PERFORMANCE MONITORING PLAN

TIGER DISCRETIONARY GRANT PROGRAM
FUNDS FOR PRIORITY BUS TRANSIT
IN THE NATIONAL CAPITAL REGION

FTA Grant Award: DC-78-0001

Version 1.1: May 16, 2012

METROPOLITAN WASHINGTON COUNCIL OF GOVERNMENTS
777 NORTH CAPITOL STREET, NE, WASHINGTON, DC 20002

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Approvals

This Performance Monitoring Plan has been approved by:

Eric Randall May 16, 2012

Eric Randall Date
MWCOG/DTP Project Manager

Version History

Version	Date	Page Changed	Modifications
1.0	**July 20, 2011**	-	Initial Performance Monitoring Plan
1.1	**May 16, 2012**	3	Modified and expanded introduction to clarify the relationship of the COG/TPB, FTA, and the nature of the grant.
		7	Table 2 – Expanded the description of the Transit Service Level measure.
		7	Table 2 – Added non-priority WMATA bus routes for on-time performance measure. Table 2 – Specified that Saturday and Sunday on-time performance data collection will be presented as all day averages. Table 2 – Added Veirs Mill Road as an applicable project for on-time performance measure. Table 2 – Noted that the PRTC Before report will present the perception of on-time performance based on surveys.
		8	Table 2 – Removed Saturday and Sunday time periods from passenger counts/average load description of measure. Table 2 – Removed Saturday and Sunday time periods from vehicle travel time description of measure.
		10	Added on-time performance for WMATA routes as a general metrics for non-priority routes.
		11	Added footnote specifying that on-time performance is measured for the Veirs Mill Road corridor stop improvement project.
		13	Table 3 – Removed reference that annual revenue miles and hours will be collected for all routes. Table 3 – Added other service providers as a data source for transit service level for corridor projects.
		14	Table 3 – Added other service providers as a data source for transit service level for point projects.

Version	Date	Page Changed	Modifications
		15	Table 3 – Removed average monthly boardings/alightings at Metrorail stations from passenger counts for non-priority bus routes measure. Table 3 – Removed MWCOG and PRTC as data sources for passenger counts for non-priority bus routes. Table 3 – Removed weekdays, Saturday, and Sunday time periods from passenger counts for non-priority bus routes measure details. Table 3 – Added ridecheck as a data source for passenger counts for priority bus routes. Table 3 – Removed reference to by time of day for transit center passenger count measure details. Table 3 – Added non-priority WMATA bus routes for on-time performance measure. Table 3 – Changed on-time performance measure details and frequency of data collection from monthly collection to quarterly. Table 3 – Removed Project #12 and added Project #9 to projects under the on-time performance measure.
		16	Table 3 – Added ridecheck as a data source for passenger counts. Table 3 – Removed project #12 as a project for passenger counts/average load data collection. Table 3 – Removed Saturday and Sunday time periods from vehicle travel time measure details. Table 3 – Removed project #12 as a project for vehicle travel time data collection. Table 3 – Removed project #12 as a project for passenger miles for corridor data collection. Table 3 – Removed project #12 as a project for queue jumper utilization data collection.

Version	Date	Page Changed	Modifications
		17	Table 3 – Removed priority bus routes from TSP activation measure. Table 3 – Removed Project #3 and #12 from projects requiring TSP activation data collection. Table 3 – Added 2011 as a year for transit center safety record data collection.
		A-2	Table 5 – Changed “reporting period” to “reporting groups”. Table 5 – Updated First Contract Award dates. Table 5 – Noted actual award dates.
		A-3	Table 6 – Updated dates for after report schedule.
		A-4	Table 7 – Removed routes 87 and 88 from the non-priority routes for Project #8. Table 7 – Added Loudoun routes to non-priority routes for Project #13. Table 7 – Added Loudoun, Martz, and Quick’s routes to non-priority routes for Project #14.
		A-5	Added Loudoun and Martz routes to non-priority routes for Project #16a.

TIGER – Priority Bus Transit in the National Capital Region
Performance Monitoring Plan

I. INTRODUCTION

On February 17, 2010, the U.S. Department of Transportation (USDOT) awarded a Transportation Investments Generating Economic Recovery (TIGER) Discretionary Grant Program grant to the National Capital Region Transportation Planning Board (TPB), the MPO for the Washington Metropolitan Area. The Metropolitan Washington Council of Governments (COG), which is a non-profit organization selected by the TPB to be its administrative agent, conducts the support and administration of the grant for Priority Bus Transit in the National Capital Region.

TPB/COG staff are responsible for managing the TIGER grant and for conducting the required performance monitoring of the TIGER funded projects. As a requirement of the TIGER Grant Program, recipients are required to submit a detailed performance monitoring plan for review by the Office of the Secretary of Transportation (OST). Guidance for this plan is provided in the USDOT Performance Measurement Plan for TIGER (dated June 28, 2010), which outlines a basic set of performance metrics and provides guidelines for reporting frequency and timing.

Based on the USDOT Performance Measurement Plan for TIGER, applicable metrics for the TIGER Priority Bus Transit project include the collection and reporting of before and after data for a variety of measures, depending on the project:

1. Transit passenger miles and hours of travel
2. Transit passenger counts
3. Transit facility counts
4. Transit rider characteristics
5. Transit service level
6. Facility service level
7. Annual average hourly vehicle travel time
8. Pedestrian crash rates by type/severity

Reports on the performance of the TIGER funded projects are required to be submitted USDOT Tiger Grants Office. Performance reports are required for each of the 16 projects funded by the grant, including a report one year before projects begin, and reports one and two years after project completion.

In addition to the performance measurement data described in this plan, TPB/COG will collect standard project finance and progress data as required for capital projects by the Federal Transit Administration (FTA), the USDOT modal administration overseeing the execution of the Priority Bus in the National Capital Region grant. This data collection is described in the *Program Management Plan for TIGER Program Funds for Priority Bus Transit in the National Capital Region*.

II. PROJECT DESCRIPTIONS

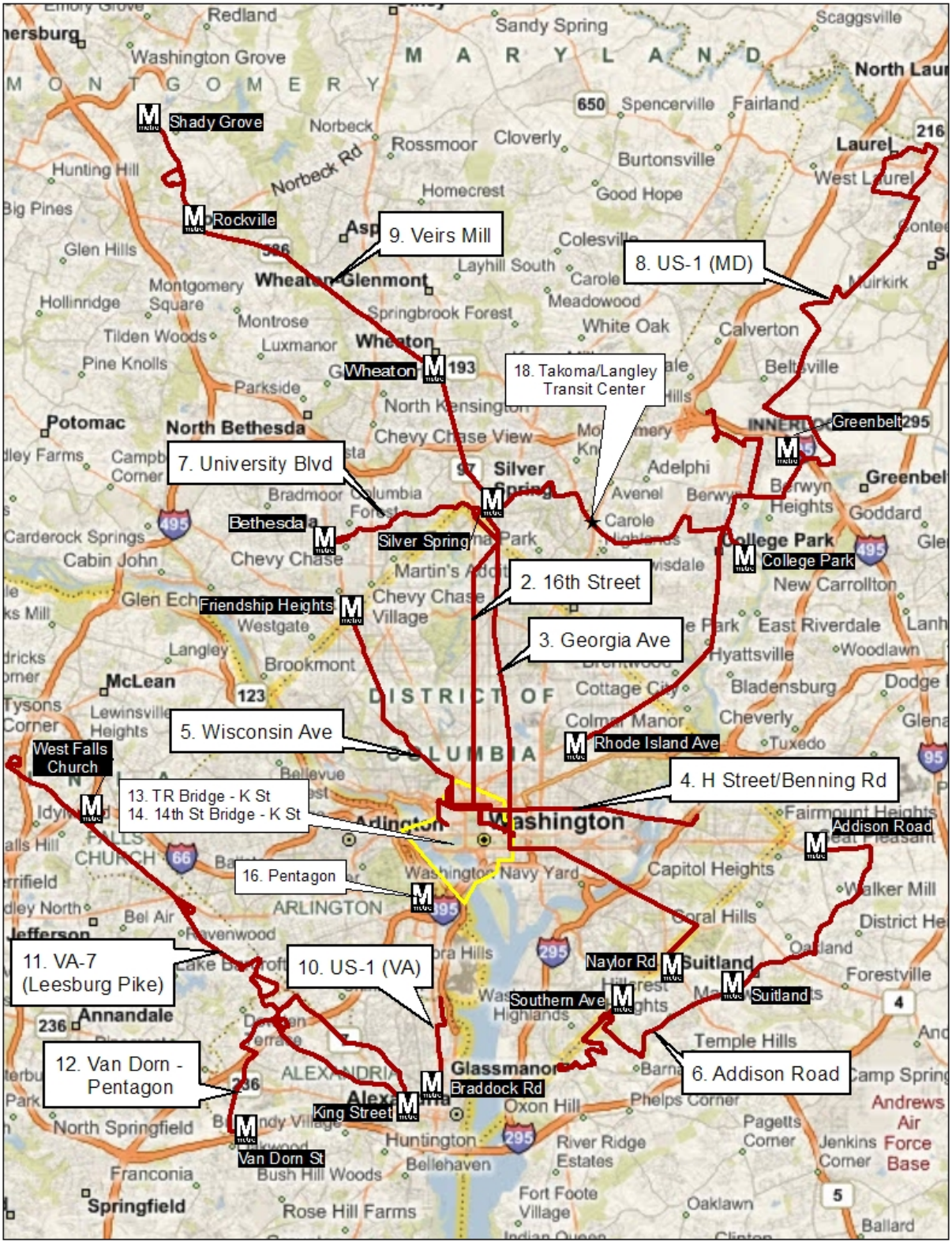
The approved components, which will be referred to in this document as "projects," of the TIGER Priority Bus Transit project are shown in Table 1, and a map of all of the projects is shown in Figure 1. (NB. The project numbers refer to those projects from the initial grant application approved by USDOT for funding.)

Table 1 Project Descriptions

#	Project
2	**16th Street Bus Priority Improvements (DDOT):** Capital improvements include a queue jump lane, NextBus real time passenger information displays at up to 17 stop locations, and transit signal priority/traffic system management (left turn phase for bus) at a number of intersections.
3	**Georgia Avenue Bus Priority Improvements (DDOT):** Improvements include completing TSP implementation at several intersections, bulb-outs, and nearly 30 stop locations enhanced with NextBus real time arrival technology. Additionally, a bus only lane will be constructed on Georgia Avenue for a short span to alleviate current exorbitant bus delays.
4	**H Street/Benning Road Bus Priority Improvements (DDOT):** This project will implement NextBus real time arrival technology displays at up to 22 bus stop locations and provide for the installation of emergency call boxes at select locations for passenger security.
5	**Wisconsin Avenue Bus Priority Improvements (DDOT):** A WMATA Priority Corridor with the highest ridership in the region, capital improvements include transit signal priority and/or traffic signal management at a number of intersections and NextBus real time arrival technology deployed to a number of express service stop locations.
6	**Addison Road Improvements (WMATA):** A WMATA priority corridor that connects the eastern ends of the Blue and Green Metrorail lines, bus shelters along the existing P12 bus route will be upgraded with NextBus real-time arrival prediction displays.
7	**University Boulevard Bus Priority Improvements (MDOT):** A WMATA Priority Corridor, improvements include four queue jump lanes, transit signal priority at around 20 intersections, and a number of bus stop enhancements, such as the deployment of NextBus technology.
8	**U.S. Route 1 Bus Priority Improvements (MDOT):** A WMATA Priority Corridor, capital improvements include queue jump lanes and transit signal priority at several intersections.
9	**Veirs Mill Bus Priority Improvements (MDOT):** A WMATA Priority Corridor that connects the commercial centers of Silver Spring and Rockville, capital improvements include a queue jump lane and NextBus real time bus arrival displays at several stations along the route.
10	**US 1 Transitway (City of Alexandria):** A bus transitway in the median of US 1 within its city limits will provide exclusive right of way for buses.
11	**VA 7 (Leesburg Pike) Bus Priority Improvements (WMATA):** A WMATA Priority Corridor that connects the Cities of Alexandria and Falls Church with the commercial center of Tysons Corner, improvements include NextBus displays at several express service bus stops and transit signal priority at a number of intersections along the corridor.
12	**Van Dorn-Pentagon Rapid Bus (City of Alexandria):** The project will provide a new rapid bus service in the City of Alexandria from the Van Dorn Metrorail Station in the City of Alexandria to the Pentagon. It will incorporate limited stop service, signal prioritization, super stops, and queue jump lanes.

#	Project
13	**Theodore Roosevelt Bridge to K Street Bus Priority Improvements (DDOT):** This project consists of three components: Transit Signal Priority (TSP), Uninterrupted Power Supply (UPS) for signals, and downtown signal optimization. • **TSP:** This major regional corridor will receive complementary transit signal priority and bus mounted enforcement cameras along E Street, northbound 18th Street, and southbound 19th Street. • **UPS:** UPS installation will prevent traffic signals from going dark or into the flashing mode following power interruptions, reducing traffic congestion, improving safety, and improving overall bus operations. • **Signal Optimization:** The central objective of the optimization project will be to improve bus running times in these busy corridors which will lead to improved schedule adherence, improved pedestrian and vehicular mobility, and reduced automobile emissions. Retiming of traffic signals results in reduced traffic congestion which in turn works as passive transit signal priority.
14	**14th Street Bus Priority Improvements (DDOT):** This project consists of three components: Transit Signal Priority (TSP), Uninterrupted Power Supply (UPS) for signals, and downtown signal optimization. • **TSP:** This project includes complementary transit signal priority and bus mounted enforcement cameras along 14th Street from the bridge to K Street. • **UPS:** UPS installation will prevent traffic signals from going dark or into the flashing mode following power interruptions, reducing traffic congestion, improving safety, and improving overall bus operations. • **Signal Optimization:** The central objective of the optimization project will be to improve bus running times in these busy corridors which will lead to improved schedule adherence, improved pedestrian and vehicular mobility, and reduced automobile emissions. Retiming of traffic signals results in reduced traffic congestion which in turn works as passive transit signal priority.
16a	**Pentagon - Franconia Springfield Station Improvements (WMATA):** Station improvements at Pentagon Station and Franconia/Springfield Station, including bus bays, real time bus information, and traffic circulation/access/security improvements. Major technology improvements include a mobile web application for real-time bus information and bus information displays.
16b	**PRTC Buses and ITS Technology (PRTC)** Project includes installing security cameras on 15 buses ans procurement of computer-aided dispatch and automatic vehicle location technology for the entire fleet. Finally, this component includes the replacement of 13 buses.
18	**Takoma-Langley Transit Center (MDOT):** This transit center will be located at the intersection of University Boulevard and New Hampshire Avenue, consolidating all the bus stops at the intersection into one facility. Through new bus bays, pedestrian walkways, a full canopy, restrooms, lighting, and bus information, the transit center will provide a safe, attractive, comfortable and efficient facility for passengers and for bus transfer activities, and will also improve pedestrian safety, accessibility, and connections to bus services.

Figure 1 Project Map



III. Performance Measurement

Table 2 lists 10 performance measures that will be collected as part of the TIGER project performance monitoring. The table has been taken directly from the TIGER Grant Agreement between FTA and TPB/COG, which specifies the Federal requirements for performance monitoring of the grant in paragraphs 2.m and 6.b.3 of the agreement. Following the table, additional definitions helpful in understanding the measures are defined. Then, in Table 3, each measure is further defined in terms of actual data collection parameters, sources, and frequency of collection.

A. Performance Measures from TIGER Grant Agreement

Table 2 provides an overview of the performance measures and is taken directly from pages 7-9 of the FTA –TPB/COG TIGER Grant Agreement. Table 3 provides additional clarification on what data need to be collected for each project.

Table 2 Performance Measures by Project

Measure	Description of Measure	Applicable Projects
Transit Service Level	Total bus routes, trips, span of service, and frequency/headway, for a typical weekday, Saturday, Sunday, by time of day. • Revenue miles and hours (corridor projects only) • Any changes to routes during timeframe of data collection (corridor and point projects only)	All project components
Passenger counts	Summary of passenger boardings on bus routes serving each project component, from farebox data for weekdays, Saturdays, Sunday.	All project components
On-time performance *(For priority and non-priority WMATA bus routes)*	Summary of on-time performance for each priority and non-priority WMATA bus route for weekdays by time of day and for Saturdays and Sundays (all day averages). To include detailed description of on-time definition (e.g., 2 minutes early to 5 minutes late) and measurement method. *The PRTC Buses and ITS Before Report will include a summary of the perception of on-time performance based on the results of a rider surveys.	• 16th Street (#2) • Georgia Avenue (#3) • Wisconsin Avenue (#5) • University Boulevard (#7) • US-1 (MD) (#8) • Veirs Mill Road (#9) • US-1 (VA) Transitway (#10) • VA 7 (Leesburg Pike) (#11) • Van Dorn – Pentagon (#12) • *PRTC Buses and ITS (#16b)
Passenger counts / Average Load *(For priority bus routes)*	Summary of average passenger load for each priority bus route for a typical weekday by time of day (hourly-periods). To be calculated from screenline counts at the beginning, middle, and end of each project component implementation corridor.	• 16th Street (#2) • Georgia Avenue (#3) • Wisconsin Avenue (#5) • University Boulevard (#7) • US-1 (MD) (#8) • US-1 (VA) Transitway (#10) • VA 7 (Leesburg Pike) (#11) • Van Dorn – Pentagon (#12)

Measure	Description of Measure	Applicable Projects
Vehicle travel time for corridor *(For priority bus routes)*	Summary of average travel time over each project component implementation corridor for each priority bus route for a typical weekday by time of day (hourly-periods). To be calculated from screenline counts at the beginning, middle, and end of each project component implementation corridor.	• 16th Street (#2) • Georgia Avenue (#3) • Wisconsin Avenue (#5) • University Boulevard (#7) • US-1 (MD) (#8) • US-1 (VA) Transitway (#10) • VA 7 (Leesburg Pike) (#11) • Van Dorn – Pentagon (#12)
Passenger miles for corridor *(For priority bus routes)*	Summary of total passenger miles travelled over the implementation corridor on each priority bus route. To be calculated from beginning, middle, and end screenline passenger counts multiplied by the length of the corridor.	• 16th Street (#2) • Georgia Avenue (#3) • Wisconsin Avenue (#5) • University Boulevard (#7) • US-1 (MD) (#8) • US-1 (VA) Transitway (#10) • VA 7 (Leesburg Pike) (#11) • Van Dorn – Pentagon (#12)
Passenger hours of travel for corridor *(For priority bus routes)*	Summary of total passenger hours travelled over the implementation corridor on each priority bus route. To be calculated from beginning, middle, and end screenline passenger counts multiplied by vehicle travel time over the implementation corridor.	• 16th Street (#2) • Georgia Avenue (#3) • Wisconsin Avenue (#5) • University Boulevard (#7) • US-1 (MD) (#8) • US-1 (VA) Transitway (#10) • VA 7 (Leesburg Pike) (#11) • Van Dorn – Pentagon (#12)
Transit rider characteristics	Survey of weekday transit rider characteristics based on intercept interviews with bus route riders. Data to include origin-to-destination travel patterns, travel purposes (home-based work, home-based other, etc.), modes of access to (and egress from) transit (walk, bike, drive alone, carpool, drop-off, etc.), and socio-economic characteristics of the transit riders (household income, vehicles available to the household, the rider's race, disability and/or driver's license status, etc.). Compare to overall regional data. Collect once only between one and two years after project completion.	• US-1 (VA) Transitway (#10)
Transit Center passenger counts	Summary of total customer use for a typical weekday, Saturday, Sunday, by time of day.	• Takoma-Langley Transit Center (#18)
Transit Center safety record	Summary of annual pedestrian accidents in the area of the Takoma-Langley Transit Center.	• Takoma-Langley Transit Center (#18)

IV. Project Data Collection Categories

Based on the elements of each project, the projects can be grouped by purpose and applicable performance metrics. The 16 projects have been divided into five general categories:

1. Corridor Transit Operations Improvements: This category includes seven projects.
2. US-1 Virginia Transitway: This category contains one project which contains the same metrics as Corridor Transit Operations, plus measures on rider characteristics.
3. General Improvement Components: This category includes six projects.
4. Takoma-Langley Transit Center: This category contains one project with different metrics than the other categories.
5. PRTC Buses and ITS Technology: This category contains one project with different metrics than the other categories.

A. Corridor Transit Operations Improvements

This category includes projects which involve implementation of signal and runningway improvements, (e.g., Transit Signal Priority, signal optimization, queue jump lanes, and bus-only lanes) as well as other components that improve operations (e.g., limited stop service, computer assisted dispatch and AVL) along a significant operational corridor served by bus transit. To assess operational impacts, a range of data on bus travel time and reliability, ridership changes, and other metrics will be collected for priority bus routes making a significant part of their trip on a priority bus measures implementation corridor.

The following definitions are helpful in understanding the key elements of the corridor improvement projects:

> Implementation Corridor: any directional guideway in which TIGER bus priority measures affect 50% or more of length and/or signalized intersections, from first measure encountered to the last.
>
> Priority Bus Route: Metrobus priority/limited stop bus route, generally branded as MetroExpress or MetroExtra. For the most part, each corridor project has only one route that is considered a priority bus route, and all priority bus routes are operated by WMATA.
>
> Non-Priority Bus Route: A bus service that operates the majority of its trip (i.e., at least 50% of route distance or travel time) on a corridor along which priority bus measures (e.g., TSP, bus lanes, queue jumps) are being implemented. Bus routes operated by the local jurisdictions are included in this category.

The projects that will be measured under this scheme are:

- 16th Street (#2)
- Georgia Avenue (#3)
- Wisconsin Avenue (#5)
- University Boulevard (#7)
- US-1 MD (#8)
- VA 7 (Leesburg Pike) (#11)
- Van Dorn – Pentagon (#12)

The general metrics that will be applied to these seven projects are:

- Priority Route(s)
    - Transit service level
    - Transit passenger counts by stop in implementation corridor
    - Vehicle travel time: scheduled and actual
    - Transit passenger miles and hours of travel
    - On-time performance
- Non-Priority Route(s)
    - Transit service level
    - Transit passenger counts at the route level
    - On-time performance for WMATA routes

Example Scenario: Bus priority measures are implemented on 16th Street, at intersections A- J and at intersection Q (2 miles away). The S2 bus travels through all of the intersections. The H8 bus travels through intersections G – J only.

- At each intersection (e.g., A-J and Q), the number of buses passing through will be measured, along with typical benefits (e.g., 10 seconds saved). Total number of persons benefitting will be calculated by multiplying each bus by the typical average ridership on that bus.
    - Intersections A-J form an implementation corridor. Intersection Q is not considered part of an implementation corridor, due to its separation from other bus priority measures.
- The S2 bus route spends more than 50% of its travel time on the A to J implementation corridor. Corridor Transit Operations Improvements: data <u>will</u> be collected for this route.
- The H8 bus route has less than 50% of its travel time/route length on the G to J corridor. Corridor Transit Operations Improvements: data <u>will not</u> be collected for this route.

B. US-1 Virginia Transitway

This is a separate category just for the US-1 Virginia Transitway project (Project #10). The project component of the Potomac Yard Transitway in Alexandria, which will feature bus-only lanes operating over a significant distance, as well as other features recognizable as Bus Rapid Transit (BRT) service, merits additional metrics as well as those of the corridor improvements.

The general metrics that will be applied to this category include the metrics for the Corridor Transit Operations projects <u>plus</u> transit rider characteristics.

C. General Improvement Components – Point Locations

Several projects funded by the TIGER grant feature traffic signal optimization, uninterruptible power supply for the signals, construction of bus bays, installation of real-time bus information displays, and the renovation of bus shelters. While offering worthwhile improvements to support bus transit operations, the nature of these improvements does not lend itself to measureable impacts on service operations. Accordingly, transit level of service information will be collected, as well as transit ridership. The projects that will be measured under this scheme are:

- Corridor Stop Improvements:
  - Addison Road (#6)
  - H Street/Benning Road (#4)
  - Veirs Mill Road (#9)[1]
- Metrorail Station Stop Improvements:
  - Pentagon – Franconia-Springfield Stations (#16a)
- Signal Improvements:
  - Theodore Roosevelt Bridge to K Street (#13)
  - 14th Street Bridge to K Street (#14)

The general metrics that will be applied to these six projects are:

- Transit service level
- Transit passenger counts
  - Corridor Stop Improvements
    - Total route level ridership for all routes
    - Stop level ridership at Metrorail stations for all routes
  - Metrorail Station Stop Improvements
    - Stop level ridership at Metrorail stations for all routes
  - Signal Improvements
    - Total route level ridership for routes crossing bridges

D. Takoma-Langley Transit Center

The construction of the Takoma-Langley Transit Center (Project # 18) should improve both ridership and pedestrian safety in the area. Data will be collected through service information, passenger counts, and crash data from police reports that are compiled and reported through the Maryland State Highway Administration Office of Traffic Safety.

The general metrics that will be applied to reviewing performance of this project are:

- Transit service level
- Transit passenger counts
- Pedestrian crash rates by type/severity

[1] On-time performance is also measured for the Veirs Mill Road corridor stop improvement project (project #9) because it contains one queue jump in addition to the stop improvement components. It is not considered a "corridor project," but on-time performance is included due to anticipated time savings with the implementation of the queue jump.

E. PRTC Buses and ITS Technology

The project for PRTC (Project # 16b) funds the purchase of 13 replacement buses, installation of security cameras, and acquisition of a Computer Aided Dispatch (CAD) / Automatic Vehicle Location (AVL) system.

The general metrics that will be collected for measuring the performance of this project are:

- Passenger counts
- Perception of on-time performance
    - On-time performance for the after reports may be available from the CAD/AVL system, but the availability of that information has not yet been finalized.
- Average miles between service interruptions due to mechanical breakdowns

F. Performance Measure Details

Table 3 provides additional descriptions for each of the measures shown in Table 2, plus an additional measure for level of service information at the Takoma-Langley Transit Center and additional measures for tracking performance of the PRTC project.

Table 3 Detailed Descriptions of Performance Measures / Additional Performance Measures

Measure Number	Measure	Details	Data Source(s)	Frequency of Data Collection	Project #s
1	Transit service level – Corridor Projects	For all routes (priority and non-priority) for weekday, Saturday, and Sunday (as appropriate): • Total trips • Span of service • Headway (by time of day, as defined by WMATA's six time periods): o Early AM – 0400-0559 o AM Peak – 0600-0859 o Midday – 0900-1459 o PM Peak – 1500-1859 o Early Night – 1900-2259 o Late Night – 2300-0359 • Annual revenue miles and hours • Any changes in service (any route) that have occurred since the time this data was collected for the previous report	• Public Schedules • WMATA • Other service providers	One time for each report: before, one-year after, two-years after	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14

Measure Number	Measure	Details	Data Source(s)	Frequency of Data Collection	Project #s
2	Transit service level – Point Projects	For all routes (priority and non-priority) for weekday, Saturday, and Sunday (as appropriate): • Total trips • Span of service • Headway (by time of day, as defined by WMATA's six time periods): o Early AM – 0400-0559 o AM Peak – 0600-0859 o Midday – 0900-1459 o PM Peak – 1500-1859 o Early Night – 1900-2259 o Late Night – 2300-0359 • Any changes in service (any route) that have occurred since the time this data was collected for the previous report	• Public Schedules • WMATA • Other service providers	One time for each report: before, one-year after, two-years after	16a, 16b
3	Transit Center level of service	For all routes that serve the stops considered to be part of the transit center (stops identified by MTA) for weekday, Saturday, and Sunday (as appropriate): • Total trips • Span of service • Headway (by time of day, as defined by WMATA's six time periods): o Early AM – 0400-0559 o AM Peak – 0600-0859 o Midday – 0900-1459 o PM Peak – 1500-1859 o Early Night – 1900-2259 o Late Night – 2300-0359	• Public Schedules • WMATA • Other service providers	One time for each report: before, one-year after, two-years after	18

Measure Number	Measure	Details	Data Source(s)	Frequency of Data Collection	Project #s
4	Passenger counts[2] *(For non-priority bus routes)*	• Average monthly total route level ridership for weekday, Saturday, and Sunday	• WMATA • Other service providers	Monthly data collected quarterly, rolled up to quarterly and annually	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14, 16a
5	Passenger counts *(For priority bus routes)*	For WMATA Priority Bus routes only: • Average monthly boardings/alightings at all bus stops for the entire priority bus route, both within and outside the implementation corridor	• WMATA: APC or ridecheck data. Monthly average boardings starting January 2010.	Monthly data collected quarterly, rolled up to quarterly and annually	2, 3, 5, 7, 8, 10, 11
6	Transit Center passenger counts	Summary of average monthly boardings/alightings at all bus stops for a typical weekday, Saturday, Sunday: • Total use at all surrounding stops (identified by MTA) by Metrobus and local service. o Separated by surrounding stops and transit center stops	• WMATA, through APC counts. • Other service providers	One time for each report: before, one-year after, two-years after	18
7	On-time performance *(For priority and non-priority WMATA routes)*	For WMATA Bus routes only: • Quarterly average on-time performance (2 minutes early to 7 minutes late) for each bus route serving the implementation corridor for weekdays (by time of day, WMATA definition) and all day for Saturdays and Sundays o To be calculated by actual vs. scheduled run time by trip for each route. For PRTC Bus routes if data becomes available: • Monthly average on-time performance (as defined by PRTC) for all routes weekdays and Saturdays for AM and PM peak periods.	• WMATA, through NextBus. Quarterly average starting January 2010. • PRTC	Quarterly data collected quarterly, rolled up to annually Quarterly data collected two times for the "after" reports	2, 3, 5, 7, 8, 9, 10, 11, 16b

[2] Passenger: An individual on board, boarding, or alighting from a revenue transit vehicle; excludes operators, transit employees, and contractors. NTD Glossary: http://www.ntdprogram.gov/ntdprogram/Glossary.htm#L, Accessed June 1, 2011

Measure Number	Measure	Details	Data Source(s)	Frequency of Data Collection	Project #s
8	Passenger counts / Average load *(For priority bus routes)*	For WMATA Priority Bus routes only: • Monthly average passenger load for a typical weekday, Saturday, Sunday, by time of day (WMATA definition) o To be calculated from screenline counts at the beginning, middle, and end of the implementation corridor.	WMATA, through APC and ridecheck counts	Monthly data collected quarterly, rolled up to quarterly and annually	2, 3, 5, 7, 8, 10, 11
9	Vehicle travel time for corridor *(For priority bus routes)*	For WMATA Priority Bus routes only: • Actual and/or scheduled run time from start to end of implementation corridor for a typical weekday by time of day (WMATA definition)	WMATA, through NextBus	One time for each report: before, one-year after, two-years after	2, 3, 5, 7, 8, 10, 11
10	Passenger miles[3] for corridor *(For priority bus routes)*	Estimation of total passenger miles travelled over the implementation corridor on each priority bus route. Calculated from average of monthly screenline passenger counts multiplied by the length of the corridor.	Calculation	One time for each report: before, one-year after, two-years after	2, 3, 5, 7, 8, 10, 11
11	Passenger hours of travel for corridor *(For priority bus routes)*	Estimation of total passenger hours travelled over the implementation corridor on each priority bus route. Calculated from average of monthly screenline passenger counts multiplied by vehicle travel time over the implementation corridor.	Calculation	One time for each report: before, one-year after, two-years after	2, 3, 5, 7, 8, 10, 11
12	Queue jumpers[4] utilization *Priority bus routes*	Number of bus trips utilizing the queue jumpers • Average monthly for weekdays for one year prior to each report by queue jumper location	WMATA	One time for each report: one-year after, two-years after	2, 4, 7, 8, 9

[3] Passenger Miles Traveled (PMT): The cumulative sum of the distances ridden by each passenger. NTD Glossary: http://www.ntdprogram.gov/ntdprogram/Glossary.htm#L, Accessed June 1, 2011

[4] The actual data that will be available for this category has not yet been finalized, as the project requirements and technology have not yet been defined; for example, it has not yet been determined whether buses will need to have on-board technology to be able to activate the traffic signal at the queue jump location or whether a trigger plate in the pavement can be used. Thus the ability to capture data, and the type of data captured, is as yet unknown; it will be further defined as the requirements for the queue jumpers and TSP are developed.

Measure Number	Measure	Details	Data Source(s)	Frequency of Data Collection	Project #s
13	TSP activations[5]	Number of times TSP activated and number of buses going through • Average monthly for weekdays for one year prior to each report by location	WMATA, SHA, VDOT, DDOT, City of Alexandria	One time for each report: one-year after, two-years after	2, 5, 7, 8, 11, 13, 14
14	Transit rider characteristics	Use of previously conducted 2008 Regional On-Board Bus Survey data and new survey of weekday transit rider characteristics based on intercept interviews with bus route riders. Data to include origin-to-destination travel patterns, travel purposes (home-based work, home-based other, etc.), modes of access to (and egress from) transit (walk, bike, drive alone, carpool, drop-off, etc.), and socio-economic characteristics of the transit riders (household income, vehicles available to the household, the rider's race, disability and/or driver's license status, etc.). Compare to overall regional data.	2008 Regional On-Board Bus Survey Data (MWCOG); New survey to be conducted by City of Alexandria	Once between one and two years after project completion.	10
15	Transit Center safety record	Summary of annual pedestrian accidents in the area of the Takoma-Langley Transit Center. • Average of 2008, 2009, 2010, 2011 (Before data) • Rolling 12 months once facility opens	Intersections provided by MTA. Data to be provided by SHA Office of Traffic Safety (OOTS)	One time for each report: before, one-year after, two-years after	18
16	Perception of On-time performance	Composite perception systemwide for PRTC: • Proportion of all complaints that are related to on-time performance • Perception of on-time performance from tri-annual PRTC survey	PRTC	One time for each report: before, one-year after, two-years after, based on three previous customer satisfaction surveys.	16b

[5] The actual data that will be available for this category has not yet been finalized, as the project requirements and technology have not yet been defined for TSP. Thus the ability to capture data, and the type of data captured, is as yet unknown; it will be further defined as the requirements for TSP are developed.

Measure Number	Measure	Details	Data Source(s)	Frequency of Data Collection	Project #s
17	Average miles between service interruptions due to mechanical breakdowns	Average miles • Monthly data collected back to January 2010 for before replacement buses are in service • Monthly data collected for one and two years after replacement buses are in service	PRTC	One time for each report: before, one-year after, two-years after,	16b

V. Reporting and Data Collection Requirements

Subject to the Paperwork Reduction Act, as necessary, TPB/COG has agreed to (i) collect the data necessary to track and report on each of the performance measures identified in the Performance Measures Table (Table 1) of the Grant Agreement, and (ii) report the results of such data collection to the Federal Transit Administration (FTA).

A. Data Collection

The data collection covers operations, level of service, and usage measures for all project components, with additional measures for corridor-focused projects where bus priority measures are being implemented. To satisfy the reporting requirements, TPB/COG has agreed to provide Before, One Year After, and Two Years After reports for each project component.

In addition to the data needed for the Before, One Year After, and Two Years After reports, TPB/COG is requiring collection of data on a quarterly or annual basis, depending on the performance measure. Table 4 shows the data that must be collected, by collection frequency, throughout the course of the project.

Table 4 Data Collection Measures and Frequency

Measure Number	Measure	Quarterly	One-Time / At Reporting Time
1,2	Transit service level		X
3	Transit Center level of service		X
4	Passenger counts *(For non-priority bus routes)*	X	
5	Passenger counts *(For priority bus routes)*	X	
6	Transit Center passenger counts		X
7	On-time performance *(For priority bus routes)*	X	
8	Passenger counts / Average load *(For priority bus routes)*	X	
9	Vehicle travel time for corridor *(For priority bus routes)*	X	
10	Passenger miles for corridor *(For priority bus routes)*		X
11	Passenger hours of travel for corridor *(For priority bus routes)*		X
12	Queue jumper utilization		X
13	TSP activation		X
14	Transit rider characteristics		X
15	Transit Center safety record		X
16	Perception of on-time Performance		X
17	Average miles between service interruptions due to mechanical breakdowns		X

B. Reports

Before reports will include current baseline data for each performance measure and will be delivered to USDOT before project completion. Reports must include a detailed description of data sources, assumptions, variability, and the estimated level of precision for each measure. After reports may include a narrative discussion detailing project success and/or the influence of external factors on project expectations, as well as an examination of project effectiveness in relation to Before baselines. Four Before reports will be developed in each reporting group (RG) for the first year of the performance monitoring task. The schedule by which the reports have been delivered is shown in Table 5.

Table 5 Before Report Schedule of Delivery

Project	RG1 June-Aug 2011	RG2 Sep-Nov 2011	RG3 Dec 2011-Jan 2012	RG4 Feb-Mar 2012	First Contract Award
Project #2: 16th Street Bus Priority Improvements	X				January 3, 2012*
Project #3: Georgia Avenue Bus Priority Improvements	X				July 29, 2011*
Project #4: H Street/Benning Road Bus Priority Improvements	X				May 21, 2012
Project #5: Wisconsin Avenue Bus Priority Improvements			X		January 3, 2012*
Project #6: Addison Road Improvements			X		April 30, 2012
Project #7: University Boulevard Bus Priority Improvements		X			April 30, 2012
Project #8: U.S. Route 1 Bus Priority Improvements				X	May 31, 2012
Project #9: Veirs Mill Bus Priority Improvements			X		June 30, 2012
Project #10: US 1 Transitway				X	November 30, 2011
Project #11: VA 7 (Leesburg Pike) Bus Priority Improvements		X			May 31, 2012
Project #12: Van Dorn-Pentagon Rapid Bus (City of Alexandria)			X		April 30, 2012
Project #13: Theodore Roosevelt Bridge to K Street Bus Priority Improvements		X			January 3, 2012*
Project #14: 14th Street Bus Priority Improvements		X			January 3, 2012*
Project #16a: Pentagon - Franconia Springfield Station Improvements				X	March 30, 2014
Project #16b: PRTC Buses and ITS Technology		X			October 23, 2008*
Project #18: Takoma/Langley Transit Center				X	August 31, 2012

RG = Report Group
*Note: Actual contract award dates

Completion dates for the After reports, both one year after and two years after project completion, are scheduled as shown in Table 6. The report dates are based upon the most recently available scheduled project completion dates and include an additional three months following project completion to collect the required data; in several cases where more than two reports would be due in the same month based

on project completion schedules, after report due dates were moved to allow for a more even work flow.

Table 6 After Report Schedule – Chronological Listing

Project	Prospective Completion Date of Last Contract[6]	One Year After Report Due	Two Year After Report Due
Project #4: H Street/Benning Road Bus Priority Improvements	June 30, 2015	September 30, 2016	September 30, 2017
Project #3: Georgia Avenue Bus Priority Improvements	June 30, 2015	September 30, 2016	September 30, 2017
Project #2: 16th Street Bus Priority Improvements	June 30, 2015	October 31, 2016	October 31, 2017
Project #9: Veirs Mill Bus Priority Improvements	June 30, 2015	October 31, 2016	October 31, 2017
Project #12: Van Dorn-Pentagon Rapid Bus (City of Alexandria)	September 30, 2013	December 31, 2014	December 31, 2015
Project #6: Addison Road Improvements	June 30, 2015	November 30, 2016	November 30, 2017
Project #5: Wisconsin Avenue Bus Priority Improvements	June 30, 2015	November 30, 2016	November 30, 2017
Project #11: VA 7 (Leesburg Pike) Bus Priority Improvements	June 30, 2015	December 31, 2016	December 31, 2017
Project #7: University Boulevard Bus Priority Improvements	September 30, 2014	December 31, 2015	December 31, 2016
Project #8: U.S. Route 1 Bus Priority Improvements	September 30, 2014	December 31, 2015	December 31, 2016
Project #16b: PRTC Buses and ITS Technology	September 30, 2013	December 31, 2014	December 31, 2015
Project #10: US 1 Transitway	December 31, 2013	March 31, 2015	March 31, 2016
Project #18: Takoma/Langley Transit Center	September 30, 2014	January 31, 2016	January 31, 2017
Project #16a: Pentagon - Franconia Springfield Station Improvements	November 30, 2015	February 28, 2017	February 28, 2018
Project #13: Theodore Roosevelt Bridge to K Street Bus Priority Improvements	June 30, 2015	December 31, 2016	December 31, 2017
Project #14: 14th Street Bus Priority Improvements	June 30, 2015	January 31, 2017	January 31, 2018

[6] Dates taken from latest available progress reports. These dates will be modified as necessary as some movement is expected with RFP/RFI releases, contracts, and project implementation schedules.

VI. Project Specific Route Information

Table 7 lists the priority and non-priority bus routes for each project; as discussed earlier, more detailed performance data will be collected for priority routes.

Table 7 Project Specific Route Information

Project	Project Type	Priority Routes	Non-Priority Routes
Project #2: 16th Street Bus Priority Improvements	Corridor	S9	S1, S2, S4
Project #3: Georgia Avenue Bus Priority Improvements	Corridor	79	70, 71
Project #4: H Street/Benning Road Bus Priority Improvements	General: Corridor Stops	n/a	X1, X2, X3, X9
Project #5: Wisconsin Avenue Bus Priority Improvements	Corridor	37, 39	31, 32, 34, 36, M2, M6
Project #6: Addison Road Improvements	General: Corridor Stops	none	P12
Project #7: University Boulevard Bus Priority Improvements	Corridor	J4	J1, J2, J3
Project #8: U.S. Route 1 Bus Priority Improvements	Corridor	none	81, 82, 83, 84, 86, 89
Project #9: Veirs Mill Bus Priority Improvements	General: Corridor Stops	none	Q1, Q2, Q4, Q5, Q6
Project #10: US 1 Transitway	US-1 VA	9A, 9E	none
Project #11: VA 7 (Leesburg Pike) Bus Priority Improvements	Corridor	28X	28A, 28F, 28G, 28T
Project #12: Van Dorn-Pentagon Rapid Bus (City of Alexandria)	Corridor	none	7A, 7F, 7W, 7X, 25B DASH: AT1, AT5
Project #13: Theodore Roosevelt Bridge to K Street Bus Priority Improvements	General: Signals	n/a	WMATA: 3Y, 16Y PRTC: MN-R Loudoun: Purcellville, Leesburg, Dulles North, Dulles South, and Ashburn North
Project #14: 14th Street Bus Priority Improvements	General: Signals	n/a	WMATA: 5A, 16F, 11Y, 13F/13G, 16F PRTC: MN-R, DC-R, LR-R, R1-R, MC-R Loudoun: Purcellville, Leesburg, Dulles North, Dulles South Martz: DC1 – DC13, Pentagon Express, Noon Shuttle Quick's: Washington Navy Yard-DOT: Run 1; Washington DC: Runs 12 and 16

Project	Project Type	Priority Routes	Non-Priority Routes
Project #16a: Pentagon -- Franconia Springfield Station Improvements	General: Metrorail Station	n/a	**Pentagon:** WMATA: 7A, 7B, 7C, 7D, 7E, 7H, 7P, 7W, 7X, 7Y, 8S, 8W, 8X, 8Z, 9A, 9E, 10A, 10E, 13F/13G, 16A, 16B, 16D, 16E, 16F, 16J, 16K, 16L, 16P, 17A, 17B, 17F, 17G, 17H, 17K, 17L, 17M, 18E, 18F, 18G, 18H, 18J, 18P, 21A, 21D, 22A, 25A, 25C, 25D, 28F, 28G, 29C, 29E, 29G, 29H, 29X ART: 42, 87, 87A, 87X DASH: AT3 FC: 306, 380, 595 PRTC: MN-R, RB-R, DC-R, LR-R, R1-R, MC-R Loudoun: DC2E, DC5E, DC13E, DC15E, DC17E, DC29E, DS3E, DS8E, CF1W, CF4E, DS1, DS14E, CF3E, CF6E, LC11E, LC23E, LC30E Martz: Pentagon Express, DC 10, DC 13 **Franconia-Springfield:** WMATA: 18R, 18S, S80, S91 FC: 171, 231, 232, 301, 304, 305, 310, 321, 322, 331, 332, 380, 401, 402 PRTC: P-MD
Project #16b: PRTC Buses and ITS Technology	PRTC Buses	n/a	All PRTC routes
Project #18: Takoma/Langley Transit Center	Transit Center	n/a	WMATA: C2, C4, J4, F8, K6 Ride-On: 15, 16, 17, 18, 25 The Bus: 18 UM Shuttle: 111