



Shuttle Services at Metro Facilities



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Washington Metropolitan Area Transit Authority
Office of Bus Planning

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Anacostia Station
Anacostia Station



Executive Summary

Shuttles—non-WMATA and non-Compact member services that typically serve offices, apartments, hospitals, educational centers, auto dealers, and hotels—are becoming a common site at Metrorail stations and are an important component of station access. By providing quick, and often free, service between a destination and a Metrorail station, private and public shuttle services can attract choice riders to the Metrorail system. Because these services typically have a small station-area footprint and do not require long-term parking, WMATA recognizes the cost savings and long-term benefits in accommodating shuttles. However, managing shuttle access to Metrorail station facilities is a challenge. Shuttles typically load and unload passengers at station bus bays, Kiss & Rides, and adjacent roadways, depending on the station and its surrounding built environment. This ad-hoc approach to serving shuttle passengers can result in operating conflicts with pedestrians, Metro and other local buses, and private vehicles, leading to safety and transit operations concerns.

WMATA currently manages station access through its bus bay prioritization policy—shuttles are authorized to access an underutilized bus bay provided that the shuttle operator has been approved by the Office of Bus Planning (BPLN) staff. WMATA initiated this *Shuttle Services at Metro Facilities* study, which is guided by a stakeholder team comprised of jurisdictional partners, to update its shuttle access policies and procedures to better address the current and future shuttle demand at its station facilities. This study presents a summary of existing shuttle services and their impact on station-area operations, access management lessons learned from other U.S. transit agencies, an estimate of future shuttle demand, and a series of facility design, demand management, permitting, and enforcement recommendations.

Existing Conditions

The study team observed 22 Metrorail stations during the AM and PM peak periods of bus activity. On-site observations were conducted to define the current shuttle demand throughout the Metrorail system. The final list of stations, selected by the stakeholder team based upon knowledge of existing shuttle operations, and existing shuttle activity is shown in Table ES-1.

Many shuttles provide on-demand service (i.e. require a reservation) and pick up only one passenger per trip. These shuttles typically serve hotels and auto dealerships, have very brief layovers, and are infrequent. However, many schedule-based shuttles serve apartments, offices, universities, and hospitals, and feature higher ridership levels, more frequent service, and often longer layover periods.

The large majority of shuttles are not authorized by WMATA, as most shuttle operators serve station Kiss

Table ES-1: Existing Shuttle Activity by Station

Station	Jurisdiction	Shuttle Trips per Peak Hour
Pentagon City	Arlington	60
Van Dorn Street	Alexandria	41
Pentagon	Arlington	38
Shady Grove	Montgomery County	37
Dunn Loring-Merrifield	Fairfax County	28
Brookland-CUA	District of Columbia	26
Crystal City	Arlington	20
Medical Center	Montgomery County	18
Ballston-MU	Arlington	16
Vienna/Fairfax-GMU (south side)	Fairfax County	15
College Park-U of MD	Prince George's County	13
Rosslyn	Arlington	12
Bethesda	Montgomery County	10
Greenbelt	Prince George's County	9
King Street	Alexandria	8
Anacostia	District of Columbia	8
Braddock Road	Alexandria	7
Eisenhower Avenue	Alexandria	7
Fort Totten	District of Columbia	6
Friendship Heights	Montgomery County	6
New Carrollton	Prince George's County	6
Southern Avenue	Prince George's County	6
Total		397

& Rides (52 percent) and are thus not required by WMATA’s current policy to apply for a permit. The bus bay area and adjacent roadways are the second and third most common shuttle locations at 26 percent and 18 percent, respectively.

An analysis of on-site observations revealed common operating issues that stem from conflicts between shuttles, buses, private vehicles, and pedestrians. These issues occur at many but not all of the study stations, with some stations experiencing more issues than others. Table ES-2 highlights these issues by location and lists their contributing factors.

Policies and Procedures

WMATA currently requires shuttle operators to request authorization to serve Metrorail stations only if they wish to serve station bus bays. WMATA’s Policy/Instruction #3.1/1 (*Use of Bus Bays at Metrorail Stations by non-WMATA Operators*) assigns last priority to shuttles, after Metrobus, Compact jurisdiction services, and other public agencies. In addition, the policy/instruction defines the procedures for non-WMATA operators (i.e. shuttle services) to request use of station bus bays. The permitting process is administered by the Office of Bus Planning. Shuttles are unauthorized to use station bus bays if their operator has not entered into a formal license agreement with WMATA for bus bay use. Enforcement of this policy is conducted by the Metropolitan Transit Police Department, bus supervisors, and through simple “DO NOT ENTER” signage installed at the entrances to bus bay areas. Only 45 percent of stations observed in this study have regularly assigned bus supervisors.

A review of five peer U.S. transit agencies summarized the national state of practice for managing shuttle service access to station facilities. Agencies reviewed include San Francisco Bay Area Rapid Transit District (BART), Chicago Transit Authority (CTA), Metropolitan Atlanta Rapid Transit Authority (MARTA), Massachusetts Bay Transportation Authority (MBTA), and Tri-County Metropolitan Transportation District of Oregon (TriMet).

Table ES-2: Summary of Observed Operating Issues

Location	Operating Issue	Contributing Factors	Observed Stations
Bus Bays	Blocked entrances and exits	Congestion; Station-area design; Lengthy Kiss & Ride queues; Drivers stopping near Metrorail entrance; Shuttle layover	Anacostia, Vienna/Fairfax (south), Bethesda, Medical Center, College Park, New Carrollton (south)
	Blocked bus bays	Congestion	Vienna/Fairfax (south), College Park, Greenbelt
	Unsafe pedestrian behavior	Station-area design	Ballston, Southern Avenue
Kiss & Ride	Blocked entrances or blocked access to passenger waiting area	Congestion; Lengthy Kiss & Ride queues; Shuttle layover	King Street, Dunn Loring, Shady Grove (east and west)
	Blocked lanes in Kiss & Ride lot	Shuttles loading and unloading passengers in travel lanes	King Street, Van Dorn Street, New Carrollton (north)
	Blocked spaces in Kiss & Ride lot	Shuttles loading and unloading passengers in travel lanes; Shuttles loading and unloading passengers in parking spaces	King Street, Dunn Loring, Medical Center
	Unsafe pedestrian situations	Lack of passenger amenities	King Street, Brookland
Adjacent Roadways	Blocked bus stops	Lack of assigned Kiss & Ride	Ballston, Crystal City, Anacostia, Friendship Heights
	Blocked travel lanes	Kiss & Ride is too small; Lack of assigned Kiss & Ride	Van Dorn Street, Ballston, Crystal City, Pentagon City, Anacostia, Brookland, Fort Totten, Vienna/Fairfax (south), Friendship Heights, New Carrollton (north)
	Limited sight distance	Driver convenience	Van Dorn Street, Crystal City

The review revealed that shuttle access at rail facilities is not as prominent an issue for other U.S. transit agencies as it is for WMATA, primarily due to these agencies' limited number of stations with bus bays, as well as competing priorities within limited budgets. The study team found that the agencies with shuttle permitting processes in place are generally not pursuing updates to their management tools and techniques as WMATA is. In general, unauthorized shuttle access in station bus bays is not considered a priority issue by other transit agencies, primarily because unauthorized access is not commonplace. These agencies essentially utilize the same enforcement techniques as WMATA, and like WMATA, other agencies rarely issue citations to unauthorized operators.

Future Demand

The metropolitan Washington region is growing despite the economic recession and is projected to continue growing throughout the coming decades. This anticipated growth will likely increase the number of shuttle services accessing Metrorail stations in the future, further straining the capacity of station-area facilities and contributing to station-area operating problems and conflicts.

To estimate future shuttle demand, the study team conducted a market-area analysis based on the premise that, within each station area, the factors contributing to the decision to offer shuttle services will continue into the future, and that shuttle trip growth can reasonably be related to the growth in demographic variables (e.g. households and employees) in a station's market area. Each station was assigned a unique market-area boundary based on the extent of its existing shuttle services. Market area boundaries also took into account future Metrorail expansion that may cause shuttle operators to serve different stations (e.g. Dulles extension, Potomac Yard station). Analysis results are summarized in Table ES-3 and Figure ES-1. The market-area analysis revealed that many stations could experience significant increases in shuttle activity based on projected growth in the region. Nine of the 22 study stations could encounter shuttle activity increases of at least 25 percent by 2030; this number could increase to 13 stations by 2040.

Additional factors beyond regional household and employment growth (e.g. walkability, connecting transit service, traffic congestion, roadway and pedestrian network, availability of parking, income, etc.) will certainly contribute to changes in shuttle activity. These types of influences can have a profound effect, both positively and negatively, on shuttle growth and could alter any demand estimates. However, the uncertainty and difficulty associated with accounting for all of these additional factors is beyond the scope of this study. Therefore, these results represent a reasonable estimate of future shuttle demand by taking into account locations of growth and big-picture transportation investments throughout the region.

Table ES-3: Future Shuttle Demand Estimate

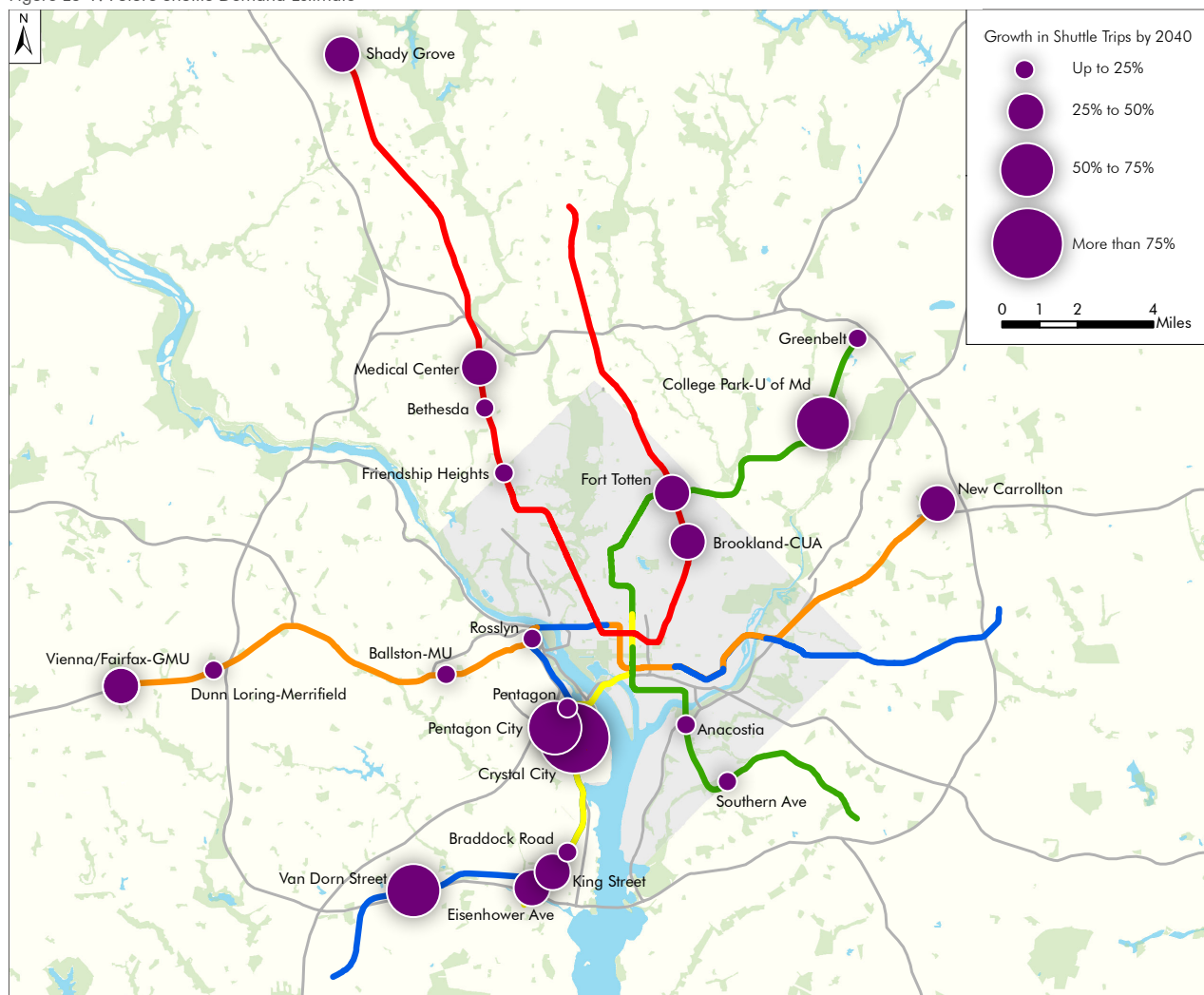
Station	Typical Shuttle Trips per Peak Hour			Shuttle Trip Growth	
	2010	2030	2040	2010-2030	2010-2040
Crystal City	20	34.5	39.2	73%	96%
Van Dorn Street	41	59.2	66.6	44%	63%
Pentagon City	60	86.1	91.8	43%	53%
Brookland-CUA	26	35.8	38.6	38%	48%
Eisenhower Avenue	7	9.6	10.0	37%	43%
Medical Center	18	23.2	23.2	29%	29%
Shady Grove	37	47.3	50.0	28%	35%
College Park-U of Md	13	16.5	20.1	27%	55%
King Street	8	10.0	10.9	25%	36%
Fort Totten	6	7.3	8.5	22%	42%
Rosslyn	12	14.5	14.9	21%	24%
Vienna/Fairfax-GMU	15	18.0	19.3	20%	29%
New Carrollton	6	7.1	7.7	19%	29%
Ballston-MU	16	18.8	18.9	17%	18%
Pentagon	38	43.9	43.9	15%	15%
Bethesda	10	11.5	11.8	15%	18%
Braddock Road	7	8.1	8.8	15%	25%
Friendship Heights	6	6.6	6.8	11%	13%
Anacostia	8	8.4	8.6	5%	7%
Greenbelt	9	9.2	9.2	2%	3%
Southern Avenue	6	6.1	6.2	1%	4%
Dunn Loring-Merrifield	28	26.1	28.3	-7%	1%
Study Station Total	397	507.7	543.1	28%	37%

Recommendations

As many Metrorail stations are already at capacity during peak periods, WMATA and local jurisdictions must begin planning for shuttle growth to ensure that its stations operate efficiently, safely, and as intended. The study team developed many high-level recommendations to address future shuttle growth throughout the Metrorail system. These recommendations are intended to be viewed as a menu of policies, strategies, and techniques, providing WMATA and local jurisdictions with different options to better manage shuttle access. Recommendations are based on four categories:

- **Facility design** recommendations would help accommodate shuttle growth through physical station-area design changes.
- **Demand management** recommendations would help reduce shuttle growth through policies, programs, and local partnerships.

Figure ES-1: Future Shuttle Demand Estimate



- **Permitting process** recommendations would help WMATA manage shuttle activity throughout the Metrorail system through internal processes.
- **Enforcement** recommendations would help promote safe and efficient station-area operations and compliance with WMATA’s shuttle permitting program.

Regardless of which recommendations may be implemented in the future, WMATA’s coordination, both internally between various permitting and enforcement offices and externally with jurisdictional partners, shuttle operators, and shuttle customers, will remain a vital component of shuttle access strategies. A desired level of access management can only be achieved through strong relationships with all stakeholders that emphasize communication and an understanding of Compact-approved policies and procedures. The WMATA Board of Directors, comprised of members from the District of Columbia, Maryland, Virginia, and the federal government, will ultimately decide how to modify shuttle access policies, and WMATA’s Office of Bus Planning will serve as the hub for shuttle access coordination as this office is currently responsible for administering the shuttle permitting program.



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Introduction

Private and public shuttles (i.e. non-WMATA or Compact jurisdictional services) are an important component of Metrorail station access. By providing quick, and often free, service between a destination and a Metrorail station, shuttle services can attract choice riders to the Metrorail system. Because these services typically use little of the station-area footprint and do not require long-term parking, WMATA recognizes the cost savings and long-term benefits in accommodating shuttles.

Scheduled shuttle services typically serve high-density land uses around the metropolitan Washington area, particularly office buildings, apartment complexes, hospitals, and educational centers. Many on-demand shuttles serve other markets, like auto dealers and hotels. Some shuttles require identification to board, while others are simply open to any member of the public. These services may potentially fill gaps in the regional transit network by serving communities that lack easy access to transit, but they more likely have begun to make certain locations (e.g. offices, apartments, etc.) more desirable. Some shuttles are required by development agreements with local jurisdictions. In these instances, shuttles could be required by local transportation management plans (TMP) as a concession for certain developments.

While WMATA and local jurisdictions recognize the benefits of shuttle services, managing their access to Metrorail station facilities is a challenge. Shuttles typically load and unload passengers at station bus bays, Kiss & Rides, or adjacent roadways, depending on the station and its surrounding built environment. Shuttle operators generally make their own decisions on where to load and unload based on considerations of timing and convenience rather than according to any policy. This ad-hoc approach to serving shuttle passengers results in operating conflicts with pedestrians, transit buses, and private vehicles, a condition that can raise safety and transit operations concerns. It is often that the most congested stations are those with the most shuttle service.

WMATA's current policy and practice is to authorize access for shuttle services at underutilized bus bays, a process that must be initiated by shuttle operators submitting an application and providing insurance information. Many shuttle operators either do not want to apply or are simply unaware of this policy, and as a result a majority of shuttle activity is concentrated in Kiss & Rides throughout the Metrorail system.

In response, WMATA is seeking to update its shuttle access policies and procedures and to better understand the current and future shuttle demand at its station facilities. This study presents access management lessons learned from other U.S. transit agencies, a summary of existing shuttle services and their contribution to station-area operating issues, an estimate of future shuttle demand, and a series of facility design, demand management, permitting, and enforcement recommendations. These recommendations are presented as a menu of possible strategies to better manage shuttle access. Regardless of which recommendations may be implemented in the future, WMATA's coordination, both internally between various permitting and enforcement offices and externally with local jurisdictions, shuttle operators, and shuttle customers, will remain a key component. A desired level of access management can only be achieved through strong relationships with all stakeholders that emphasize communication and an understanding of Compact-approved policies and procedures.



Study Process

Coordination

This study was guided by a stakeholder team comprised of WMATA staff and representatives from the City of Alexandria, Arlington County, the District of Columbia, Fairfax County, Montgomery County, and Prince George's County. The stakeholder team reviewed deliverables and selection of the Metrorail stations on which this study was focused. Each jurisdiction was asked to outline a handful of stations within their boundaries where shuttle operations are present and could potentially interfere with Metro/jurisdictional bus operations or create safety issues.

On-Site Observations

Because the primary focus of the study is on WMATA's policy regarding the use of bus bays by shuttles, the study team conducted the station observations during the heaviest hour of bus activity in the morning and afternoon peak periods. The heaviest AM and PM hours of bus activity were defined individually for each study station based on published timetables for Metrobus and regional partner bus services. Observing stations during the busiest periods of bus operations helped identify where operational and safety issues related to shuttle activity exist. All on-site observations took place in November and December of 2010.

Shuttle activity and characteristics (e.g. vehicle type, schedule, ridership, etc.) were recorded on data collection sheets (example in the Appendix) created for the study. Other data, including notes from station managers/bus supervisors, Kiss & Ride activity, and condition of station amenities, were recorded during these observation periods as well. The study team conducted additional internet research to help augment data collected during field visits.

This effort resulted in a technical memorandum, *Task 2: Establish Existing Use*.

Operating Issues

The study team developed a list of common operating issues for station bus bays, Kiss & Rides, and adjacent roadways based on its on-site observations. The summary of these issues also include their contributing factors (e.g. shuttle layover, station layout, etc.). Issues were ranked according to how the issue affects a series of general station-related criteria, including:

- Current safety,
- Long-term safety,
- Transit operations,
- Public perception of transit operators, and
- Private vehicle use.

The study team also summarized the experience of five U.S. transit agencies regarding shuttle-related operational problems and conflicts, including the San Francisco Bay Area Rapid Transit District (BART), Chicago Transit Authority (CTA), Metropolitan Atlanta Rapid Transit Authority (MARTA), Massachusetts Bay Transportation Authority (MBTA), and Tri-County Metropolitan Transportation District of Oregon (TriMet). Like WMATA, these other transit agencies also operate high-quality rail services with intermodal station facilities. Phone interviews were conducted with agency employees

familiar with station-area operations, and planning documents as well as current and planned station layouts were reviewed. This effort resulted in a technical memorandum, *Task 4: Operating Issues*.

Future Demand

The study team then estimated future shuttle demand for each study station for years 2030 and 2040, which helped understand where to expect the most shuttle growth. This step is crucial as future shuttle demand estimates directly influence overall recommendations concerning station design, demand management, and P/I enforcement. A more detailed discussion of the methodology employed to estimate future shuttle demand is presented later in this report.

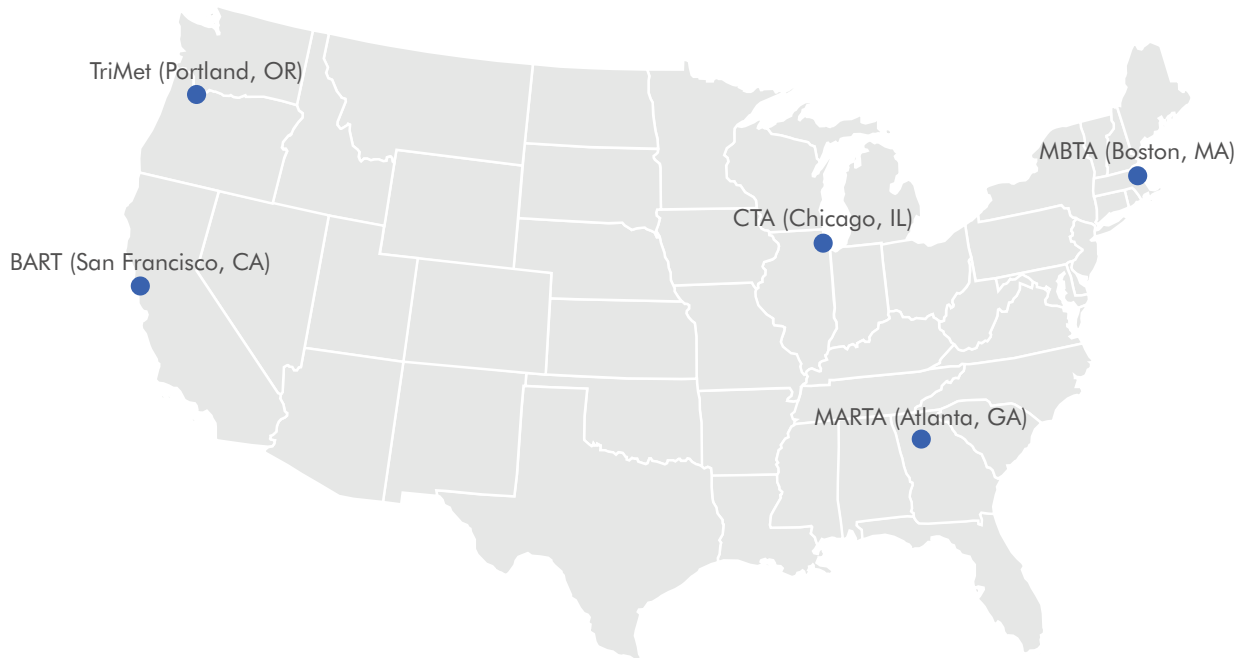
Permitting and Enforcement

A key component of this study is the development of a new process for permitting shuttle operators to serve Metrorail station facilities. The study team initiated this process by reviewing and summarizing WMATA’s Policy/Instruction (P/I) regarding the use of bus bays at Metrorail stations by non-WMATA operators.¹ This review included the agency’s internal processes necessary to authorize use of a station bus bay by a shuttle operator, including application submittal, bus bay availability analyses, insurance requirements, and license agreement creation. WMATA’s Kiss & Ride policy was also examined.

The study team summarized the current permitting process of the same five U.S. transit agencies (BART, CTA, MARTA, MBTA, and TriMet), shown in Figure 1. Permitting process information was gathered through phone interviews with employees responsible for or knowledgeable about regulating the use of bus bay facilities at each transit agency.

.....
1. Use of Bus Bays at Metrorail Stations by Non-WMATA Operators, number 3.1/1

.....
Figure 1: Location of Peer U.S. Transit Agencies



Using this information, the study team proposed an updated permitting process that incorporates an electronic database for approving and managing shuttle license agreements, among other recommendations.

The study team reviewed WMATA's current enforcement techniques for ensuring that shuttle operators comply with the existing P/I regarding the use of non-WMATA operators at station bus bays. The enforcement techniques of the five peer U.S. transit agencies were also reviewed. The study team developed recommendations to improve operator compliance with existing rules.

This effort resulted in a technical memorandum, *Task 3: Review Current Permitting Process*.



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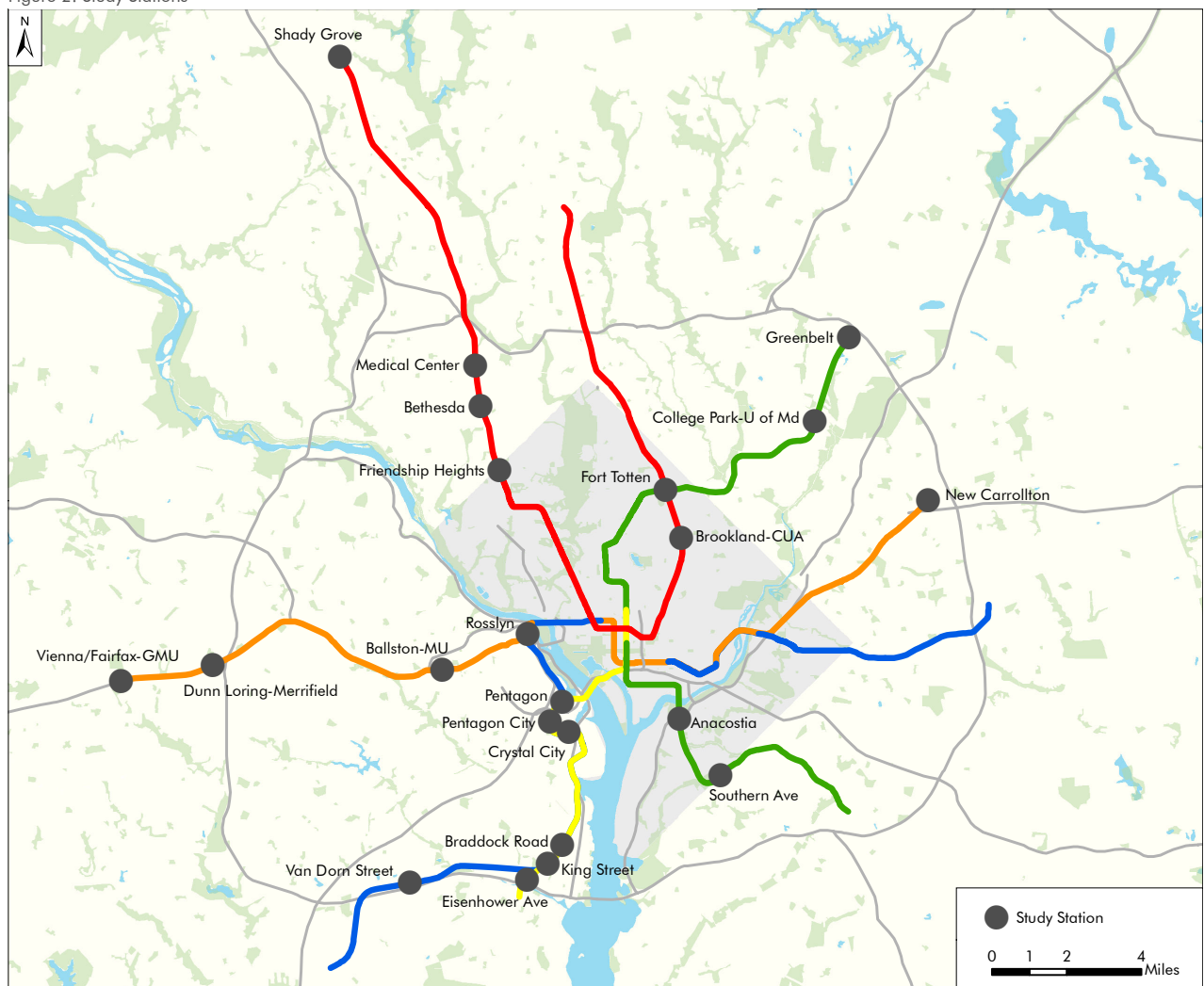
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Existing Conditions

All 22 stations were observed during AM and PM peak periods of bus activity. While more detail of existing conditions at individual stations is presented in the *Task 2: Establish Existing Use* memorandum, this section provides a summary of key observations noted during station visits throughout fall 2010. The final list of stations, selected by the stakeholder team, is shown in Figure 2.

Figure 2: Study Stations



Key Observations

Shuttle Characteristics

Two distinct shuttle types were observed serving Metrorail stations: schedule-based shuttles and courtesy shuttles. A schedule-based shuttle operates on a set schedule with predefined trip frequencies, while a courtesy shuttle operates on-demand only and requires a reservation in advance or as needed.

Shuttles that operate on schedules typically serve apartments, offices, schools, or universities and, when compared courtesy shuttles, tend to be more frequent, carry more passengers per trip, and have longer layovers. Because these shuttles provide connections to Metrorail stations for commuters, many of these services only provide trips during the AM and PM peak periods. Consequently, the service span for schedule-based shuttles is typically shorter than the service span for courtesy shuttles.

Courtesy shuttles are usually less frequent than schedule-based shuttles and tend to serve hotels, automobile dealers, and automobile body shops. Because these shuttles do not operate on a set schedule and only arrive at a Metrorail station when prompted by a passenger, these trips are infrequent, usually do not require long layovers, and almost always serve a single passenger. These demand-based shuttles usually have longer than average spans of service as well, as service is available outside of peak periods. Due to the quick in-and-out nature of demand-based shuttles, they almost always serve Kiss & Ride locations and rarely contribute to operational problems and conflicts within the station area.

Table 1: Additional Shuttle Characteristics

Characteristic	Yes	No
Authorized?	14%	86%
Peak Period Service Only?	34%	66%

Table 2: Existing Shuttle Activity by Station

Station	Jurisdiction	Shuttle Trips per Peak Hour
Pentagon City	Arlington	60
Van Dorn Street	Alexandria	41
Pentagon	Arlington	38
Shady Grove	Montgomery County	37
Dunn Loring-Merrifield	Fairfax County	28
Brookland-CUA	District of Columbia	26
Crystal City	Arlington	20
Medical Center	Montgomery County	18
Ballston-MU	Arlington	16
Vienna/Fairfax-GMU (south side)	Fairfax County	15
College Park-U of MD	Prince George's County	13
Rosslyn	Arlington	12
Bethesda	Montgomery County	10
Greenbelt	Prince George's County	9
King Street	Alexandria	8
Anacostia	District of Columbia	8
Braddock Road	Alexandria	7
Eisenhower Avenue	Alexandria	7
Fort Totten	District of Columbia	6
Friendship Heights	Montgomery County	6
New Carrollton	Prince George's County	6
Southern Avenue	Prince George's County	6
Total		397

The large majority of shuttles are not authorized by WMATA (see Table 1), because most shuttle operators serve station Kiss & Rides and are thus not required by WMATA's current practice to obtain the appropriate license.

Shuttle Activity by Station

Pentagon City Station was found to have the most shuttle activity with 60 shuttles arriving during the peak hour—46 percent more activity than Van Dorn Street Station, which is second on the list presented in Table 2.

Pentagon Station, which is served by the Department of Defense's large shuttle network, is the third most active station. More information on shuttle activity is presented in the *Task 2: Establish Existing Use* memorandum, which provides detailed information about station-area characteristics and operations, shuttle types and service characteristics, and station amenities.

Shuttle Activity by Facility

Though the primary focus of this study is on shuttle bus bay use, on-site observations have shown that 52 percent of shuttle activity is found at Metrorail station Kiss & Ride lots (Table 3). The bus bay area is the second most common shuttle location (26 percent), though many of these shuttles do not necessarily stop at a bus bay but somewhere within the bus bay area—for example, before or after the bus bays along open curb space.

Additionally, 18 percent serve adjacent roadways, two percent serve adjacent bus stops, and two percent serve WMATA-owned high occupancy vehicle (HOV) lots or private lots connected to the station area.

Limited Bus Bay Supervision

All Metrorail bus bay facilities have a finite capacity. When this capacity is exceeded by demand, operational problems and conflicts are likely to occur. Bus supervisors help keep bus bays functioning in high demand situations, but not all stations with bus bays employ bus supervisors. Table 4 highlights which stations have an assigned bus supervisor based on study team observations during fall 2010.

Passenger Amenities and their Condition

Observations included an assessment of passenger amenities (e.g. shelters, seating, lighting, etc.) at station bus bays and Kiss & Rides. Each bus bay typically includes a large shelter (twice the size of a standard on-street bus shelter), two benches, and a trash can. When observed, these amenities were typically in fair condition. Deterioration observed on any of these amenities was primarily due to general wear and tear and continual exposure to the elements. Shelter glass usually contained tape marks from flyers and some scratches. Graffiti was not common but was observed at a few stations. A few shelter and overhead lights were out of service at some stations (and were reported), but this was the exception rather than the norm.

Kiss & Ride parking lots usually contain at least one shelter, one bench, one trash can, and some overhead lighting. These amenities appeared to be in fair condition similar to bus bay amenities. More detailed information on a station by station basis is summarized in the *Task 2: Establish Existing Use* memorandum.

Operating Issues

An analysis of on-site observations revealed common operating issues stemming from conflicts between shuttles, buses, private vehicles, and pedestrians. These issues occur at many, but not all, of the study stations, with some stations experiencing more issues than others.

Table 3: Locations of Shuttle Activity

Kiss & Ride	Bus Bay	Adjacent Roadway	Adjacent Bus Stop	HOV Lot	Other
52%	26%	18%	2%	1%	1%

Table 4: Bus Supervisors by Station

Jurisdiction	Station	Bus Supervisor
Alexandria	Braddock Road	No
	Eisenhower Avenue	No
	King Street	No
	Van Dorn Street	No
Arlington County	Ballston-MU	Yes
	Crystal City	Yes
	Pentagon	Yes
	Pentagon City	No
District of Columbia	Rosslyn	Yes
	Anacostia	Yes
	Fort Totten	No
Fairfax County	Brookland-CUA	Yes
	Dunn Loring-Merrifield	No
Montgomery County	Vienna/Fairfax-GMU (south side)	Yes
	Bethesda	No
	Friendship Heights	Yes
	Medical Center	No
Prince George's County	Shady Grove	No
	College Park-U of MD	No
	Greenbelt	No
	New Carrollton	Yes
	Southern Avenue	Yes

This section summarizes operating issues by the area in which they were observed: bus bays, Kiss & Rides, or adjacent roadways. Table 5 highlights issues by location and lists the factors that contribute to these issues. Additional detail can be found in the *Task 4: Operating Issues* memorandum.

Issues Observed at Bus Bays

Three operating issues were observed at station bus bays: blocked entrances and exits, blocked bus bays, and unsafe pedestrian behavior. Bus bay entrances and exits may be blocked by shuttles or other vehicles due to a variety of reasons:

- **Congestion**—PM peak-period bus bay and Kiss & Ride congestion mix in stations with shared exit drives. This traffic may back up at the exit traffic light, blocking exits.
- **Station-area design**—some station layouts are compact with tight turns. Entrances and exits are sometimes blocked by vehicles serving bus bays near such tight turns (Figure 3).
- **Lengthy Kiss & Ride queues**—PM peak Kiss & Ride queues may extend beyond the Kiss & Ride lot entrance, blocking access to bus bays (Figure 4).
- **Drivers stopping near station entrances**—some bus or shuttle drivers unload passengers near the station entrance for passenger convenience because their assigned bus bay is farther away. This action may block bus bay entrances or exits.
- **Shuttle layover**—some shuttles were observed dwelling near bus bay entrances, forcing bus and other shuttle drivers to carefully maneuver around the obstructing shuttle.

Table 5: Summary of Observed Operating Issues

Location	Operating Issue	Contributing Factors	Observed Stations
Bus Bays	Blocked entrances and exits	Congestion; Station-area design; Lengthy Kiss & Ride queues; Drivers stopping near Metrorail entrance; Shuttle layover	Anacostia, Vienna/Fairfax (south), Bethesda, Medical Center, College Park, New Carrollton (south)
	Blocked bus bays	Congestion	Vienna/Fairfax (south), College Park, Greenbelt
	Unsafe pedestrian behavior	Station-area design	Ballston, Southern Avenue
Kiss & Ride	Blocked entrances or blocked access to passenger waiting area	Congestion; Lengthy Kiss & Ride queues; Shuttle layover	King Street, Dunn Loring, Shady Grove (east and west)
	Blocked lanes in Kiss & Ride lot	Shuttles loading and unloading passengers in travel lanes	King Street, Van Dorn Street, New Carrollton (north)
	Blocked spaces in Kiss & Ride lot	Shuttles loading and unloading passengers in travel lanes; Shuttles loading and unloading passengers in parking spaces	King Street, Dunn Loring, Medical Center
	Unsafe pedestrian situations	Lack of passenger amenities	King Street, Brookland
Adjacent Roadways	Blocked bus stops	Lack of assigned Kiss & Ride	Ballston, Crystal City, Anacostia, Friendship Heights
	Blocked travel lanes	Kiss & Ride is too small; Lack of assigned Kiss & Ride	Van Dorn Street, Ballston, Crystal City, Pentagon City, Anacostia, Brookland, Fort Totten, Vienna/Fairfax (south), Friendship Heights, New Carrollton (north)
	Limited sight distance	Driver convenience	Van Dorn Street, Crystal City

Blocked bus bays were primarily due to bus bay congestion. Many bus bays throughout the Metrorail system are shared by more than one bus route, and these bays may be served by shuttles as well. Bus routes often terminate at Metrorail stations (leading to layover periods) and feature relatively short peak-period headways (leading to frequent arrivals). The combination of layovers and frequent peak-period arrivals results in bus bay congestion. During periods of congestion, drivers of buses and shuttles may be forced to stop at other bus bays or even in the bus bay travel lane if their assigned bus bay is occupied.

Finally, unsafe pedestrian behavior may lead to bus bay operating issues, as well. Pedestrians seek the quickest possible path between two points, which may entail walking across bus bay travel lanes without crosswalks or appropriate signage (example path shown in Figure 5). Bus and shuttle drivers may not expect to see pedestrians in these areas, creating unsafe vehicle-pedestrian conflicts.

Figure 3: Vehicles in Tight Turning Areas May Block Bus Bay Entrances (New Carrollton Station)



Figure 4: Long Kiss & Ride Queue (New Carrollton Station)



Figure 5: Pedestrian Shortcut (Southern Avenue Station)



Source: Google

Issues Observed at Kiss & Rides

Kiss & Ride lots feature the most shuttle activity and, subsequently, many of the operating issues that were observed primarily occur in these locations. Four issues were observed at station Kiss & Rides: blocked entrances or blocked access to passenger waiting area, blocked Kiss & Ride lanes, blocked Kiss & Ride parking spaces, and unsafe pedestrian situations.

Kiss & Ride entrances or access to the passenger waiting area may be blocked for several reasons:

- **Congestion**—PM peak period congestion, as well as layover times as drivers wait for passengers, leads to overcrowded Kiss & Ride facilities. Private vehicle and shuttle drivers may be blocked from accessing the curb space or even the Kiss & Ride altogether during highly congested periods.
- **Lengthy Kiss & Ride queues**—vehicle queues can be long during the PM peak period and extend beyond the Kiss & Ride entrance to the point where vehicles cannot enter the facility. Drivers are sometimes confused by Kiss & Ride or taxi queues and may erroneously wait behind them even though ample space is available ahead of the queue (Figure 4).
- **Shuttle layover**—Kiss & Ride parking lots are the most common area for shuttle layovers, which can be as long as half an hour. Kiss & Ride queues may be infrequently caused by shuttles that wait near the Kiss & Ride entrance or the passenger waiting area.

Kiss & Ride travel lanes may become blocked if shuttle drivers load and unload passengers in a Kiss & Ride travel lane (Figure 6). Usually in these cases shuttle drivers unload passengers near or in a crosswalk and then move farther down the travel lane to wait for boarding passengers to arrive. Shuttle drivers attempt to stay out of the way by waiting in locations that do not see much vehicle traffic, but the opportunity for shuttle-automobile conflict is still present, particularly when the shuttle is very large.

Like Kiss & Ride travel lanes, parking spaces may be occupied or blocked by shuttles, which can obstruct drivers of private vehicles. Blocked spaces are caused by shuttle drivers, or other private vehicle drivers, who load and unload passengers in a Kiss & Ride travel lane. Some shuttles are very large and can block several spaces at once. Some shuttle drivers use parking spaces to serve passengers or to layover for long periods of time because they cannot reach the passenger waiting

Figure 6: Shuttle Blocking Kiss & Ride Travel Lane (King Street Station)



area in crowded conditions, they do not want block the passenger waiting area with long layovers, or they simply prefer serving passengers from a parking space even when the Kiss & Ride is not crowded. Shuttles using parking spaces for long layovers, or even for shorter layovers during peak periods, may block spaces that could be used by other vehicles with higher turnover. Additionally, passengers must walk through the Kiss & Ride lot to board or exit their shuttle if it is waiting in a parking space, creating potential for vehicle-pedestrian conflicts.

Pedestrians may be forced into unsafe situations due to a lack of Kiss & Ride amenities or shuttle driver convenience. Large 40- to 50-seat passenger shuttles can cause pedestrians to accumulate in the Kiss & Ride during peak periods as they wait to board their shuttle. Some Kiss & Rides lack sidewalk space, shelters, and benches, and cannot accommodate such large volumes of waiting pedestrians, which forces some pedestrians to wait in the travel lanes or on non-paved surfaces. Furthermore, when shuttle drivers pick up passengers from travel lanes and not at the pedestrian waiting area, pedestrians must then walk through congested Kiss & Ride lots and around parked vehicles, creating vehicle-pedestrian conflicts. Sometimes there are enough people waiting to board a shuttle that the passenger queue extends into an adjacent travel lane. Other drivers must maneuver around these pedestrians.

Issues Observed at Adjacent Roadways

Shuttle activity also occurs at the periphery of Metrorail stations. Shuttles were observed contributing to three operating issues on adjacent roadways, including blocked bus stops, blocked travel lanes, and limited sight distance.

Shuttles sometimes pick up, drop off, or layover in or near station bus stops (Figure 7), which can effectively prevent bus drivers from using their designated space and may force them to load and unload passengers in the adjacent travel lane. In this potentially dangerous situation, bus passengers may be forced to walk in the roadway to reach the bus, an especially difficult task for disabled passengers. This operating issue is most common at well-used stations that lack a Kiss & Ride facility.

Similar to blocking a bus stop, one or more shuttles may stop in a roadway travel lane adjacent to the curb and block other vehicles. Pedestrian safety is greatly affected, as shuttle passengers may be forced to walk in the roadway to enter or exit their shuttle. A lack of Kiss & Ride space, or a Kiss & Ride that's simply too small, contributes to this issue.

Figure 7: Shuttle Blocking Bus Stop (Anacostia Station)



Pedestrian and vehicle sight distance can be impacted when shuttles or other vehicles are stopped in the curb lane of the roadway adjacent to the station. Pedestrians may have a difficult time seeing around stopped vehicles when trying to cross the street. Similarly, drivers may have difficulty seeing pedestrians around stopped vehicles when making right turns. The few shuttles that were observed in limited sight-distance situations appear to stop at these locations because the roadway is wide, there is limited signage discouraging temporary stopping, and, most notably, its proximity to the Metrorail station entrance increases the convenience for both shuttle passengers and drivers.

Ranking of Operating Issues

This study ranked the operating issues to provide a better understanding of where the most pressing issues occur. Rankings, coupled with the system recommendations at the end of this report, will help WMATA integrate shuttle considerations into future planning efforts.

Rankings are based on how each issue affects a series of general station-related criteria—the greater the operating issues affect the criteria, the higher the problem is ranked. Operating issues that are more highly ranked are those that most affect routine operations of station areas. The ranking criteria include (listed in order of importance):

- Current safety;
- Long-term safety;
- Transit operations;
- Public perception of transit operators; and
- Private vehicle use.

Table 6 lists operating issues in order of those that affect the station area the most to those that affect the station area the least. This study defines safety criteria as the most important component for ranking operating problems. Safety criteria are broken down into two categories: current safety (is the safety impacted now?) and long-term safety (will safety likely be impacted in the future?).

Safety criteria are followed by transit operations criteria in terms of importance. Transit operations criteria are broken down into two categories as well: transit operations (are Metrobus and other Compact jurisdiction member services impacted?) and public perception of transit operators (are the operating problems likely to impact passengers’ perception of transit brands?).

Table 6: Existing Shuttle Activity by Station

Rank	Operating Problem or Conflict	Current Safety	Long-Term Safety	Transit Operations	Public Perception of Transit Operators	Private Vehicle Use
1	Blocked bus stops on adjacent roadways	●	●	◐	●	○
2	Blocked travel lane of adjacent roadways	●	●	◐	○	◐
3	Unsafe pedestrian behavior in bus bays	●	●	◐	○	○
4	Blocked entrances and/or exits to bus bays	◐	◐	●	●	○
5	Blocked bus bays	◐	◐	●	●	○
6	Limited sight distance on adjacent roadways	●	●	○	○	○
7	Unsafe pedestrian situations in Kiss & Ride	◐	●	○	○	◐
8	Blocked lanes in Kiss & Ride lot	◐	●	○	○	◐
9	Blocked entrances and/or blocked access to passenger waiting area at Kiss & Ride	◐	◐	○	○	●
10	Blocked spaces in Kiss & Ride lot	◐	◐	○	○	◐

● Greatly affects ◐ Somewhat affects ○ Does not affect

Finally, the private vehicle use criterion follows transit operations in terms of importance. This criterion is used to identify if operating problems and conflicts affect normal use of station facilities by drivers of private vehicles—essentially, does the problem affect the Kiss & Ride or adjacent roadways?

Ranking the operational issues shows that the most pressing issues are safety concerns, with station-adjacent roadways being of highest concern due to the potential interaction between pedestrians and stopped vehicles with fast-moving vehicles. Issues in the Kiss & Ride facilities rank toward the bottom of the list, primarily because transit operations are not affected and low travel speeds within the Kiss & Rides mean less severe safety concerns. Though most station-area shuttle activity is found in Kiss & Rides, the potential for shuttles to affect safety as well as transit operations cause bus bay operational issues to be ranked relatively highly in Table 6.



Policies and Procedures

The study team reviewed WMATA’s current shuttle permitting process and enforcement techniques, as well as relevant policies and procedures of five peer U.S. transit agencies (BART, CTA, MARTA, MBTA, and TriMet), in order to better understand state-of-the-practice strategies for managing shuttle access and enforcing policies. The peer agencies’ shuttle access experience provided a better understanding of the strengths and weaknesses of WMATA’s current policies and procedures. As a result, permitting and enforcement recommendations are presented later in this report. The following section summarizes WMATA’s shuttle permitting process and enforcement techniques, as well as those of the five peer U.S. transit agencies.

Permitting

WMATA Permitting Process

WMATA currently requires shuttle operators to request authorization to serve Metrorail stations only if they serve station bus bays. WMATA’s Policy/Instruction (P/I) regarding bus bay access (#3.1/1), last updated in May 2001, prioritizes bus bay access by service type² and defines the procedures for non-WMATA operators (i.e. shuttle services) to request use of station bus bays. These procedures (i.e. the permitting process) are administered by the Office of Bus Planning (BPLN).

The shuttle service operator seeking to use a station bus bay must first submit an application, which asks for general service characteristics such as the Metrorail station, schedule, vehicle dimensions and weight, purpose of service, and an insurance certificate. The application is returned to BPLN once completed. BPLN determines if the requested station’s bus bay facilities can accommodate any additional service by checking shuttle vehicle dimensions and weight, schedule, and dwell time (i.e. layover), as well as analyzing schedules of existing buses and authorized shuttle services at the station. If approved, the Office of Risk Management (RISK) reviews the shuttle operator’s certificate of insurance to ensure compliance with WMATA’s standards, naming WMATA an additional insurer. A formal license agreement is issued to the shuttle operator upon final approval. Authorized shuttle operators do not pay a fee for use of a station bus bay.

WMATA currently maintains an electronic list of shuttle services authorized to use bus bay facilities. The list is organized by station and identifies the destination of the shuttle and its assigned bus bay. WMATA does not maintain a list of unauthorized shuttles that use bus bays or other station facilities, though on-site observations conducted for this study have identified unauthorized shuttle services.

WMATA also manages a similar permitting process for intercity buses (long-distance transportation services between major cities, like Greyhound Lines, Inc.), but there are some variations when compared to shuttle

permitting: intercity bus operators have longer applications, maximum vehicle dimensions and weight are different (Table 7), and the license

Table 7: Vehicle Size and Weight Differences between Shuttle and Intercity Bus License Agreements

License Agreement Type	Maximum Vehicle Size (ft-in)			Maximum Vehicle Weight (lbs.)	
	Length	Width	Height*	Gross Vehicle	Per Axle
Shuttle	60’0”	8’6”	12’8”	40,000	20,000
Intercity Bus	45’0”	8’7”	5’6”	55,000	23,000

* Maximum intercity bus height is considerably shorter than maximum shuttle height, according to sample license agreements. This may be an error in the intercity bus license agreement.

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- Highest priority is granted to Metrobus, then Compact member jurisdiction services, then services provided by other public agencies, and finally services operated by private agencies or organizations. Paratransit services, whether operated by WMATA or member jurisdictions, are permitted to access station bus bays in general.

agreements contain additional terms. Intercity bus applications are processed by the Office of Station Area Planning and Asset Management (SAAM) because a fee is charged to the intercity bus operator. Historically, SAAM has handled intercity bus operator fees. This distinction originally began when Greyhound entered into an agreement with WMATA to construct structures at the New Carrollton bus bays for its intercity service, which was considered a real estate agreement. Similar intercity bus services, regardless of if they build any structures, have been charged a similar fee since that time.

Permitting Processes of Other U.S. Transit Agencies

The study team reviewed the current permitting process of U.S. transit agencies that operate rail services with intermodal station facilities comparable to WMATA's. The purpose of this peer agency review was to summarize the national state of practice for managing shuttle service access to station facilities. The final list of peer agencies included BART, CTA, MARTA, MBTA, and TriMet. The study team conducted phone interviews with transit agency employees who are responsible for regulating the use of bus bay facilities at each transit agency or have an understanding of this process.

This review revealed that shuttle access to rail facilities is not as prominent an issue for other U.S. transit agencies as it is for WMATA, primarily due to these agencies' limited number of stations with bus bays or competing priorities with limited budgets. The review found that the agencies that have shuttle permitting processes are generally not pursuing more sophisticated management tools and techniques like WMATA. Individual summaries for each agency are provided in the following sections. More detailed information is found in the *Task 3: Review Current Permitting Process* memorandum.

BART

BART currently has no shuttle permitting process and does not enter into formal license agreements with shuttle operators. However, BART Office of Planning and Access staff do believe that this issue should be addressed in the near future. The agency recently completed a comprehensive shuttle inventorying effort intended to forge better relationships with shuttle operators by providing support for conceptual service planning, marketing, and grant identification. Funding for this program ended in November 2009 and all efforts are on hold.

CTA

Most CTA rail stations are in dense urban locations and do not include bus bay facilities due to space constraints. Stations that do include these facilities are typically located on the outskirts of the city or in nearby suburban communities, and are not owned by CTA. Right-of-access agreements for station facilities are administered by the owner of the station, not CTA. Consequently, CTA does not have a formalized permitting program for shuttle services, though there are a few instances where private operators do have agreements with CTA (e.g. Greyhound buses at several stations).

MARTA

MARTA bans all private shuttles services from using station bus bays and does not hold any license agreements with operators of private services. Though the agency does not have a written policy defining bus bay access, other public transportation services are permitted to use station bus bays provided enough capacity is available. Current practice shows that MARTA-operated services are granted highest priority for bus bay use, followed by other public transportation services.

MBTA

MBTA administers a small program for licensing shuttles to use rail station facilities. Shuttle operators may apply for the use of station bus bays or Kiss & Ride facilities, but MBTA typically insists that shuttles only use the Kiss & Ride area so station bus bays remain as conflict-free as possible.

Maintaining efficient bus operations within station bus bays is a high priority for the agency as locations with bus bays and/or Kiss & Ride lots are limited—less than 10 rail stations overall. Shuttle operators do not pay a fee if authorized to serve a station.

TriMet

TriMet currently employs a permitting process that authorizes non-TriMet services, like shuttles, to enter and use transit center facilities. Shuttles must meet TriMet’s eligibility requirements—generally, a shuttle service eligible to apply for use of station facilities include services that provide a linkage that TriMet cannot and/or does not serve. For example, a shuttle operated by a homeowners association in a neighborhood without existing transit service would likely qualify. Because of this selective definition, only seven shuttle services are authorized to serve transit station facilities. Operators must also pay a one-time nominal administrative fee, but this fee may be waived if a shuttle serves locations outside of the TriMet service boundary.

Other Agencies

Though not one of the agencies reviewed for this study, the District Department of Transportation (DDOT) is implementing a new permitting process for commuter, sightseeing, and shuttle buses that load and unload passengers along public right-of-way in the District of Columbia. These services must now register for public right-of-way occupancy permits, which will cost \$50. Service providers must renew licenses annually. Similarly, service providers must apply for a permit to post signage at their stop(s). The fee ranges between \$250 and \$500, depending on whether the sign is affixed to an existing or new pole, respectively. This new rule defines a shuttle bus as “a public or private vehicle having a seating capacity of more than fifteen (15) passengers, exclusive of the driver, that travels a regular route at scheduled times and with specific stop(s) at which it is available to a limited group, such as employees of a particular business or students attending a particular academic institution, for boarding or discharging.”

Enforcement

WMATA’s bus bay P/I #3.1/1 establishes that transportation services provided by private agencies or organizations have last priority for the use of bus bay facilities behind services provided by Metrobus, Compact jurisdiction members, and other public agencies. Operators of private shuttles are granted lowest priority and must apply for permission to serve a bus bay. Shuttles are not authorized to use station bus bays if their operator has not entered into a formal license agreement with WMATA for bus bay use. This section summarizes WMATA’s current procedures for enforcing access restrictions for unauthorized shuttle services at station bus bays.

WMATA Enforcement

Access to Metrorail station bus bays is restricted by signage placed at the bus bay entrances and exits (Figure 8). Both the entrance and exit signs state “DO NOT ENTER” in large bold letters surrounded by a red circle, but the entrance sign is accompanied by a second sign stating “EXCEPT AUTHORIZED VEHICLES.” This second sign generally does not appear at bus bay exits, unless the exit is in the same location as the entrance.

Figure 8: Typical Signs Prohibiting Non-Authorized Access to Station Bus Bays (King Street Station)



Source: Google

Entering the bus bay area in an unauthorized vehicle is a traffic violation, which is enforced by the Metro Transit Police Department (MTPD) officers throughout the Metrorail system. MTPD officers have the ability to issue warnings and citations concerning traffic violations on WMATA property. Citations are issued to the driver of the vehicle and not the company operating the shuttle service. The fine associated with the citation varies according to the jurisdiction in which the fine was issued. If issued in Maryland or Virginia, drivers who refuse to sign the citation may be arrested. The same does not hold true for citations issued in the District of Columbia—drivers can refuse to sign the ticket without further punishment. Unauthorized bus bay access citations can be contested in court by the driver.

MTPD officers exercise discretion in enforcing violations of traffic law, with actions ranging from the issuance of citations to verbal warnings. In most cases, drivers of shuttles or other private vehicles are unaware they are in an authorized-only area, they simply took a wrong turn, or they are confused by the station layout and could not find the proper Kiss & Ride location. In these cases MTPD officers educate drivers that they are in a restricted area and remind them where to properly pick-up or drop-off passengers. Officers are well acquainted with their areas of patrol and eventually become familiar with the types of vehicles entering station bus bays. Over time they are able to remember who is knowingly violating the bus bay access policy and who is making an honest mistake. This experience allows officers to better gauge the appropriate action.

In addition to MTPD officers, WMATA street supervisors have the authority to remove vehicles from station bus bays in violation of the *Procedures and Rules for the Use of WMATA Bus Bay Facilities at Metrorail Stations* (a document that is included in every shuttle license agreement). A “street supervisor,” as defined in the procedures and rules, could be any WMATA employee, though station managers and bus supervisors would likely enforce the procedures and rules of station bus bays. As shown previously in Table 4, bus supervisors are stationed at only 45 percent of all stations observed in this study.

MTPD and bus supervisors maintain a strong working relationship, sharing information back and forth to strengthen the safety and security of the station areas. MTPD officers often depend on information provided by bus supervisors and other WMATA employees in the field, and vice versa.

Enforcement at Other U.S. Transit Agencies

The study team also reviewed current enforcement practices of peer U.S. transit agencies (BART, CTA, MARTA, MBTA, and TriMet) to summarize the national state of practice for enforcing station access policies. The study team conducted phone interviews with transit agency employees and augmented interviews with additional research.

This review revealed that unauthorized shuttle access in station bus bays is not considered a priority issue by other transit agencies, primarily because unauthorized access is not commonplace. These agencies essentially utilize the same enforcement techniques as WMATA, including displaying warning signage at bus bay entrances and exits and educating unauthorized shuttle drivers that they cannot serve restricted facilities if they are caught doing so. The review found that issuing citations to unauthorized drivers is extremely uncommon for all agencies. Individual summaries for each agency are provided in the following sections. More detailed information is found in the *Task 3: Review Current Permitting Process* memorandum.

BART

Bus areas located on BART Station property are equipped with standard “DO NOT ENTER” signs at the entrances and exits to warn drivers. In addition, some station entrances include pavement markings that note “BUS ONLY.” As there is no shuttle authorization process, BART transit police can easily identify unauthorized vehicles in station bus bays. Transit police rely on tips from bus supervisors concerning problem drivers. Many of the bus areas are informally policed by bus transit supervisors who will educate drivers that mistakenly drive into restricted bus bay areas. While transit police are able to issue citations to drivers who violate the “bus only” rule, it is rare that BART police issue citations. Unauthorized entry into bus bays is not considered a prevalent problem by BART staff.

CTA

CTA utilizes “Do Not Enter” signs and/or “BUS ONLY” pavement markings to warn drivers of non-authorized vehicles to not enter. If these drivers enter the bus-only areas, station managers, supervisors, and transit police will educate the drivers and require them to exit the premises. Unlike other transit agencies, CTA does not have a police force that is part of the agency. Instead, the Chicago Police Department (CPD) runs a transit unit that is responsible for patrolling CTA vehicles and facilities. CPD transit officers are able to issue citations at all rail stations regardless of jurisdiction, but it is uncommon for these officers to issue citations to private shuttles.

MARTA

Shuttles are expected to use MARTA Kiss & Ride areas instead of bus bays; gray bus bay entrance signs warn “BUS ONLY” (Figure 9) and other wayfinding signs pointing drivers to Kiss & Ride and parking facilities. MARTA police and station bus supervisors are responsible for enforcing bus bay access rules. As with other transit agencies, only transit police are allowed to issue citations to drivers entering the bus bays without permission. Citations are extremely rare—officers and bus supervisors usually force drivers of unauthorized vehicles out of the bus bays. As transit police officers cannot be at the station bus bays at all times, they rely on tips from bus supervisors concerning problem drivers.

Figure 9: Simple “BUS ONLY” Signs at MARTA Facilities (Inman Park-Reynoldstown Station)

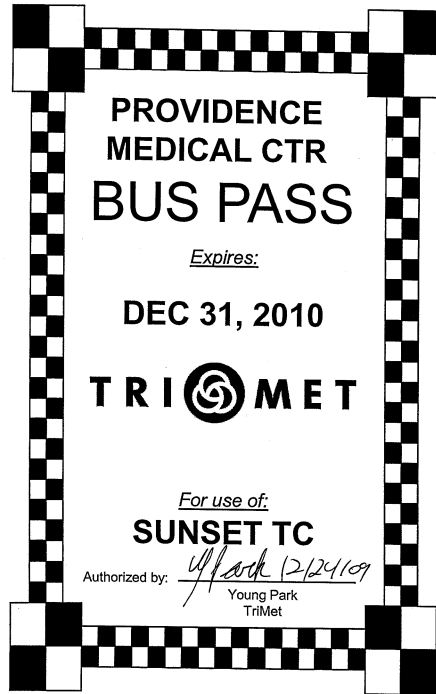


Source: Google

MBTA

Bus bays signage warns drivers of non-authorized vehicles to stay out. These signs are styled similarly to other U.S. transit systems with a red circle designed to catch the eye of motorists. Station officials observe and monitor rail station bus bays primarily during peak periods in the morning and evening. These officials are familiar with the station they observe, and have an understanding of which vehicles are authorized to use the bus bays and which are not. Station officials will inform drivers of unauthorized vehicles to leave and may report information regarding nuisance shuttle activity to the MBTA Central Control, who then contact the transit police if assistance is needed. MBTA transit police can issue citations to drivers who serve bus bays without permission, though this rarely occurs in practice. Use of station bus bay and Kiss & Ride facilities by unauthorized shuttles is not a pressing issue for the agency.

Figure 10: Example TriMet Windshield Sticker



Source: TriMet

TriMet

Field supervisors (part of TriMet’s security staff) are primarily responsible for enforcing the shuttle permit system, though station managers and transit police can enforce the policy as well. Because TriMet utilizes windshield sticker permits (Figure 10), supervisors easily identify authorized and unauthorized shuttles. Field supervisors can issue citations to any shuttle operators violating the station facility policy, though the issuance of citations is rare, and are granted permission to force unauthorized shuttle operators to leave station premises. TriMet security staff sometimes report information directly to planning staff if more stringent action is needed to prevent operational issues associated with continued unauthorized shuttle use.



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Future Demand

The metropolitan Washington region is growing despite the economic recession and is projected to continue growing throughout the next decades. This anticipated growth will likely increase the number of shuttle services accessing Metrorail stations, further straining the capacity of station-area facilities and contributing to station-area operating problems and conflicts. To better understand the potential station-area issues in the future, the study team estimated future shuttle demand for each of the 22 stations in this study. This step is crucial to the study process as future shuttle demand will influence overall recommendations.

WMATA and the study team decided not to estimate future Kiss & Ride, Park & Ride, and taxi demand because these are not directly related to the focus of this study, which is future shuttle demand and impacts from shuttle operations.

Methodology

The first step in estimating future shuttle demand for each study station consisted of establishing a relationship between each station's existing shuttle services and the existing demographics within the station's market area. The number of shuttle trips from apartment buildings, for example, might be related to the number of households in the market area for the station. Similarly, the number of business shuttles might be related to the density of employment within a station area and the distance from the station. The study team collected shuttle service data during on-site observations throughout the final months of 2010, including shuttle headways, ridership, and span of service. The study team chose shuttle trips as the metric for estimating future shuttle demand because the number of shuttle trips is a contributor to station-area operating problems and conflicts, an emphasis of the study.

After establishing the relationship between different shuttle purposes and the appropriate demographic variable, the study team estimated future shuttle demand based on the change in station area demographics for 2030 and 2040. Growth in households and employment were examined both within the Transportation Analysis Zone (TAZ) where each specific shuttle operates and within the entire station market area.

Regression Analysis

To establish a relationship between existing shuttle services and the appropriate demographic variable, the study team performed a multiple regression analysis on all known shuttle trips and the following independent variables:

- The distance between a shuttle's final destination and the station it serves;
- Existing household density around the station; and,
- Existing employment density around the station.

The distances between a shuttle destination and the station the shuttle serves was calculated for each observed shuttle by geocoding destination and station addresses. An "as the crow flies" distance between these two points was calculated for all shuttles. Household and employment data is available in five-year increments from 2005 to 2040 via the Metropolitan Washington Council of Governments (MWCOC) Round 8 Cooperative Forecasts. Existing household and employment densities were

Figure 11: Shuttle Trips Greater than ½-Mile by Household Density

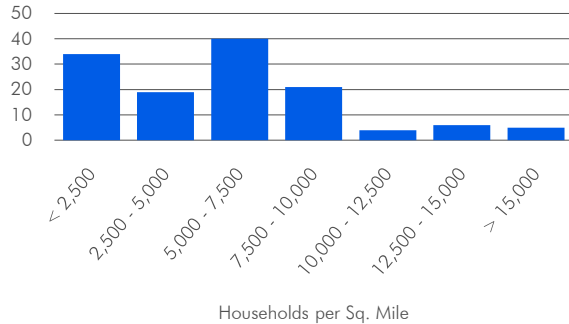


Figure 12: Shuttle Trips Greater than ½-Mile by Employment Density

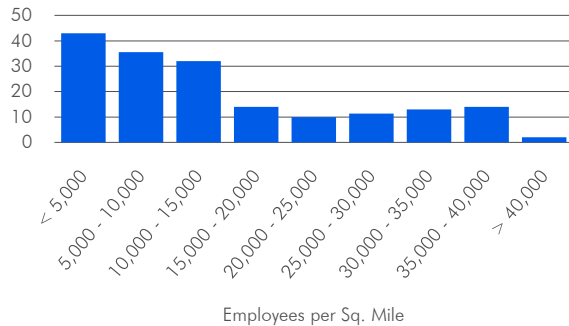
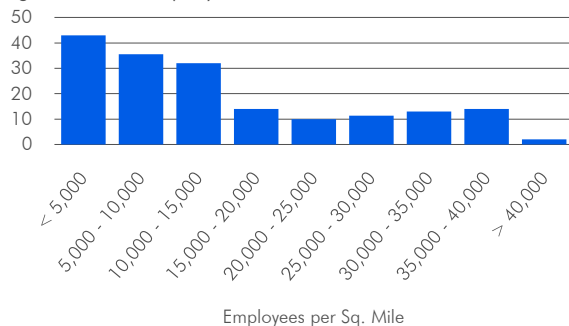


Figure 13: Shuttle Trips by Destination Distance



calculated by dividing year 2010 total households and total employment of each TAZ by the TAZ area. These densities were calculated for each TAZ that currently contains a shuttle destination.

The study team conducted a multiple regression analysis using existing shuttle trips as the dependent variable and distance, household density, and employment density as independent variables. The results showed that these relationships were not statistically significant enough to use to estimate future shuttle demand (only 3.4 percent of the change in shuttle trips could be explained by the change in the variables). None of these variables were determinants of the number of shuttles, or at least were only some of the many variables needed to more accurately estimate demand.

The study team concluded that demographic density is not necessarily a determinant of the number of shuttle trips produced. Indeed, the data shows that, from TAZs farther than ½ mile from the station, the majority of shuttle trips occur from areas with lower densities (Figures 11-12), but not all areas with similar densities have shuttle trips. Figure 13 also shows that many existing shuttle trips tend to come from destinations located one mile or less from the Metrorail station they serve, with a distinct drop-off as distance increases.

The relationships between these variables are not significant enough to estimate future shuttle demand with confidence. The number of shuttle trips is probably more related to the desires of specific apartment developers and employers to attract either buyers or employees by serving their access needs. Those decisions are likely related to local conditions such as the availability of connecting bus service and the quality

of that service, traffic congestion, roadway and pedestrian network, availability of parking, and area income. Obtaining specific data on each of these variables would be difficult and costly, if available at all, and are not guaranteed to provide significant results. The study team therefore decided to conduct a second analysis based on growth patterns in each station’s market area.

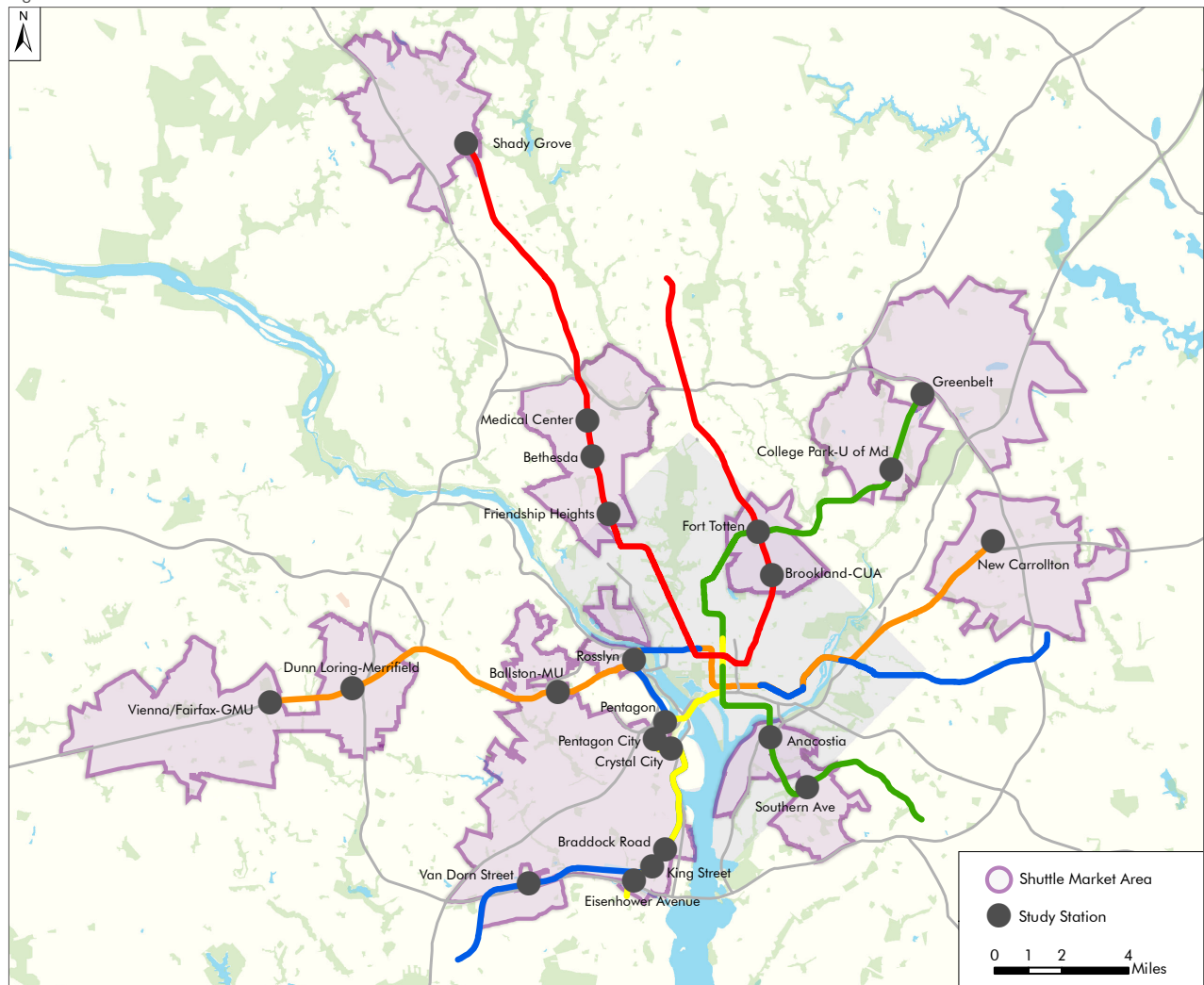
Market-Area Analysis

The second analysis conducted by the study team is based on the premise that, within each station area, the factors contributing to the decision to offer shuttle services will continue into the future, and that the percent growth of shuttle trips can reasonably be related to the percent growth in the appropriate demographic variable for the specific TAZ within which each shuttle operates or within the overall market area. If two apartment complexes within an area today offer shuttles to a Metrorail station, and the number of households doubles between now and 2040, it is likely that similar apartment complexes will be constructed in that area and that two of the new complexes will offer

shuttle services (or an existing complex doubles in size and offers additional shuttle trips). Likewise, if three employers today offer shuttles because existing bus service and the pedestrian network are not attractive alternatives for getting to work, new employers have the same probability of offering shuttles as their existing counterparts. The methodology used in this analysis consisted of the following steps.

First, existing shuttles were categorized into certain types (e.g. offices, apartments, hospitals, etc.) and assigned an analysis measure (e.g. households or employees). The household and employment growth for each TAZ where a shuttle destination currently exists were calculated by using MWCOG Round 8 Cooperative Forecasts. Next, a growth factor tied to the household or employment growth rate (depending on which analysis measure was assigned to the shuttle) was applied to existing shuttle trips. If the individual TAZ growth rate was smaller than the growth of the surrounding station area, or market area, the larger market area growth rate was applied to estimate future shuttle

Figure 14: Shuttle Market Areas



trips. Conversely, if the individual TAZ growth rate was larger than the market area growth rate, the individual TAZ growth rate was applied to estimate future shuttle trips. Shuttle trips were estimated for year 2030 and 2040.

For example, assume an office shuttle serves Braddock Road station with three trips during the peak hour of station-area activity and that the office is located ¼-mile from the station in TAZ 1579. Assume the employee growth rate between 2010 and 2030 for this TAZ is six percent, while the employee growth rate for the Braddock Road station market area is seven percent. The analysis would then apply the larger growth rate of the two, seven percent, to the existing three trips per peak hour of activity. The final result is an estimated 3.2 trips per peak hour by 2030 for this shuttle service.

The analysis always applied the larger growth rate of the two (TAZ or market area) as a method of approximating new shuttle services in addition to factoring up trips of existing shuttle services. New shuttle services will likely be introduced in the future as development intensifies around Metrorail stations and population and employment continues to grow. This method captures this additional growth beyond the TAZs where shuttle trips now originate, but only the growth within a predefined area surrounding the station, which this study calls the shuttle market area.

Market areas generally extend between two and seven miles from stations, but are not perfect circles defined with an exact radius (see Figure 14). Each station was assigned a unique market-area buffer based on the locations of its existing shuttles. For example, the Shady Grove station market area extends almost entirely northwest from the station because almost all shuttles originate from the Gaithersburg area or large developments west of the station. Market areas also took into account future Metrorail expansion. For example, much of the Tysons Corner area was excluded from the Dunn Loring-Merrifield station market area because of the future Dulles Metrorail extension, even though several shuttles that serve this station originate from the Tysons Corner area. In this situation the study team assumed that these shuttles may either be terminated or will serve these new stations

when the Metrorail extension is completed.

Table 8: Future Shuttle Demand Estimate

Station	Typical Shuttle Trips per Peak Hour			Shuttle Trip Growth	
	2010	2030	2040	2010-2030	2010-2040
Crystal City	20	34.5	39.2	73%	96%
Van Dorn Street	41	59.2	66.6	44%	63%
Pentagon City	60	86.1	91.8	43%	53%
Brookland-CUA	26	35.8	38.6	38%	48%
Eisenhower Avenue	7	9.6	10.0	37%	43%
Medical Center	18	23.2	23.2	29%	29%
Shady Grove	37	47.3	50.0	28%	35%
College Park-U of Md	13	16.5	20.1	27%	55%
King Street	8	10.0	10.9	25%	36%
Fort Totten	6	7.3	8.5	22%	42%
Rosslyn	12	14.5	14.9	21%	24%
Vienna/Fairfax-GMU	15	18.0	19.3	20%	29%
New Carrollton	6	7.1	7.7	19%	29%
Ballston-MU	16	18.8	18.9	17%	18%
Pentagon	38	43.9	43.9	15%	15%
Bethesda	10	11.5	11.8	15%	18%
Braddock Road	7	8.1	8.8	15%	25%
Friendship Heights	6	6.6	6.8	11%	13%
Anacostia	8	8.4	8.6	5%	7%
Greenbelt	9	9.2	9.2	2%	3%
Southern Avenue	6	6.1	6.2	1%	4%
Dunn Loring-Merrifield	28	26.1	28.3	-7%	1%
Study Station Total	397	507.7	543.1	28%	37%

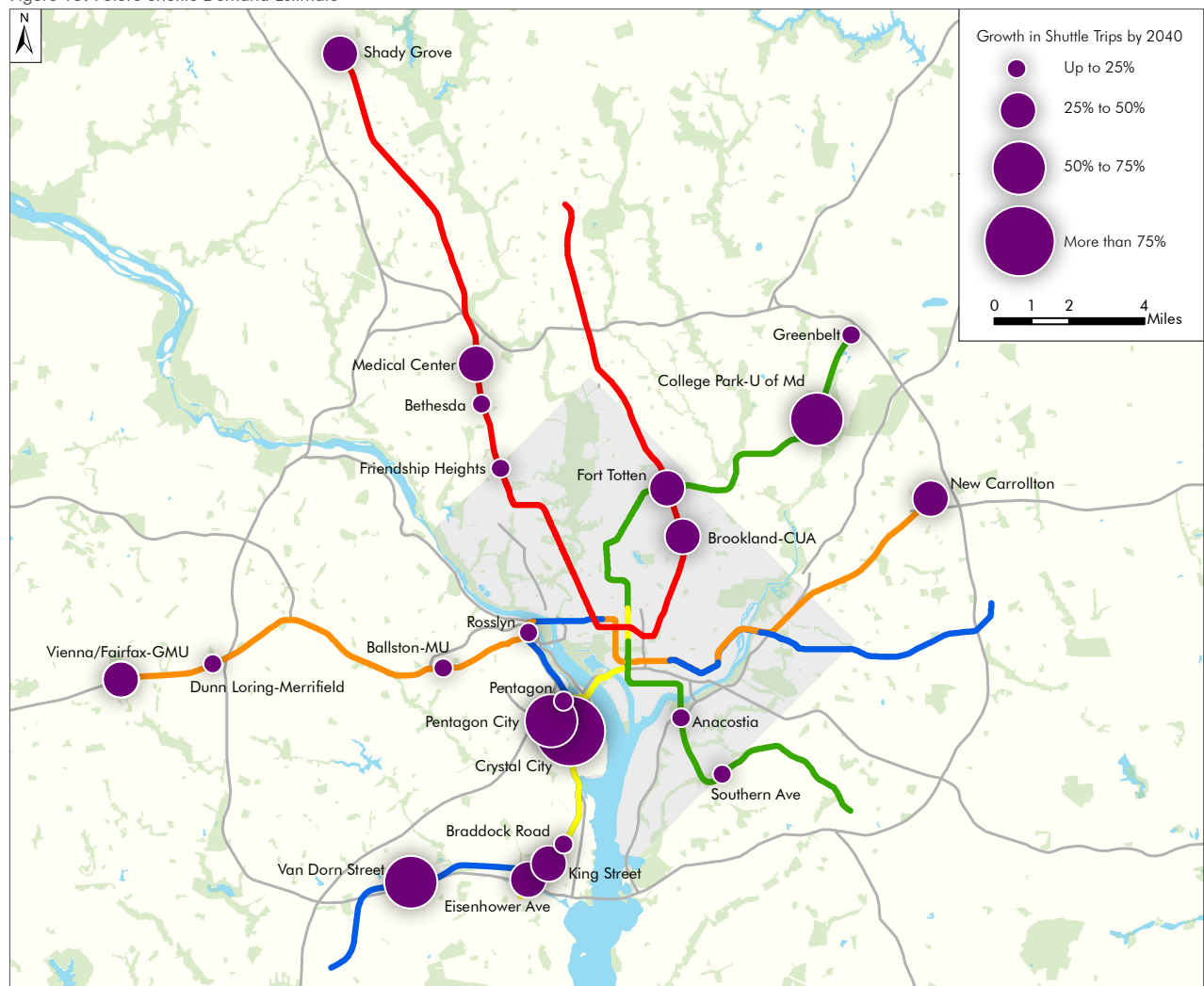
Results

The market-area analysis revealed that many stations could experience significant increases in shuttle activity, based on projected growth in the region (see Figure 15). As shown in Table 8, nine of the 22 study stations could encounter shuttle activity increases of at least 25 percent by 2030; this number could increase to 13 stations by 2040. The top three stations for estimated shuttle growth, Crystal City, Van Dorn Street, and Pentagon City, could experience more than 50 percent growth in the amount of current shuttle activity by 2040, with Crystal City potentially doubling. Pentagon City and Van Dorn Street

stations are estimated to remain the top two stations in terms of total shuttle activity by 2040, while Shady Grove station is estimated to overtake Pentagon station as the third most active station. Overall, this analysis estimates total shuttle demand for all study stations could increase 28 percent by 2030 and 37 percent by 2040, potentially placing a greater strain on station-area facilities.

As stated in the methodology summary, additional factors beyond regional household and employment growth (e.g. walkability, connecting transit service, traffic congestion, roadway and pedestrian network, availability of parking, income, etc.) will certainly contribute to growth in shuttle activity. These factors can also reduce shuttle activity, too. For example, while shuttle trips to Anacostia are estimated increase, much of the growth in this particular market area is attributed to Bolling Air Force Base and the Anacostia Naval Support Facility, which is expected to be served by the planned DC Streetcar network. If the streetcar connection between Anacostia station and these military facilities sees high ridership by military employees and personnel, the Air Force Base

Figure 15: Future Shuttle Demand Estimate



shuttle program may decrease or be eliminated. Similarly, the addition of the Silver Line through Tysons Corner is estimated to stunt shuttle growth at Dunn Loring station, as shuttles in the Tysons Corner area that currently serve Dunn Loring station will likely serve Silver Line stations or be eliminated altogether. In addition, the Base Realignment and Closure (BRAC) law is estimated to slow Department of Defense (DoD) shuttle growth by moving many defense-related functions to locations farther from the urban core (e.g. Fort Belvoir and Fort Meade) or away from the region entirely. Some of the DoD's shuttles may even be eliminated.

These types of influences can have a profound effect, both positively and negatively, on shuttle growth and could certainly alter any demand estimates. However, the uncertainty and difficulty associated with accounting for all of these additional factors is beyond the scope of this study. The data in Table 8 represent reasonable estimates of future shuttle demand by taking into account locations of growth and big-picture transportation investments throughout the region.



Recommendations

This study estimates that shuttle demand could increase 37 percent by 2040. Space at Metrorail stations is a finite resource. As many Metrorail station-area facilities are already at capacity during peak periods, WMATA and local jurisdictions must begin planning for this shuttle growth to ensure that its stations operate efficiently, safely, and as intended. This report provides many general recommendations to address future shuttle growth throughout the Metrorail system. These high-level recommendations are intended to be viewed as a menu of policies, strategies, and techniques, providing WMATA and local jurisdictions with different options to better manage shuttle access. This study acknowledges that each recommendation has different costs, benefits, and feasibility, but that defining these characteristics will require more detailed study.

The recommendations are based on four categories:

- **Facility design** recommendations would help accommodate shuttle growth through physical station-area design changes.
- **Demand management** recommendations would help reduce shuttle growth through policies, programs, and local partnerships.
- **Permitting process** recommendations would help WMATA manage shuttle activity throughout the Metrorail system through internal processes.
- **Enforcement** recommendations would help promote safe and efficient station-area operations and compliance with WMATA's shuttle permitting program.

Regardless of which recommendations may be implemented in the future, WMATA's coordination, both internally between various permitting and enforcement offices and externally with jurisdictional partners, shuttle operators, and shuttle customers, will remain a vital component of shuttle access strategies. A desired level of access management can only be achieved through strong relationships with all stakeholders that emphasize communication and an understanding of Compact-approved policies and procedures.

The WMATA Board of Directors, comprised of members from the District of Columbia, Maryland, Virginia, and the Federal government, will ultimately decide how to modify shuttle access policies, and WMATA's Office of Bus Planning will serve as the hub for shuttle access coordination, as this office is currently responsible for administering the shuttle permitting program.

Many of the following recommendations, particularly facility design recommendations, would have implications for station-area operations if implemented. WMATA is studying station access at several stations throughout the Metrorail system, and may find it useful to incorporate some of these recommendations into those studies. Several stations are currently being studied or have recently been studied, including Brookland-CUA, East Falls Church, Glenmont, King Street, Largo Town Center, Naylor Road, New Carrollton, and Wheaton.

The recommendations in this report were developed based on a review of peer U.S. transit agency experiences and state-of-practice research, as well as on-site observations at 22 stations noted by the Compact jurisdictions for their existing shuttle use. These 22 stations are thought to have much of, but not all of, the shuttle activity in the Metrorail system, and as such likely provide an account of possible shuttle-related operating issues at Metrorail stations complete enough from which to develop recommendations. In essence, though only about 26 percent of all Metrorail stations were observed and directly contributed to this study, the following recommendations were developed for consideration at any station, as all stations contain some common facilities, elements, and constraints.

Facility Design

Dedicate Kiss & Ride Shuttle-Only Space

Providing bus layover space is a constant challenge for WMATA. Shuttle layover space at busy stations could be given just as much consideration. WMATA could designate shuttle layover locations within the station area, most likely in the Kiss & Rides, provided that space is available or can be made available without significant redesign. This space could be easily distinguishable with pavement markings and signage. Designated layover space would consolidate shuttle activity and make it safer and easier for pedestrians to access shuttles while reducing operating conflicts with other vehicles. Signage could define a layover time limit to encourage quick turnover.

Improve Pedestrian Amenities

WMATA could improve pedestrian safety and comfort by providing additional Kiss & Ride pedestrian amenities, like more sidewalk space, shelters, or benches in locations with pedestrian overcrowding or poorly located existing facilities. Most Kiss & Rides feature a primary waiting area with one shelter and one bench, but stations with high Kiss & Ride demand may require more amenities. Additionally, existing amenities may not be located where pedestrians actually wait for their ride, as is the case at Greenbelt station, leaving these amenities underutilized.

Improve Pedestrian Safety by Removing Dangerous Shortcuts

WMATA could remove precarious station-area pedestrian shortcuts to improve safety and station operations. Pedestrians will often take the shortest or quickest path between two points, which can be dangerous to both pedestrians and occupants of vehicles. Shortcut removal would force pedestrians to walk along existing pathways designed to minimize pedestrian-vehicle conflicts. Figure 16 shows a median fence designed to discourage jaywalking and encourage crosswalk usage along Fairfax Drive in the Ballston-MU station area. Although fencing is important as a way to discourage unsafe behavior in certain circumstances, it should not be used to disrupt station access from adjoining streets or other legitimate access points from the community. The *Metrorail Bicycle & Pedestrian Access Improvements Study* (October 2010)

calls for “direct and safe approaches for pedestrians from all adjacent streets.” Shortcuts may also be between station-area facilities (e.g. Kiss & Ride to bus bays, station entrance to HOV lot, etc.).

Figure 16: Fairfax Drive Median Fence (Ballston-MU Station)



Designate a Shuttle Bus Bay

Where space is available, WMATA could designate shuttle-only bus bays to discourage shuttle drivers from serving unauthorized bays or to remove shuttles from bays already congested. The shuttle-only bay would be located farther from the station entrance than bays for higher-priority vehicles (i.e. Metro and Compact jurisdiction buses), in accordance with P/I #3.1/1.

Provide More Curbside Space in Kiss & Rides

Most drivers using the Kiss & Ride try to pick-up or drop-off passengers curbside whenever possible. At Kiss & Ride stations with high demand and only a single row of curbside space, WMATA could redesign the Kiss & Ride facility and add an additional curbside space, which would reduce operating conflicts within the Kiss & Ride as drivers would have greater choice in where to pick-up or drop-off passengers.

Relocate or Reduce Taxi Stand

Taxi stands take up valuable Kiss & Ride curb space, particularly at stations where taxis wait for extended periods of time for a limited customer pool. Some taxi stands could be moved to less prominent locations or reduced in size to create additional space for shuttles and other private vehicles that often serve more people and feature shorter layovers. Moving or reducing the taxi stand may also benefit Kiss & Ride operations, as taxi queues can extend out into the entrance area (see Figure 17). If taxi queues are too long they can block Kiss & Ride entrances or confuse other drivers who wait in the taxi queue because they cannot see the available curbside space farther ahead.

Additionally, WMATA could implement additional signage and striping to discourage lengthy taxi queues that can block Kiss & Ride access.

Modify Geometry at Station-Facility Entrances and Exits

Some bus bay or Kiss & Ride entrances or exits are narrow or feature tight turning radii. Where possible, WMATA could modify these entrances or exits to reduce bottlenecks and make it easier for drivers to navigate tight spots on station roadways. Altering entrances or exits would likely come at the expense of other facilities (e.g. removing a short-term parking space to make room), as many station areas are limited by space constraints.

Figure 17: Long Taxi Stand Queue Extending Beyond Kiss & Ride Entrance (New Carrollton Station)



Implement Curbside Kiss & Ride on Adjacent Roadway

WMATA could partner with local or state agencies responsible for roadways adjacent to stations to provide curbside Kiss & Ride facilities, if needed. A curbside Kiss & Ride would be most appropriate at a station with no existing Kiss & Ride and where vehicles already stop in existing bus stops or layover areas. A shuttle-only curbside Kiss & Ride could be considered if demand is high, though such a facility would likely require additional signage and enforcement to reduce unauthorized use.

A typical curbside Kiss & Ride is separated from adjacent travel lanes, as shown in Figure 18.

Figure 18: CTA Curbside Kiss & Ride (Halsted Station)



Source: Bing

Separate Entrances Where Currently Shared

If possible, WMATA could separate Kiss & Ride and bus bay shared entrances to reduce operational conflicts. Some station Kiss & Rides feature vehicle queues that extend into these shared entrances.

Modify Entrance Intersections

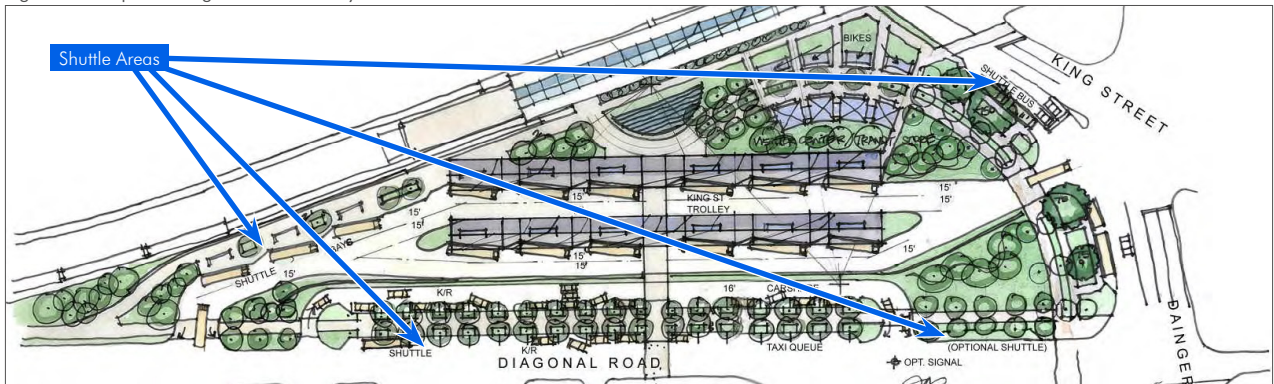
WMATA could partner with location jurisdictions or state DOTs to study station entrance modifications at busy or unsafe locations. Efficiencies could be gained at station-area entrances or exits by modifying existing signal timing to clear station congestion more quickly or better protect pedestrians, or even altering intersection geometry to favor specific

turning movements to improve safety. For example, pedestrians cross Eisenhower Avenue at the Van Dorn Street station bus bay entrance despite not having crosswalks or pedestrian signals. Coupled with the limited site distance, this intersection presents a serious safety issue that could be addressed.

Remove Short-Term Parking

WMATA could look to reduce the amount of short-term parking spaces to accommodate station-area design modifications, as is proposed for King Street station (Figure 19). Short-term parking consumes the bulk of a Kiss & Ride facility and is often underutilized during the busy AM and PM peak periods. Repurposing this space for other uses recommended in this study would help reduce operational issues and accommodate increased passenger loading and unloading in the future. WMATA's *King*

Figure 19: Proposed King Street Station Layout



Source: Presentation, "Revised King Street Metro Station Access Improvements," July 2010

Street Station Access Improvement Study recommended the removal of short-term parking in the station-area redesign. As shown in Figure 19, the proposed King Street station redesign doubles bus bay capacity at the expense of short-term Kiss & Ride parking. Despite losing all short-term parking, the proposed station layout increases Kiss & Ride curbside space and provides designated shuttle bus parking at several potential locations.

Redesign Entire Station Area

The multimodal demand at some Metrorail stations has exceeded the original design capacity. These locations need a complete redesign of station-area facilities, including bus bays, Kiss & Rides, taxi stands, and Park & Rides. At these locations, short-term surface parking could be deemphasized and this space could be repurposed for short-term bus, shuttle, and Kiss & Ride uses. WMATA could implement designs from previous station studies, for example the *King Street Station Access Improvement Study*, and work closely with jurisdictions to maximize short-term use of station facilities.

Demand Management

Reassign Buses or Shuttles in Bus Bays

At locations where bus bay congestion causes operational conflicts, WMATA could analyze bus bay use, taking into account the number of routes, frequency, layover, typical ridership, and other relevant service characteristics, to optimize bus and shuttle operations by altering bus bay assignments. For example, routes with long layovers, like intercity buses, could be located farther away from the station entrance and tight turns where stopping prevents buses from passing. Shuttles could be located farthest from the station due to their lower priority.

Adjust Bus or Shuttle Schedules

WMATA could conduct a schedule analysis at overcrowded bus bays to reduce bus and shuttle congestion. Bus and shuttle schedules could be adjusted based on the analysis results, ensuring that any schedule adjustments would maintain the same quality of service, if possible. Adjusting schedules of authorized shuttles may be more difficult, but WMATA could leverage its role as licensor if operators are not compliant with any suggested scheduling changes.

Promote Bicycle and Pedestrian Connections

WMATA is working with local jurisdictions to plan and implement pedestrian and bicycle improvements near Metrorail stations to encourage alternative modes for these short trips. In its analysis of potential pedestrian and bicycling trips, the *Metrorail Bicycle & Pedestrian Access Improvements Study* used a station walkshed of 0.5 miles from the station and bikeshed of three miles. On-site observations have shown that most shuttle trips originate from locations within a few miles of Metrorail stations—about 12 percent of these trips travel 0.5 miles or less to the station, while 88 percent travel three miles or less. Improving access for pedestrian and bicycle may lessen the need for additional shuttles in the future. Currently, WMATA is encouraging cycling by installing additional bike racks throughout

Figure 20: Metrorail Bicycle Parking



the Metrorail system (Figure 20) and is developing a list of projects for improving both bike and pedestrian access to stations. WMATA's Board of Directors adopted a goal to increase bike access to Metrorail in the AM Peak period to 2.1 percent of trips by 2020 and 3.5 percent of trips by 2030.

Implement New Bus Routes

At particularly busy stations, WMATA could study existing shuttle routes, service characteristics, and ridership to determine if shuttle demand can be satisfied with a new or modified bus route. In conducting such an analysis, WMATA may find that it or a Compact jurisdiction could provide peak-period bus service with routing and service characteristics similar to existing shuttles. WMATA could coordinate and partner with those companies or organizations that offer existing shuttle services, as it may be cheaper to eliminate their shuttle services and simply provide transit benefits to their employees or customers. WMATA should conduct a new market analysis as part of any bus/shuttle duplication study.

Prioritize Shuttles by Station Radius or Purpose

WMATA has recognized that it will need to accommodate more riders by providing more cost-effective access alternatives. The *Metrorail Bicycle & Pedestrian Access Improvements Study* focused on developing recommendations that encourage walking to stations for trips less than ½-mile and cycling to stations for trips less than three miles. These trips are the most cost-effective, as the amount of infrastructure needed for non-motorized trips is considerably less than the needs of large amounts of automobiles. It is to WMATA's benefit to encourage these trips, given funding and space constraints.

WMATA may need to take a similar stance with shuttle trips at stations that feature particularly high shuttle use. WMATA may need to limit the amount of shuttles using these stations by defining similar station buffers. For example, if a station is used by too many shuttles, WMATA may decide that shuttles serving areas beyond typical walking distance of stations will be prioritized over those serving areas very close to stations. This policy would need an accompanying analysis to determine if limiting shuttle service is feasible given the current transit offerings that feed into that particular station.

WMATA may also seek to authorize shuttles according to how well the destination is served by transit, much like TriMet. In TriMet's case, shuttles are generally eligible to apply for use of station facilities only if they serve a linkage that TriMet cannot and/or does not serve. If a shuttle destination is already well served by existing transit service, then WMATA may reserve the right to deny access to a Metrorail station.

WMATA may need to develop a hierarchy that prioritizes some shuttles over others depending on the type of destination they serve. Much like WMATA's access hierarchy that prioritizes walking trips over automobile trips, a shuttle hierarchy would help WMATA further prioritize shuttle access at busy stations.

Partner with Communities to Plan Public Circulators

WMATA could partner with local communities to plan public circulator buses to supplant shuttles at locations with many shuttles and where station-area space is limited. Free circulator bus services, including the Bethesda Circulator, King Street Trolley, Friendship Heights Shuttle, and Ride On's Silver Spring VanGo service already serve some Metrorail stations, and implementing similar circulators in other areas may reduce short-distance shuttle trips.

Consolidate Shuttle Routes

At particularly busy stations, WMATA and shuttle customers (e.g. hotel, office or apartment complex, etc.) could study the possibility of consolidating shuttle routes to reduce strain on existing facilities. The Metropolitan Washington Council of Governments (MWCOG) completed a shuttle consolidation study for Brookland-CUA station in June 2010, titled *Independent Shuttle Bus Consolidation Strategy for the Greater Brookland Community*. The report found that Brookland shuttle operators were willing to discuss service consolidation as long as the combined service would not “reduce the service provided for their riders, compromise their safety, or inconvenience their riders.” The report provided suggestions on how to begin a dialogue amongst operators, including how to coordinate and the types of benefits to discuss.

This strategy may be difficult to successfully implement due to different rules and requirements of shuttle customers, loss of the “rolling billboard” perk, and the required outreach efforts. Consequently, this strategy should only be considered for high shuttle demand locations with little opportunity for facility expansion or redesign. Alternative methods may one day include mandating shuttle consolidation through transit development plans (TDPs) or requiring developers to pay funds to transit agencies to operate a coordinated shuttle service as part of a transportation management plan (TMP).

Figure 21: Consolidating Shuttle Routes May Reduce Crowding at Station Facilities (Pentagon City Station)



Permitting

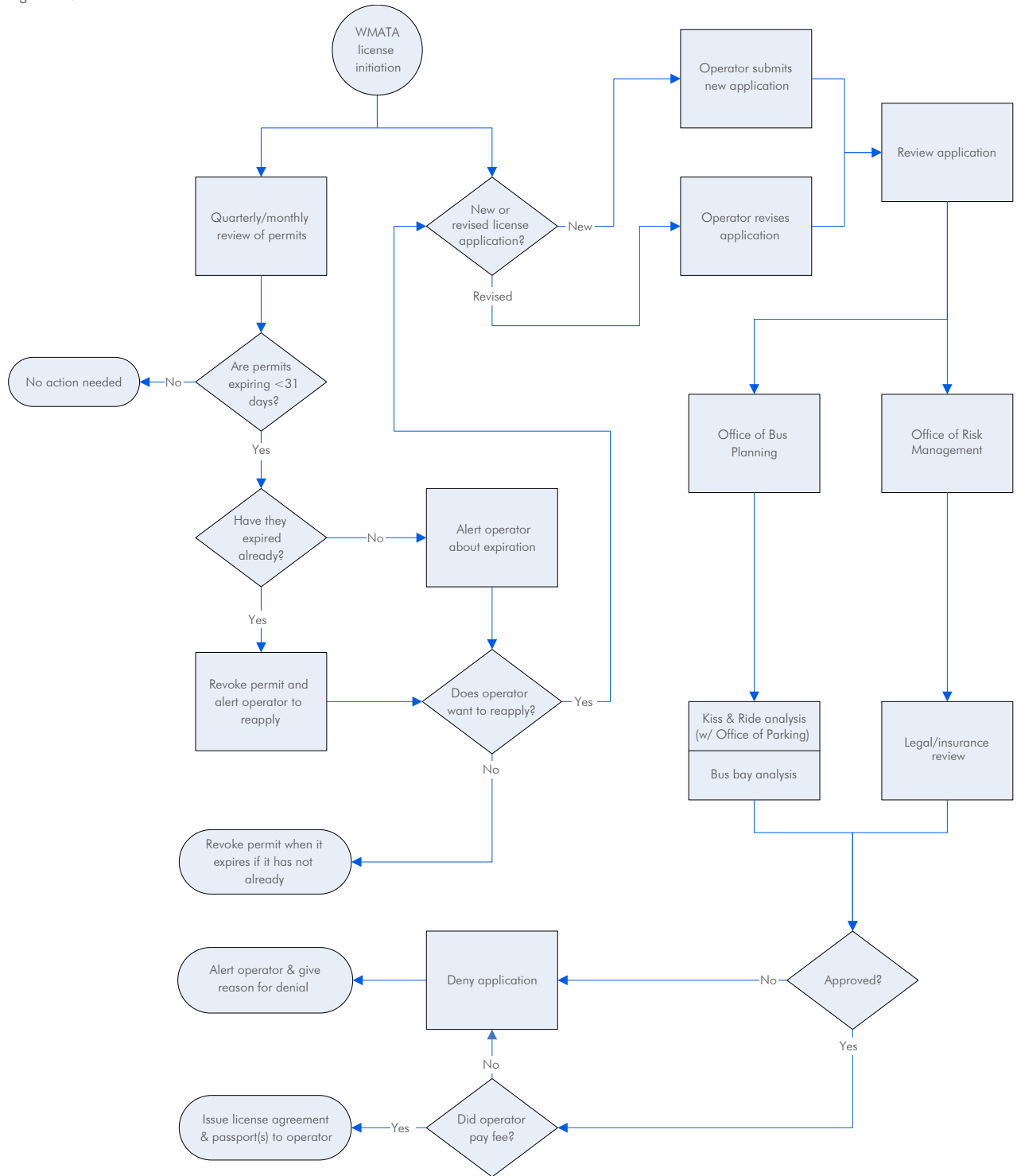
WMATA’s permitting process is generally more developed than other U.S. transit agencies, but updating this process could lead to a more efficient permitting system adaptable to future shuttle growth and even potential policy changes. Updating the permitting process will have positive benefits for enforcement techniques as well. Permitting recommendations are discussed in the following pages.

Implement Electronic Database and Application Form

The study team developed an electronic database and application form to streamline permitting-related data collection and management. This new electronic process will help manage the process by storing application and license agreement data in a single database, while keeping the entire permitting process simple and convenient. The database was built in Microsoft Access 2007 for simplicity and cost savings, as WMATA computers already have access to this program through the Microsoft Office suite. The database workflow, shown in Figure 22, is essentially split into two processes: new/revised applications and a review of existing permits.

The database can accept new and revised applications for use of station facilities. Once a new or revised application is submitted, BPLN would review the application to make sure all the information has been provided by the operator. BPLN would then ensure that the vehicle dimensions and weight listed in the application do not exceed the maximum dimensions and weight defined in the license agreements. If vehicles are within the acceptable dimension and weight limits, BPLN would determine whether the station facility identified in the application can accommodate the

Figure 22: Database Workflow



shuttle service. The office of Risk Management would review the operator’s insurance information to determine if it meets WMATA’s requirements. Assuming both the bus bay analysis and insurance review are approved, the operator would then pay the fee (if applicable) and WMATA would issue the formal license agreement. If at any time the operator does not meet any requirements, fails to provide information, or the service cannot be accommodated at the requested station facility, BPLN would deny the application and alert the operator as to the reasons for its denial.

WMATA can also review existing license agreements to check for those that are about to expire. The database can provide a report of agreements that are about to expire within one month. BPLN would then alert the operators of the status of their license agreement(s) and allow them to reapply for the privilege to continue to serve a specific station facility. The Office of Bus Planning should conduct this review on a monthly or quarterly basis. WMATA will be able to run other reports as well—for example, a report of all operators.

The study team also developed an electronic application form allowing shuttle operators to request authorization to use station facilities. This form is in PDF format and can be linked to the database. Applicant operators simply fill out the form and electronically return it to WMATA with any insurance, maps, and schedule information attached (like appendices). Operators may still choose to physically mail the application, though WMATA should encourage operators to submit electronically.

When sent electronically, the WMATA email recipient saves the data file (the digital output of the PDF application will be in XML format) with all related attachments on a network server (e.g. a file share location that is backed up and accessible to the database program). BPLN staff responsible for the electronic database program will import the XML file into the database, upload any attachments to the correct database field, and save the database record. The database program is setup with a switchboard, standard entry forms (for manual entry), and a function that performs the XML application data input.

The application form provides space for operator and customer information, vehicle specifications, service characteristics, and insurance information.

Consolidate Shuttle and Intercity Bus Permitting Processes

The shuttle permitting process varies slightly from the intercity bus permitting process. Though both require the same general information from applicants, the actual application forms are not the same, and there are differences in the approval process as well as the license agreements. Consolidating shuttle and intercity bus permitting would make the licensing process more efficient.

The application form should be the same for both types of service, allowing for more consistent data entry into the new permitting database and eliminating any confusion between intercity bus and shuttle operators as to which application form to use. License agreements should be the same for both types of service, with WMATA defining consistent criteria for application processing time, maximum allowed vehicle sizes, and even language concerning fees paid by operator, in the event that WMATA

Figure 23: Intercity Bus Serving New Carrollton Station



wishes to begin charging for bus bay access by shuttles in the same way that it currently does for intercity buses. The electronic database and application form is designed to accommodate both shuttle and intercity bus permitting.

Alter Current Practice Regarding Access to Kiss & Rides

Current Kiss & Ride practice is that vehicles are not allowed to use the Kiss & Ride if they are 26 feet or longer, or require a commercial driver’s license (CDL) to operate. This practice is not recorded in any official WMATA policy. Currently, there is no process for vehicle operators to request permission from WMATA to use a station Kiss & Ride.

Amending the practice to require shuttle operators to apply for authorization to use Kiss & Ride lots, regardless of vehicle size or license requirements, would allow WMATA to better enforce the vehicle restrictions. WMATA could deny authorization to a shuttle operator that submits a Kiss & Ride application if the vehicle is simply too large (based on current restrictions). WMATA will then have a record of this application and denial in its electronic database, and can then suggest the operator instead apply for permission to use a bus bay where more space is available. Over time, with shuttle applications for both the bus bay and Kiss & Ride, WMATA would assemble a collection of shuttle data that would help WMATA understand current station access trends and better estimate future demand. Such information would aid in future station access studies and in design of future stations.

Formalizing the Kiss & Ride practice would require WMATA to have it approved by the Board of Directors through the P/I process and officially recorded as policy. Implementation of an altered Kiss & Ride practice would require coordination with the Office of Parking (PARK).

Enforcement

WMATA bus bay access enforcement is consistent with current practice elsewhere in the U.S. However, the amount of shuttles that access Metrorail facilities appears to be greater than that experienced by other U.S. transit agencies reviewed for this study. WMATA may need to modify its enforcement techniques to further discourage improper use of station facilities and help maintain smooth operations at its stations. Enforcement recommendations are discussed in the following pages.

Increase Awareness, Training, and Enforcement

Even the best designed facilities will be misused. WMATA could increase awareness of common station-area operational issues in bus supervisor and police training. Enforcement could be increased at problem stations during peak periods, particularly the PM peak period.

Figure 24: Metro Transit Police



Source: Beechwood Photography (Creative Commons)

Awareness of the bus bay policy, both within WMATA and externally, should be increased. The average MTPD officer is unaware of which shuttles are breaking rules and which are not. Greater emphasis should be placed on the policy during the training of MTPD officers, bus and rail field supervisors, bus operators, and station managers. This will help enforcement officials better understand the policy and what to look for in the field to ensure it is enforced appropriately.

MTPD officers are busy with many duties, and can only devote a certain amount of their attention to enforcing the bus bay policy. Street supervisors should continue to relay first-hand observations regarding continued shuttle violations and problem areas to MTPD officers to ensure the policy is consistently enforced. Additionally, WMATA should investigate the possibility of granting citation abilities to these supervisors.

WMATA could incorporate bus bay safety into its overall public outreach program to keep the general public informed that bus bays are only for authorized vehicles, and that improper use of bus bay facilities puts passengers and Metrobus employees at risk. Public outreach should include proper Kiss & Ride etiquette (e.g. do not block spaces and entrances/exits, drive to the end of the pick-up curb, etc.) to reduce peak-period conflicts.

Finally, WMATA should emphasize shuttle awareness and enforcement among Compact jurisdiction members to help develop policies that limit the time shuttles are allowed to dwell on local streets. DDOT recently updated its public right-of-way permitting process, requiring shuttle operators to register for a permit to stop and serve passengers on a public street. As several operating problems from shuttle activity were observed along roadways around Metrorail station areas, it may be in WMATA's interest to promote similar public right-of-way permitting programs to other Compact jurisdiction members.

Implement Vehicle Passport Program

The biggest enforcement challenge is distinguishing between authorized and unauthorized shuttles. Currently, WMATA's method of tracking authorized shuttles is a simple electronic list stored and maintained by BPLN. This list is not shared with MTPD officers and bus supervisors in charge of enforcing the bus bay policy and keeping station bus bays safe. Providing authorized shuttles with an identification mechanism to be displayed on each shuttle is likely the simplest way to increase awareness of the policy and improve the effectiveness of enforcement.

WMATA should implement a vehicle identification program to be transferrable from vehicle to vehicle (see Figure 25 for example). A transferrable mechanism would allow operators to continue shuttle services even during periods of vehicle maintenance or breakdowns, which necessitates substitute vehicles. The study team proposes a vehicle "passport" program.

The passport should be removable (i.e. not permanently affixed to a vehicle like a sticker). The number of passports given to the operator would equal the number of vehicles needed to operate a shuttle service. Passports would be issued on an application basis, not by operator. If a shuttle company wants to operate a second route, then it would have to fill out a second application. Upon approval, WMATA would issue a second set of passports for this additional service.

Figure 25: Example Vehicle Passport Placard



Each passport should reflect the station(s) served by the shuttle service. If a shuttle company’s vehicle serves Shady Grove station, Vienna/Fairfax-GMU station, and Fort Totten station all in the same route, the passport should display these stations using a two-letter code in a color-coded box corresponding to the Metrorail line that serves the station. The two-digit codes and color-coded boxes allow for transit police and bus supervisors to easily distinguish which stations the shuttle serves. As shown in Figure 25, the passport should contain other information such as the Metro logo and passport title, operator name and phone number, license agreement number, stations that the shuttle is authorized to serve, and the license agreement expiration date (one year after approval).

Vehicle passports should be clearly posted inside a window on the right side of the vehicle to be easily seen by transit police and bus supervisors standing curbside. Passports should be printed on a specific type of paper or possibly finished with a plastic or reflective coating, or perhaps even an ink stamp, to discourage unauthorized operators from printing their own. The size of the passport should be large enough to be legible from a distance, but small enough so driver or passenger views are not obstructed.

Figure 26: Signage Displaying \$50 Fine (Boston)



Source: Google

Implement Enhanced Signage

Simple “DO NOT ENTER” signage is placed near the bus bay entrances and exits reminding drivers that access is prohibited for unauthorized vehicles. The signage should be upgraded to provide the driver with a more stern warning (e.g. “VIOLATORS WILL BE FINED” or “MINIMUM FINE \$X,” as shown in Figure 26) or even WMATA contact information to help shuttle operators become authorized. These signs should be placed near the entrances and exits to the bus bay area, instead of only at the entrances. Entrances should also contain “BUS ONLY” pavement markings as observed in other transit systems across the U.S. In addition, existing signage that is faded or obscured by foliage or other obstructions should be replaced or remedied.

Adding typical shuttle locations to wayfinding signage, as found at Brookland Station, should be considered as well.

Check Shuttle Compliance on a Monthly Basis

Only 45 percent of stations observed in this study employ a bus supervisor, and MTPD officers generally have more pressing priorities than to patrol station facilities for compliance with station access policy. However, the fact remains that someone needs to check for compliance with these policies. Office of Bus Planning

staff could conduct monthly field visits to Metrorail stations to ensure that authorized shuttles or intercity buses are utilizing their assigned facility(s) as described in the license agreement. BPLN would determine the desired frequency of compliance checks, which should take place during the AM and PM peak periods. BPLN employees would record any unauthorized shuttles and inform the drivers of these vehicles that their operating company or organization may be required to register with WMATA, depending on bus bay and Kiss & Ride policy specifications at the time. An existing or new BPLN employee should monitor this task and serve as a liaison between planning and enforcement divisions.

Increase the Scope of the Shuttle Permit Database

In the long term, WMATA may want to link the new electronic database to MTPD computers, allowing officers to quickly retrieve a list of active permits from the on-board computer systems in patrol vehicles. MTPD officers could cross-check active permits with operator information to determine if a shuttle is allowed to use a certain station facility. Coupling this ability with the shuttle

passport program would provide a mechanism for officers to check the legitimacy of any vehicle passport, as operators may try to create counterfeit passports for certain stations with limited capacity and high demand.

Track Repeat Offenders

In the long term, MTPD could track repeat violators, increasing the fine for each violation and potentially even suspending the commercial driver’s license for chronic offenders or revoking an operating company’s license agreement. Currently, unauthorized bus bay access is not a common occurrence, but as the region grows and more people access Metrorail stations WMATA should expect to see more bus bay access violations.

Implement Radio Frequency Identification Tags

If unauthorized access becomes unwieldy in the long term, WMATA could consider implementing a shuttle passport program with radio frequency identification (RFID) tag readers at station facility entrances. Under this program shuttle passports would include an RFID tag that would be registered by an automated electronic RFID reader as the vehicle enters the assigned station facility.

This option would likely be prohibitively expensive and unnecessary unless unauthorized shuttle access becomes a major station operations and safety issue, or if the cost of such a program is passed on to shuttle operators through permit fees. If implementing this option in the future, WMATA should be prepared to discuss privacy and security concerns, as detractors of RFID tags generally cite these issues among the main reasons to limit the introduction of the technology in the first place.

Figure 27: E-Z Pass Utilizes RFID Technology



Source: Alexander Wipf (Creative Commons)



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