballston Lines
 - Overall service characteristics, ridership and productivity, boardings and alightings, passenger loads, bus stop spacing, on-time performance, driver and planner interviews
- *Traffic Operations Assessment*
 - Identify the full range of traffic issues on the Hunting Point-Pentagon and Hunting Point-Ballston Lines
 - Traffic signals and other traffic control devices
 - Lane widths and right-of-way
 - Turns and adequate turning radius

Project Scope of Work

- *Public Outreach*
 - Rider survey to gauge issues and needs
 - Two public meetings, a focus group and three “Pop-Up” meetings at Ballston Metro, S. Walter Reed Drive and Shirlington Transit Center
 - Issues identification
 - Feedback on preliminary recommendations
 - Outreach results were key input into the study process and recommendations

Project Scope of Work

- *Recommendations*

- Completed in two steps

- Preliminary recommendations – relied on inputs from all previous steps
- Final – incorporate project team comments

- Areas covered by recommendations

- Improved frequencies on the 10B in order to meet WMATA service frequency guidelines
- Routing adjustments on the 10A, E and 10B
- Scaling back of evening service levels and hours of service on the 10A to save resources
- Passenger facilities
- Traffic and running way improvements
- Schedule adjustments to reflect actual run times

Line Summary

- Hunting Point – Pentagon (10A, E) Line Description
 - The Hunting Point–Pentagon Line, (10A,E) is an arterial line running between the Hunting Point Apartment complex in Alexandria and the Pentagon and Rosslyn in Arlington.
 - The 10A route pattern begins at the Hunting Point Apartment complex in Alexandria and runs north through Old Town Alexandria via Washington Street and the Del Ray neighborhood via Mount Vernon Avenue before serving Crystal City and the Pentagon. The line serves the Braddock Road, Crystal City, and Pentagon Metrorail Stations.
 - The 10E route pattern begins at the Braddock Road Metro station and follows the same routing as the 10A as far as the intersection of Arlington Ridge Road and 23rd Street. It accesses the Pentagon via Arlington Ridge Road and then runs south into Crystal City before running north into Rosslyn via Jefferson Davis Highway. The line serves the Braddock Road, Pentagon, Crystal City, and Rosslyn Metrorail stations.

Line Summary

- Hunting Point – Ballston (10B) Line Description
 - The Hunting Point–Ballston Line, (10B) is an arterial line running between the Hunting Point Apartment complex in Alexandria and Ballston.
 - In Alexandria, the 10B follows the same routing as the 10A via Washington Street and Mount Vernon Avenue. In Arlington the line runs via S. Glebe Road, the Arna Valley, Walter Reed Drive, N. Glebe Road and Randolph Street. The line serves the Braddock Road and Ballston Metrorail Stations.

Line Summary

- Service Characteristics

- Days and hours of service (start of first trip to start of last trip)

	Hunting Point – Pentagon Line (10A, E)	Hunting Point – Pentagon Line (10B)
Northbound		
Weekday	4:51 AM to 12:00 AM	5:10 AM to 12:30 AM
Saturday	5:18 AM to 12:00 AM	5:35 AM to 12:28 AM
Sunday	6:15 AM to 10:15 PM	5:38 AM to 9:51 PM
Southbound		
Weekday	5:28 AM to 12:35 AM	5:41 AM to 12:52 AM
Saturday	5:53 AM to 12:35 AM	6:13 AM to 12:37 AM
Sunday	6:59 AM to 11:05 PM	6:29 AM to 11:12 PM

Line Summary

- Weekday Ridership and Productivity

Line	Productivity Measure	Value	Minimum WMATA Standard
Hunting Point-Pentagon Line (10A, E)	Daily ridership	2,452	>385
	Cost recovery from fares	31.9%	>14.96%
	Boardings/trip	27.9	>9.49
	Subsidy/passenger	\$2.10	<\$5.90
	Boardings/revenue mile	3.7	>1.02
Hunting Point-Ballston Line (10B)	Daily ridership	2,589	>385
	Cost recovery from fares	27.4%	>14.96%
	Boardings/trip	34.6	>9.49
	Subsidy/passenger	\$2.59	<\$5.90
	Boardings/revenue mile	3.2x	>1.02

Source: WMATA Productivity Report – March 2013

Line Map



Study Findings

- Inadequate Service Frequency
 - Based on WMATA guidelines for service frequency, the 10B has inadequate service frequencies during the weekday peak periods as well as on Sunday
- Indirect Routing
 - There are three instances where indirect routing results in inconvenience for through riders. These are:
 - The 10B diversion through the Arna Valley in Arlington
 - The 10B diversion through Shirlington
 - The 10E access to Jefferson Davis Highway from the Pentagon via Crystal City

Study Findings

- On-Time Performance
 - A review of the on-time performance data on 10 Line trips shows that on-time performance on each of the 10 Lines falls below WMATA goals for on-time performance during many times of the day, and during all days of the week. The most significant issues occur on Saturdays, on both lines
- Insufficient Run Time
 - Review of NextBus data identified multiple instances of insufficient run time when compared to actual run times.

Study Findings

- Passenger Facilities
 - Bus stop spacing - multiple stops are too close together based on WMATA bus stop spacing guidelines.
 - Multiple stops lack basic bus stop amenities as outlined in the WMATA Bus Stop Guidelines.
- Productivity
 - Lower boardings per trip than during other times of the day on evening trips on the 10A on both weekdays and weekends.

Service Recommendations

Recommendation #1

- *Recommendation*

- Strengthen transit link between Alexandria and Ballston through staged implementation of different elements of the overall recommendation
 - 1.1 - Remove 10B diversion through the Arna Valley in order to make the trip between Alexandria and Ballston more direct (short-term implementation)
 - 1.2 - Improve 10B service frequencies during the weekday peak periods from current 30 minutes to 15 minutes (mid-term implementation)
 - 1.3 - Evaluate potential to implement limited stops service between Alexandria and Ballston. Multiple options evaluated (potential longer-term implementation – not recommended for implementation at this point)

Service Recommendations

Recommendation #1 (cont.)

- Limited Stop Service Options Evaluated
 - 1.3.1 - Full Length Bi-Directional Peak Period Service between Hunting Point and Ballston via Mount Vernon Avenue
 - 1.3.2 - Full Length Bi-Directional Peak Period Service Between Hunting Point and Ballston via new Route 1 Transitway rather than Mount Vernon Avenue
 - 1.3.3 - Shortened Bi-Directional Peak Period Service between Braddock Road Metro and Ballston via Mount Vernon Avenue

Service Recommendations

Recommendation #1 (cont.)

- Limited Stop Service Options Evaluated
 - 1.3.4 - Full Length Single Direction Peak Period Service between Hunting Point and Ballston – northbound service in the AM peak, southbound service in the PM peak
 - 1.3.5 - Shortened Single Direction Peak Period Service between Braddock Road Metro and Ballston - northbound service in the AM peak, southbound service in the PM peak

Service Recommendations

Recommendation #1 (cont.)

- Proposed Limited Stop Service Stops – Service via Mount Vernon Avenue
 - Ballston Metrorail Station
 - N. Glebe Road & Pershing Drive
 - S. Glebe Road & Columbia Pike
 - S. Glebe Road & W. Glebe Road
 - Mount Vernon Avenue & Executive Avenue (also covers high ridership stop at Mount Vernon Avenue & Russell Road)
 - Mount Vernon Avenue & W. Glebe Road
 - Mount Vernon Avenue & Hume Avenue
 - Mount Vernon Avenue & Bellefonte Avenue
 - Braddock Road Metrorail Station
 - S. Washington Street & King Street
 - Hunting Point

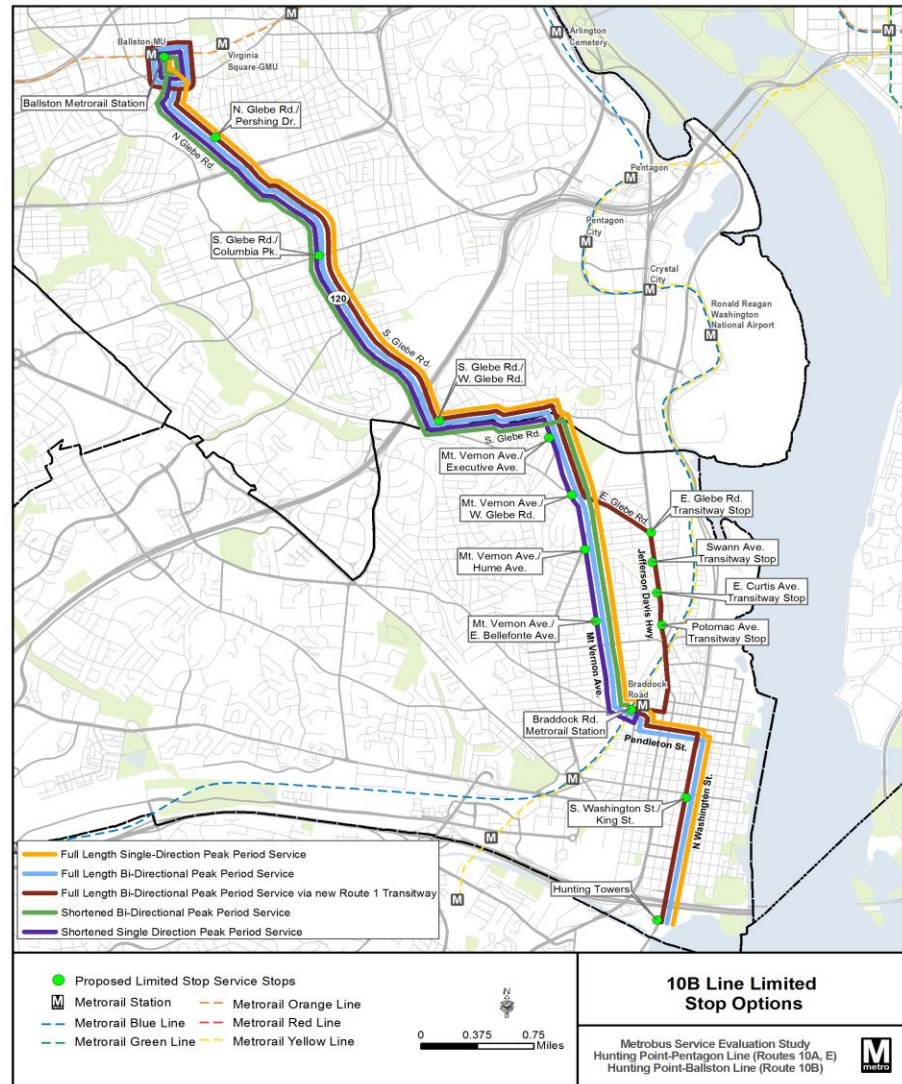
Service Recommendations

Recommendation #1 (cont.)

- Proposed Limited Stop Service Stops – Service via Route 1 Transitway
 - Ballston Metrorail Station
 - N. Glebe Road & Pershing Drive
 - S. Glebe Road & Columbia Pike
 - S. Glebe Road & W. Glebe Road
 - Jefferson Davis Highway & E. Glebe Road Transitway Stop
 - Jefferson Davis Highway & Swann Avenue Transitway Stop
 - Jefferson Davis Highway & E. Custis Avenue Transitway Stop
 - Jefferson Davis Highway & Potomac Avenue Transitway Stop
 - Braddock Road Metrorail Station
 - S. Washington Street & King Street
 - Hunting Point

Service Recommendations

Limited Stop Service Options and Stop Locations



Service Recommendations

Recommendation #1 (cont.)

- *Recommendation Purpose*
 - The current 10B service is the most direct transit connection between Alexandria and Ballston and is the only bus connection between these two destinations. The removal of the diversion through the Arna Valley will make the service more direct and the improvement in headways will make the service more convenient for riders, thus strengthening this important transit connection. Limited stop service would also strengthen connection but is not recommended at this time. Evaluation of longer-term demand will highlight whether limited stop implementation is warranted.

Service Recommendations

Recommendation #1 (cont.)

- *Estimated Operating Costs and Cost Effectiveness Measures*
 - 1.1 - Removal of service from Arna Valley – estimated cost savings of \$239,544

Service Recommendations

Recommendation #1 (cont.)

- *Estimated Operating Costs and Cost Effectiveness Measures*
 - 1.2 - Improve weekday peak period service frequency from 30 minutes to 15 minutes
 - Estimated annual operating cost change due to service changes
 - With run time savings from removal of Arna Valley diversion: \$818,570
 - Without run time savings from removal of Arna Valley diversion: \$1,023,212
 - Estimated cost per rider – before and after service change
 - With run time savings from removal of Arna Valley diversion:
 - » Before: \$1.13
 - » After: \$2.97
 - Without run time savings from removal of Arna Valley diversion:
 - » Before: \$1.13
 - » After : \$3.48

Service Recommendations

Recommendation #1 (cont.)

- *Estimated Operating Costs and Cost Effectiveness Measures*

- 1.3 Limited Stop Options

- Estimated annual operating cost change due to service changes

- 1.3.1 - Full Length Bi-Directional via Mount Vernon Avenue: \$1,432,497
- 1.3.2 - Full Length Bi-Directional via Route 1 Transitway: \$1,432,497
- 1.3.3 - Shortened Bi-Directional – Braddock Road to Ballston: \$1,023,212
- 1.3.4 - Full Length One Direction: \$ 627,570
- 1.3.5 - Shortened One Direction – Braddock Road to Ballston: \$ 463,856

Service Recommendations

Recommendation #1 (cont.)

- *Estimated Operating Costs and Cost Effectiveness Measures*
 - Limited Stop Options
 - Estimated cost per rider – before and after service change
 - 1.3.1 - Full Length Bi-Directional via Mount Vernon Avenue:
 - » Before: \$4.47
 - » After: \$9.32
 - 1.3.2 - Full Length Bi-Directional via Route 1 Transitway:
 - » Before: n/a (new service, no current ridership)
 - » After: \$6.59
 - 1.3.3 - Shortened Bi-Directional – Braddock Road to Ballston:
 - » Before: \$4.19
 - » After: \$7.80
 - 1.3.4 - Full Length One Direction:
 - » Before: \$3.53
 - » After: \$6.85
 - 1.3.5 - Shortened One Direction – Braddock Road to Ballston:
 - » Before : \$3.22
 - » After: \$5.69

Service Recommendations

Recommendation #2

- *Recommendation*
 - Modify 10A, E Routing
 - 2.1 – Remove 10A from Pentagon and Extend to Rosslyn
 - 2.2 – Terminate 10E Service at Pentagon
- *Recommendation Purpose*
 - The foundation of this recommendation is the belief of the project team that a bus connection from Alexandria and south Arlington to Rosslyn to supplement Blue Line service is important and necessary.
 - Utilizing a modified 10A that does not enter the Pentagon will allow a much more direct routing to access Jefferson Davis Highway, thus making the extension into Rosslyn a true alternative to Blue Line service.
 - Longer term, an extension of this service into the District of Columbia may be considered.

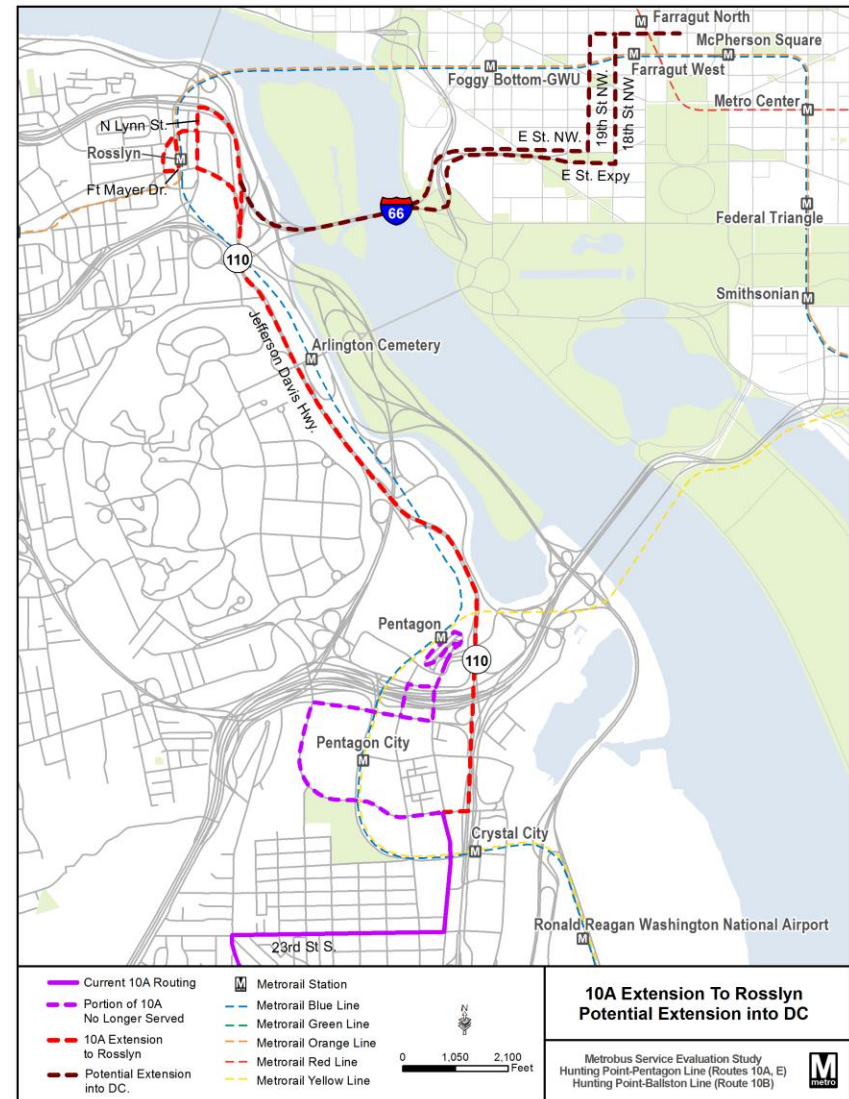
Service Recommendations

Recommendation #2 (cont.)

- *Estimated Annual Operating Cost Associated with Change*
 - \$47,374

Service Recommendations

Recommendation # 2 –
10A re-route and
extension to Rosslyn –
potential longer term
extension to DC



Service Recommendations

Recommendation #3

- *Recommendation*

- Scale Back 10A Evening Service Throughout Week – Change Frequencies and Hours of Service

- Weekday

- Scale back service frequencies on southbound 10A trips to 60 minutes after 8:00 PM (the service frequency on northbound trips is already 60 minutes after 8:00 PM).
- In addition, after 10:00 PM, end all 10A trips at Braddock Road rather than running all the way to Hunting Point.

- Saturday and Sunday

- Scale back 10A service frequencies on all trips after 8:00 PM to 60 minutes.
- In addition, end all trips between 8:00 PM and 10:00 PM at the Braddock Road Metro Station rather than running all the way to Hunting Point.
- Eliminate all 10A trips after 10:00 PM on weekends

Service Recommendations

Recommendation #3 (cont.)

- *Recommendation Purpose*
 - Late evening service on the 10A on both weekdays and weekends has lower boardings per trip than during other times of the day. Given the fact that the majority of the service area where the recommended changes are proposed is also served by the 10B, the recommended scaling back of service should have limited impacts.
- *Estimated Annual Operating Savings Associated with Change*
 - \$99,745

Service Recommendations

Recommendation #4

- *Recommendation*

- Improve Sunday Service Frequency on the 10B Line to 30 Minutes from 60 Minutes between 7:00 AM and 8:00 PM

- *Recommendation Purpose*

- The portion of the shared 10A/10B Lines in Alexandria have a combined service frequency of 30 minutes based on the 10A and 10B each running every 60 minutes. The Arlington portion of the line, however, which is served only by the 10B and has some of the heaviest boardings on the two lines, has a 60 minute service frequency. Given the high ridership on the Arlington portion of the lines as well the Arlington service area's urban nature, 60 minutes was deemed inadequate.

Service Recommendations

Recommendation #4 (cont.)

- *Estimated Operating Cost and Cost-Effectiveness Measures*
 - Annual Operating Cost Change Associated with Change
 - \$177,099
 - Estimated cost per rider – before and after service change
 - Before: \$4.49
 - After: \$7.61

Service Recommendations

Recommendation #5

- *Recommendation*
 - Add Additional AM Trip on 10A Weekday Northbound Service between current 5:51 AM and 6:15 AM Trips to Address Crowding
- *Recommendation Purpose*
 - High maximum loads on the 5:51 AM and 6:15 AM trips (47 and 69 trips respectively) indicate excessive crowding. The proposed additional trip will address this crowding issue.
- *Estimated Annual Operating Cost Associated with Change*
 - \$15,740

Service Recommendations

Recommendation #6

- *Recommendation*

- Adjust Scheduled Run Time To Reflect Actual Run Times
 - 68 trips throughout the week on the two lines were identified as having actual run times at least five minutes greater than scheduled run times
 - Recommendation is twofold:
 - WMATA Schedules Department to verify the potential run time issues identified in this study
 - Address verified run time issues through schedule adjustments

Service Recommendations

Recommendation #6 (cont.)

- *Recommendation Purpose*
 - Increase rider certainty and convenience through increased reliability
 - Reduce overcrowding due to uneven passenger loading
 - Address on-time performance issues on lines (see next slide)
- *Estimated Annual Operating Cost Associated with Change*
 - \$114,414

Service Recommendations

Recommendation #6 (cont.) – 10 Lines On-Time Performance

Route Pattern	Early AM	AM Peak	Mid-Day	PM Peak	Early Evening	Late Evening
Weekday On-Time Performance - % of Trips On-Time						
10A	86.1%	82.6%	89.7%	74.7%	77.9%	66.2%
10B	90.0%	91.0%	84.6%	74.6%	73.2%	71.4%
10E	n/a	72.3%	n/a	74.8%	n/a	n/a
Saturday On-Time Performance - % of Trips On-Time						
10A	70.9%	80.1%	59.4%	61.6%	68.9%	68.4%
10B	84.2%	90.2%	67.8%	60.9%	65.5%	69.6%
Sunday On-Time Performance - % of Trips On-Time						
10A	n/a	90.0%	83.4%	86.3%	85.4%	61.9%
10B	91.7%	85.1%	79.0%	75.3%	91.6%	83.2%

Traffic Improvement Recommendations

Recommendation #7

- *Recommendation*

- Implement multiple traffic related recommendations to improve operations and reliability on the Hunting Point – Pentagon and the Hunting Point – Ballston Lines
- Specific Recommendations
 - 7.1 – Insufficient Turning Radius
 - **Fillmore Street and 2nd Street (10B)** – Buses traveling northbound have difficulty making the left turn from Fillmore Street to 2nd Street due to vehicles too close to the intersection. The proposal is to move the stop bar on eastbound 2nd Street further west to allow more room for turning buses.
 - **Pendleton Street and West Street (10A,B)** – Buses traveling northbound have difficulty making the right turn from Pendleton Street onto West Street due to southbound vehicles on West Street located too close to the intersection. The proposal is to move the stop bar on southbound West Street further north to allow more room for turning buses.

Traffic Improvement Recommendations

Recommendation #7 (cont.)

- 7.2 – Signal Timing and Phasing
 - Field visits and driver interviews identified a number of locations where long signal cycles result in bus delays. The following locations were identified for additional intersection analysis to determine if more efficient signal cycles can improve bus run times.
 - » **Wilson Boulevard and Lynn Street (10E extension into Rosslyn)** – Long signal cycles were observed along westbound Wilson Boulevard at Lynn Street. Buses were observed waiting for more than 90 seconds at the signal during the AM peak period.
 - » **Meade Street and South Glebe Road (10B)** – Long signal cycles were observed along southbound Meade Street at South Glebe Road for eastbound 10B trips exiting the Arna Valley. Buses were observed waiting for over a minute at the signal during the AM and PM peak period.
 - » **Mount Vernon Avenue and Braddock Road (All lines)** – Long signal cycles and queues were observed along southbound Mount Vernon Avenue at Braddock Road. Buses were observed waiting for a minute at the signal during the AM and PM peak periods.

Traffic Improvement Recommendations

Recommendation #7 (cont.)

- 7.2 – Signal Timing and Phasing
 - » ***Arlington Ridge Road and 23rd Street (10A, 10E)*** – Long queues were observed at Arlington Ridge Road and 23rd Street. Buses were observed waiting up to 3 minutes during the PM peak period.
 - » ***Arlington Ridge Road and South Glebe Road*** – Long queues were observed at Arlington Ridge Road and S. Glebe Road. Buses were observed waiting 1 minute during PM peak hours.
- The proposal at each of these locations is to conduct turning movement/pedestrian counts and optimize cycle length/splits based on traffic demand in order to potentially provide additional green for bus movements, if feasible.

Traffic Improvement Recommendations

Recommendation #7 (cont.)

- 7.3 – Un-signalized Movements
 - Field visits and driver interviews identified a number of areas where the 10 Lines move through un-signalized intersections, which often result in significant bus delays. The following locations were identified for additional intersection analysis to determine if signal-protected movements at these intersections are feasible.
 - » ***Eads Street and I-395 Northbound Off-Ramp (10A, E)*** – Buses were observed waiting a significant amount of time exiting the Pentagon at Eads Street and the I-395 off ramp due to a lack of signaling. Buses were observed waiting over a minute at the intersection during AM peak hours.
 - » ***Walter Reed Drive and Kenmore Street (10B)*** – Buses were observed waiting a significant amount of time traveling southbound and turning left onto Kenmore Street from Walter Reed Drive due to a lack of signaling. Buses were observed waiting over a minute at the intersection during AM peak hours.

Traffic Improvement Recommendations

Recommendation #7 (cont.)

- 7.3 – Un-signalized Movements
 - » **Martha Custis Drive and Gunston Road (10B)** – The intersection of Gunston Road and Martha Custis Road is un-signalized, which leads to long queues for buses traveling southbound at the intersection.
 - » **Washington Street and Pendleton Street (All Lines)** – Buses traveling northbound had difficulty turning left from Washington Street onto Pendleton Street due to a high level of southbound traffic volumes during the PM peak period. Buses had to wait until after the signal had changed to make the left turn, thus delaying cross traffic momentarily on Pendleton Street.
- The proposal at each of these locations is to conduct turning movement/pedestrian counts and assess traffic demand in order to determine the feasibility of providing signals at these intersections.

Traffic Improvement Recommendations

Recommendation #7 (cont.)

- 7.4 – Transit Stop Locations
 - Field visits and driver interviews identified a number of locations where bus stops on the 10 Lines are difficult to access. The proposal for each of these locations is for the WMATA bus stop coordinator to evaluate the location of the stop relative to the adjacent street network to determine if stop re-locations are warranted. The following stops where issues were identified include:
 - » **Randolph Street and Ballston Commons Mall Entrance (10B)** – The transit stop along southbound Randolph Street at the Ballston Commons Mall Entrance is difficult for the bus to access during both the AM and PM peak periods. The stop is located on the nearside of the intersection with on-street parking located on the far side of the intersection.
 - » **Arlington Mill Drive and Randolph Street (10B)** – The transit stop along the eastbound side of Arlington Mill Drive at Randolph Street is located immediately after a right hand turn for buses traveling northbound. All vehicles traveling northbound on Randolph Street are forced to turn either left or right. The stop is within 100 feet of the right turn at the intersection, which causes a conflict for other vehicles that are turning right onto Arlington Mill Drive from Randolph Street.
 - » **North Glebe Road and Henderson Road (10B)** – The transit stop located along southbound Glebe Road at Henderson Street (nearside stop) is inhibited by the median-separated parking on the intersection's far side. The bus was observed having to making a difficult merge into the adjacent left lane while traveling through the intersection during PM peak hours.

Traffic Improvement Recommendations

Recommendation #7 (cont.)

- 7.5 – Parking Restriction Enforcement
 - Field visits and driver interviews identified a number of stops where unenforced parking restrictions were blocking bus stops and making it difficult for buses to access stops. The proposal is for an increase in enforcement at these locations, and improved parking restriction signage where such signage is missing. The following locations were identified:
 - » **26th Street and Troy Street (10B)** – The transit stop along the northbound side of 26th Street in the Arna valley is inhibited by shuttle parking immediately in front of the stop during PM peak hours.
 - » **1334 28th Street (10B)** – The transit stop located along the northbound side of 28th Street at 1334 is inhibited by on street parking immediately in front of the stop during PM peak hours.
 - » **Fillmore Street between 5th and 6th Streets (10B)** – Vehicles were observed parked in front of the southbound bus stop at Fillmore Street between 5th and 6th Streets with no restrictive parking signage in place.

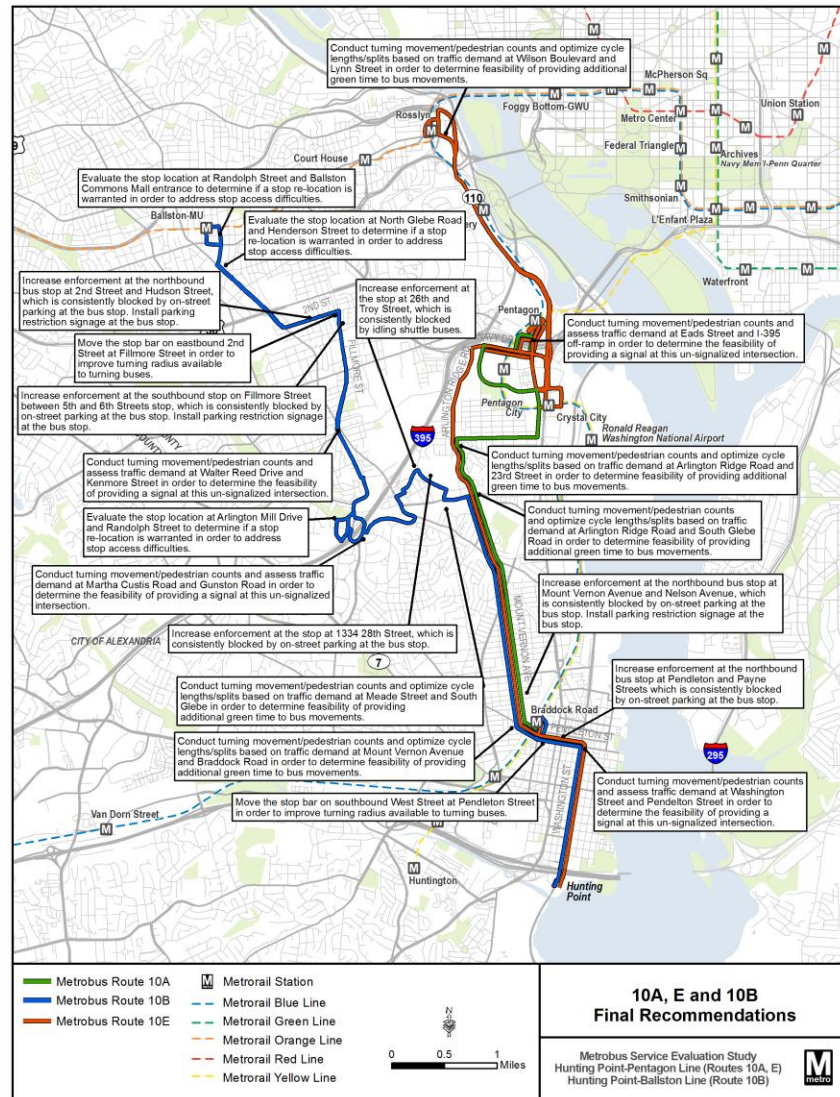
Traffic Improvement Recommendations

Recommendation #7 (cont.)

- 7.5 – Parking Restriction Enforcement
 - » ***Pendleton Street and Payne Street (All Lines)***– Vehicles were observed parked in front of the northbound bus stop at Pendleton Street and Payne Street with restrictive parking signage in place.
 - » ***Mount Vernon Avenue and Nelson Avenue (All Lines)*** – Vehicles were observed parked in front of the northbound bus stop at Mount Vernon Avenue and Nelson Avenue with no restrictive parking signage in place.
 - » ***2nd Street and Hudson Street (10B)*** – Vehicles were observed parked in front of the southbound bus stop at 2nd Street and Hudson Street with no restrictive parking signage in place.

Traffic Improvement Recommendations

Summary of Traffic Improvement Recommendations



Facility Recommendations

Recommendation #8

- *Recommendation*

- Improve Bus Stop Amenities

- All basic stops should have a basic set of passenger amenities including a bus stop flag, an accessible sidewalk and a landing pad.
- Amenities that should be installed based on the level of passenger boarding activity at a stop include an information case, a trash receptacle, and a shelter and bench.

Facility Recommendations

Recommendation #8 (cont.)

- *Summary of Recommended Amenities*

Amenity	# of Stops @ Which Installation is Proposed
Bus Stop Flag	5
Bus Stop Pad	42
Sidewalk Accessibility	4
Information Case – Immediate Installation	12
Information Case – Installed as Resources Become Available	27
Trash Receptacle	6
Shelter and Bench	11

- *Recommendation Purpose*
 - To increase rider comfort, safety and convenience
- *Estimated Capital Cost Associated With Amenities*
 - \$256,700

Facility Recommendations

Recommendation #8 (cont.)

- 8.1 - 10 Lines' Stops missing a Bus Stop Landing Pad

Stop	Direction	Total Boardings/Alightings	Routes Serving Stop
Mount Vernon Ave & W Glebe Rd	Northbound	274	10A,E, 10 B
S Eads St & 23rd St	Northbound	91	10A
S Walter Reed Dr & 8th St	Northbound	33	10B
S Walter Reed Dr & 9th St	Northbound	29	10B
Kenmore St & 19th St	Northbound	26	10B
S Walter Reed Dr & 16th Rd	Northbound	23	10B
S Fillmore St & 5th St	Northbound	17	10B
15th St & Eads St	Northbound	15	10A
S Glebe Rd & Arlington Ridge Rd	Northbound	12	10B
Mount Vernon Ave & Spring St	Northbound	11	10A, E, 10B
N Glebe Rd & Cathedral La	Northbound	8	10B
S 2nd St & Jackson St X	Northbound	3	10B
S 23rd St & 26th St	Northbound	3	10A

Facility Recommendations

Recommendation #8 (cont.)

- 8.1 - 10 Lines' Stops missing a Bus Stop Landing Pad

Stop	Direction	Total Boardings/Alightings	Routes Serving Stop
Kenmore St & #1941	Northbound	2	10B
S Lynn St & Army-Navy Dr	Northbound	2	10E
S Walter Reed Dr & 13th St	Northbound	1	10B
S 2nd St & Irving St	Northbound	1	10B
S Eads St & Army-Navy Dr	Northbound	0	10E
Arlington Ridge Rd & S Lynn St	Northbound	0	10E
S Eads St & 22nd St	Southbound	37	10A
S 2nd St & Fillmore St	Southbound	29	10B
N Glebe Rd & 4th St	Southbound	27	10B
Shirlington Rd & S 25th St	Southbound	24	10B
S 2nd St & Glebe Rd	Southbound	24	10B
Kenmore St & #1936	Southbound	23	10B
S Walter Reed Dr & 13th St	Southbound	22	10B

Facility Recommendations

Recommendation #8 (cont.)

- 8.1 - 10 Lines' Stops missing a Bus Stop Landing Pad

Stop	Direction	Total Boardings/Alightings	Routes Serving Stop
N Glebe Rd & 3rd Rd	Southbound	20	10B
S Meade St & S Glebe Rd	Southbound	20	10B
Mount Vernon Ave & Glendale Ave	Southbound	14	10A,E, 10B
Kenmore St & 19th St	Southbound	13	10B
Joyce St (E&W) & Joyce St (N&S) Apts.	Southbound	12	10A
S 26 th Rd & Vetch St	Southbound	9	10B
Mount Vernon Ave & Alexandria Ave	Southbound	9	10A,E, 10B
28th St & #1434	Southbound	4	10B
Arlington Ridge Rd & S Lang St (School)	Southbound	4	10A,E
Arlington Ridge Rd & S Lynn St	Southbound	4	10E
28th St & #1334	Southbound	3	10B
S Lynn St & Arlington Ridge Rd	Southbound	3	10E
Mount Vernon Ave & Alexandria Ave	Southbound	2	10A,E, 10B

Facility Recommendations

Recommendation #8 (cont.)

- 8.1 - 10 Lines' Stops missing a Bus Stop Landing Pad

Stop	Direction	Total Boardings/Alightings	Routes Serving Stop
S Eads St & 15th St	Southbound	0	10E
S Eads St & 12th St	Southbound	0	10E
Arlington Ridge Rd & #1704	Southbound	0	10E

Facility Recommendations

Recommendation #8 (cont.)

- 8.2 – 10 Lines Stops Missing Sidewalk Accessibility

Stop	Direction	Total Boardings	Routes Serving Stop
S Lynn St & 15th St	Northbound	1	10E
S Lynn St & Army-Navy Dr	Northbound	0	10E
S Eads St & Army-Navy Dr	Northbound	0	10E
Mount Vernon Ave & Kennedy St	Southbound	12	10A,E

Facility Recommendations

Recommendation #8 (cont.)

- 8.3 - 10 Lines Stops Recommended for Immediate Installation of an Information Case (stops with more 50 or more boardings per day that do not currently have an information case)

Stop	Direction	Total Boardings	Routes Serving Stop
Mount Vernon Ave & Russell Rd	Northbound	201	10A,E, 10B
S Washington St & (Rt 7) King St	Northbound	201	10A,B
S Washington St & Hunting Point	Northbound	116	10A,B
Mount Vernon Ave & Reed Ave	Northbound	81	10A,E, 10B
Mount Vernon Ave & Herbert St	Northbound	76	10A,E, 10B
Mount Vernon Ave & S Glebe Rd	Northbound	57	10A,E, 10B
S Walter Reed Dr & Columbia Pike	Northbound	54	10B
S Washington St & Wilkes St	Northbound	51	10A,B
Mount Vernon Ave & Executive Ave	Southbound	243	10A,E, 10B

Facility Recommendations

Recommendation #8 (cont.)

- 8.3 - 10 Lines Stops Recommended for Immediate Installation of an Information Case (stops with more 50 or more boardings per day that do not currently have an information case)

Stop	Direction	Total Boardings	Routes Serving Stop
Mount Vernon Ave & Russell Rd	Southbound	181	10A, E, 10B
S Walter Reed Dr & Columbia Pk	Southbound	121	10B
N Randolph St & 9th St Ballston Common	Southbound	53	10B

Facility Recommendations

Recommendation #8 (cont.)

- 8.4 - 10 Lines Stops Recommended for Installation of an Information Case when Resources become Available (stops with 20 or more boardings per day that do not currently have an information case)

Stop	Direction	Total Boardings	Routes Serving Stop
Mount Vernon Ave & Mason Ave	Northbound	49	10A,E, 10B
N Washington St & Queen St	Northbound	43	10A,B
N Washington St & Oronoco St	Northbound	34	10A,B
Kenmore St & 24th St	Northbound	32	10B
Mount Vernon Ave & Kennedy St	Northbound	26	10A,E, 10B
Mount Vernon Ave & Bellefonte Ave	Northbound	25	10A,E, 10B
S Washington St & Wilkes St	Northbound	25	10A
Mount Vernon Ave & Mason Ave	Northbound	24	10A, E
Valley Dr (Pkfx) & Tennessee Ave	Northbound	23	10B

Facility Recommendations

Recommendation #8 (cont.)

- 8.4 - 10 Lines Stops Recommended for Installation of an Information Case when Resources become Available (stops with 20 or more boardings per day that do not currently have an information case)

Stop	Direction	Total Boardings	Routes Serving Stop
S Walter Reed Dr & 8th St	Northbound	23	10B
Valley Dr (Pkfx) & Tennessee Ave	Northbound	23	10B
S Walter Reed Dr & 8th St	Northbound	23	10B
Braddock Rd & Mt Vernon Ave	Northbound	22	10A, E, 10B
S Washington St & Franklin St	Northbound	22	10A,B
Mount Vernon Ave & Kennedy St	Northbound	22	10A, E
Shirlington Rd & S 25Th St	Northbound	21	10B
Mount Vernon Ave & Uhler Ave	Southbound	47	10A,E, 10 B
N Glebe Rd & Pershing Dr	Southbound	39	10B

Facility Recommendations

Recommendation #8 (cont.)

- 8.4 - 10 Lines Stops Recommended for Installation of an Information Case when Resources become Available (stops with 20 or more boardings per day that do not currently have an information case)

Stop	Direction	Total Boardings	Routes Serving Stop
Mount Vernon Ave & Mason Ave	Southbound	33	10A,E, 10B
Joyce St & Pentagon Row	Southbound	30	10A
Mount Vernon Ave & Bellefonte Ave	Southbound	28	10A,E, 10B
Army-Navy Dr & S Hayes St	Southbound	28	10A,E
Shirlington Rd & Four Mile Run Dr	Southbound	25	10B
Mount Vernon Ave & Custis Ave	Southbound	23	10A,E, 10B
Mount Vernon Ave & Bellefonte Ave	Southbound	21	10A,E
S Glebe Rd & #2900 Shirley Park	Southbound	20	10B
Mount Vernon Ave & Mason Ave	Southbound	20	10A,E

Facility Recommendations

Recommendation #8 (cont.)

- 8.5 – 10 Lines Stops that are Candidates for a Trash Receptacle based on Daily Boardings (25 or more boardings per day)

Stop	Direction	Total Boardings	Routes Serving Stop
Mount Vernon Ave & Reed Ave	Southbound	127	10A,E, 10B
N Randolph St & 9th St Ballston Common	Southbound	53	10B
S Eads St & 18th St	Southbound	36	10A
S 23rd St & Fern St	Southbound	30	10A
Joyce St & Pentagon Row	Southbound	30	10A
Army-Navy Dr & S Hayes St	Southbound	28	10A,E

Facility Recommendations

Recommendation #8 (cont.)

- 8.6 - Stops that are Candidates for a Shelter and Bench based on Daily Boardings (50 or more boardings per day)

Stop	Direction	Total Boardings	Routes Serving Stop
Mount Vernon Ave & Russell Rd	Northbound	201	10A,E, 10B
S Washington St & (Rt 7) King St	Northbound	201	10A,E, 10B
Mount Vernon Ave & W Glebe Rd	Northbound	164	10A,E, 10B
Mount Vernon Ave & Reed Ave	Northbound	81	10A,E, 10B
Mount Vernon Ave & Herbert St	Northbound	76	10A,E, 10B
Mount Vernon Ave & Hume Ave	Northbound	66	10A,E, 10B
S Walter Reed Dr & Columbia Pike	Northbound	54	10B
Mount Vernon Ave & Executive Ave	Southbound	243	10A,E, 10B
Mount Vernon Ave & Russell Rd	Southbound	181	10A,E, 10B

Facility Recommendations

Recommendation #8 (cont.)

- 8.6 - Stops that are Candidates for a Shelter and Bench based on Daily Boardings (50 or more boardings per day)

Stop	Direction	Total Boardings	Routes Serving Stop
Mount Vernon Ave & Reed Ave	Southbound	127	10A,E, 10B
N Randolph St & 9th St Ballston Common	Southbound	53	10B

Facility Recommendations

Recommendation #9

- *Recommendation*
 - Begin bus stop consolidation process following WMATA procedures – potential consolidation candidates have been identified based on distance-between-stops guidelines
- *Recommendation Purpose*
 - Improve passenger convenience
 - Improve trip times and service reliability
- *Estimated Capital Costs Associated with Change*
 - Costs cannot be calculated until specific stops to be consolidated are identified

Facility Recommendations

Recommendation #9 (cont.)

- 9.1 - Consolidation Candidates – Hunting Point to Mount Vernon Avenue & S. Glebe Road (10A, E & 10B)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
MOUNT VERNON AVE + E BELLEFONTE AVE	NB	25	38
MOUNT VERNON AVE + W GLEBE RD	NB	164	110
MOUNT VERNON AVE + KENNEDY ST	NB	26	24
MOUNT VERNON AVE + S GLEBE RD	NB	59	13
MOUNT VERNON AVE + HERBERT ST	NB	76	48
MOUNT VERNON AVE + REED AVE	NB	81	51
MOUNT VERNON AVE + HUME AVE	NB	66	67
MOUNT VERNON AVE + E MASON AVE	NB	49	36
BRADDOCK RD + MT VERNON AVE	NB	22	4
MOUNT VERNON AVE + BET S GLEBE & ELBERT	NB	34	9
MOUNT VERNON AVE + E WINDSOR AVE	NB	12	38

Facility Recommendations

Recommendation #9 (cont.)

- 9.1 - Consolidation Candidates – Hunting Point to Mount Vernon Avenue & S. Glebe Road (10A,E & 10B)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
MOUNT VERNON AVE + GLENDALE AVE	NB	12	12
MOUNT VERNON AVE + ALEXANDRIA AVE	NB	1	4
MOUNT VERNON AVE + NELSON AVE	NB	12	33
MOUNT VERNON AVE + OXFORD AVE	NB	19	56
S WASHINGTON ST + JEFFERSON ST	NB	5	0
S WASHINGTON ST + GREEN ST	NB	11	0
S WASHINGTON ST + FRANKLIN ST	NB	22	0
MOUNT VERNON AVE + OXFORD AVE	SB	8	10
MOUNT VERNON AVE + GLENDALE AVE	SB	4	10
MOUNT VERNON AVE + ALEXANDRIA AVE	SB	5	4
MOUNT VERNON AVE + KENNEDY ST	SB	13	28

Facility Recommendations

Recommendation #9 (cont.)

- 9.1 - Consolidation Candidates – Hunting Point to Mount Vernon Avenue & S. Glebe Road (10A,E & 10B)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
MOUNT VERNON AVE + NELSON AVE	SB	10	9
MOUNT VERNON AVE + E CUSTIS AVE	SB	23	24
MOUNT VERNON AVE + E MASON AVE	SB	33	35
S WASHINGTON ST + PRINCE ST	SB	2	7
S WASHINGTON ST + GREEN ST	SB	0	15
S WASHINGTON ST + DUKE ST (RT 236)	SB	0	18
S WASHINGTON ST + WILKES ST	SB	2	32
S WASHINGTON ST + GIBBON ST	SB	0	20
PENDLETON ST + PATRICK ST	SB	1	9
PENDLETON ST + HENRY ST	SB	0	14

Facility Recommendations

Recommendation #9 (cont.)

- 9.2 - Consolidation Candidates – Arlington Ridge Rd. & S. Glebe Rd. to Pentagon via Arlington Ridge Rd. (10E)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
S ARLINGTON RIDGE RD + S GLEBE RD	NB	17	9
S ARLINGTON RIDGE RD + S LANG ST	NB	0	1
S ARLINGTON RIDGE RD + S 23RD ST	NB	3	7

Facility Recommendations

Recommendation #9 (cont.)

- 9.3 - Consolidation Candidates – Arlington Ridge Rd. & S. Glebe Rd. to Pentagon via Crystal City (10A)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
S 23RD ST + FT SCOTT DR	NB	4	2
S 23RD ST + JOYCE ST	NB	7	3
S EADS ST + 23RD ST	NB	13	78
S 23RD ST + 26TH ST	NB	0	3

Facility Recommendations

Recommendation #9 (cont.)

- 9.4 - Consolidation Candidates – Mount Vernon Avenue & S. Glebe Road to Ballston (10B)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
26TH ST + 28TH ST	NB	20	3
S WALTER REED DR + COLUMBIA PK	NB	17	32
28TH ST + 26TH ST	NB	2	0
S 2ND ST + HUDSON ST	NB	0	1
N GLEBE RD + 3RD RD	NB	7	9
N GLEBE RD + 4TH ST	NB	3	7
S WALTER REED DR + 9TH ST	NB	16	13
N GLEBE RD + PIEDMONT ST	NB	6	4
N GLEBE RD + PERSHING DR	NB	19	58
S WALTER REED DR + 16TH ST	NB	5	1

Facility Recommendations

Recommendation #9 (cont.)

- 9.4 - Consolidation Candidates – Mount Vernon Avenue & S. Glebe Road to Ballston (10B)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
S WALTER REED DR + COLUMBIA PK	NB	37	96
S 2ND ST + OLD GLEBE RD	NB	6	15
28TH ST + #1501-1507	NB	3	0
S WALTER REED DR + 6TH ST	NB	13	1
S 2ND ST + IRVING ST	NB	1	0
KENMORE ST + 24TH ST	NB	32	8
S WALTER REED DR + 16TH RD	NB	5	1
28TH ST + SHIRLEY PARK	NB	2	0
S WALTER REED DR + 13TH RD	NB	4	7
S WALTER REED DR + 13TH ST	NB	1	0

Facility Recommendations

Recommendation #9 (cont.)

- 9.4 - Consolidation Candidates – Mount Vernon Avenue & S. Glebe Road to Ballston (10B)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
26TH ST + TROY ST	NB	4	1
S GLEBE RD + 1ST RD	NB	2	1
S 2ND ST + JACKSON ST	NB	1	2
S WALTER REED DR + 8TH ST	NB	23	10
N GLEBE RD + CATHEDRAL LA	NB	2	6
S 2ND ST + OLD GLEBE RD	SB	5	13
N GLEBE RD + 4TH ST	SB	17	10
ADAMS ST + 26TH ST	SB	4	7
S 2ND ST + IRVING ST	SB	0	2
26TH ST + 28TH ST	SB	4	11

Facility Recommendations

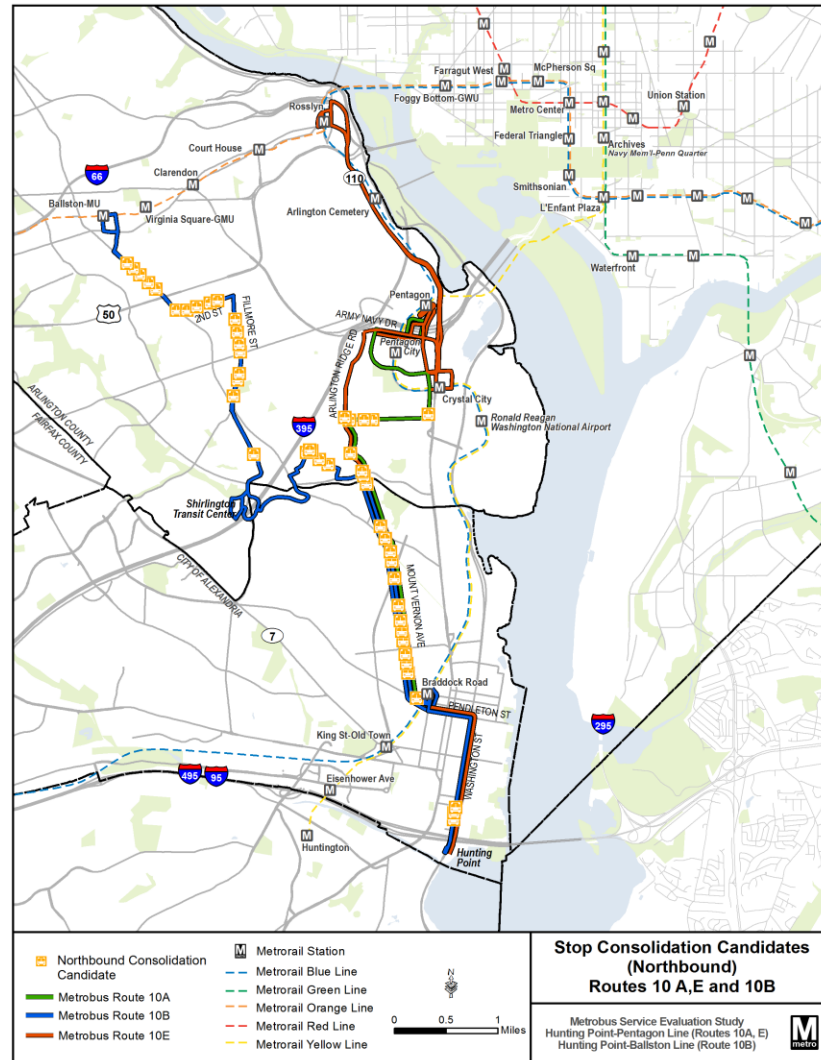
Recommendation #9 (cont.)

- 9.4 - Consolidation Candidates – Mount Vernon Avenue & S. Glebe Road to Ballston (10B)

Candidate Stop	Direction	Stop Boardings	Stop Alightings
28TH ST SHIR PK + 26TH ST	SB	0	0
S 2ND ST + JACKSON ST	SB	0	4
N GLEBE RD + 3RD RD	SB	13	7

Facility Recommendations

Northbound Stop
Consolidation Candidates
All Lines



Facility Recommendations

Southbound Stop
Consolidation Candidates
All Lines

