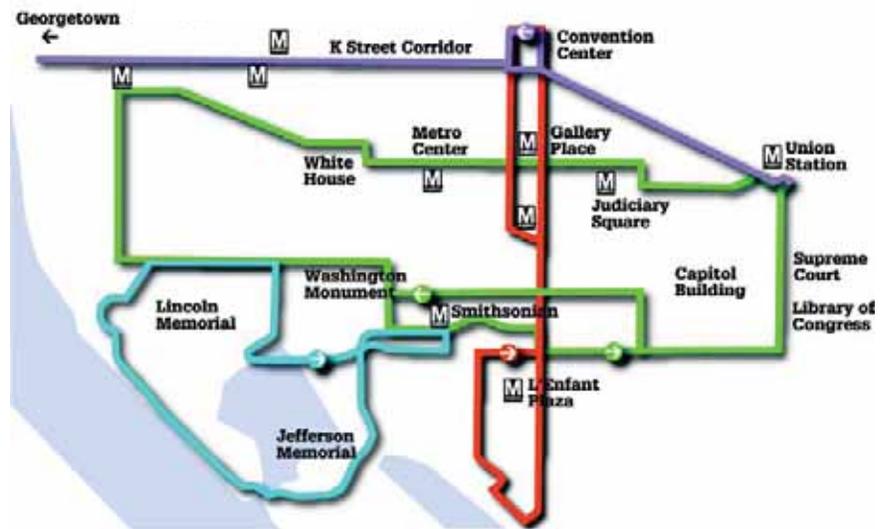


District of Columbia Downtown Circulator Implementation Plan



MULTISYSTEMS

with DMJM + Harris

prepared for:

National Capital Planning Commission

District of Columbia Department of Transportation

Downtown Business Improvement District

Washington Metropolitan Area Transit Authority

July 2003

Table of Contents

Executive Summary	1
1 Introduction	9
1.1 The Need for a Downtown Circulator	9
1.2 Goals for the Circulator	11
1.3 The Implementation Plan.....	12
2 Project Background	13
2.1 Development Plans	13
2.2 Transportation and Security Plans	14
2.3 Monumental Core and Downtown Circulation Plans	14
2.4 Transportation Services in Downtown Washington	16
3 Market Analysis	19
3.1 Potential Markets for the Circulator	19
3.2 Review of Circulators in Other Cities.....	33
4 Operations Plan	43
4.1 Service Design	43
4.2 Resources and Impacts.....	56
4.3 Implementation Phasing.....	61
4.4 Evaluation Methods and Procedures.....	63
5 Fare Structure Plan	67
5.1 Metro Fare Changes.....	67
5.2 Proposed Structure	68
5.3 Fare Media Sales and Distribution.....	69
5.4 Projected Utilization of Fare Options	70
5.5 Revenue.....	72
5.6 Alternative Fare Scenarios	76
5.7 Sensitivity of Ridership to Higher/Lower Fares	80
6 Capital Plan	81
6.1 Vehicles.....	81
6.2 Stops and Stop Amenities	90

6.3	Storage and Maintenance Facility.....	90
7	Financing Plan	93
7.1	Funding for Other Downtown Circulators.....	93
7.2	Conclusions for the Downtown Circulator	97
7.3	Funding Sources for Downtown Circulator Operations	98
8	Marketing Plan	99
8.1	Marketing Plan Overview	99
8.2	Target Markets	99
8.3	Project Name and Identity	104
8.4	Marketing Strategy.....	110
8.5	Individual Marketing Efforts	110

List of Tables

- Table 3-1: Visitor Volumes for Major Attractions23
- Table 3-2: Estimated Percentage of Visitors Visiting Two Areas25
- Table 3-3: Estimated Annual Trips Within and Between Attraction Areas25
- Table 3-4: Estimated Average Daily Trips Within and Between Attraction Areas.....25
- Table 3-5: Total Hotel Rooms by Area.....27
- Table 3-6: Estimated Annual Volumes of Visitors Visiting Two Areas27
- Table 3-7: Annual and Average Daily Access Round Trips to Attraction Areas.....29
- Table 3-8: Estimated Average Daily Circulator Market for Access Trips29
- Table 3-9: Estimated Daily Trips Between Areas from COG Model.....31
- Table 3-10: Estimated Daily Circulator Market for Trips Between Areas32
- Table 3-11: Summary of All Potential Circulator Markets32
- Table 3-12: Examples of Cities with Downtown Circulators.....34
- Table 3-13: Downtown Circulator Characteristics35
- Table 3-14: Important Service Characteristics for Each Market38
- Table 4-1: Circulator Running Times and Cycle Times.....52
- Table 4-2: Circulator Maximum Passenger Wait Time.....53
- Table 4-3: Circulator Headways and Vehicle Requirements – Off-Peak Season.....54
- Table 4-4: Circulator Headways and Vehicle Requirements – Peak Season.....55
- Table 4-5: Annual Resource Requirements and Operating Costs – Alternative A.....57
- Table 4-6: Annual Resource Requirements and Operating Costs – Alternative B.....57
- Table 4-7: Employment Coverage of Circulator Routes59
- Table 4-8: Estimated Average Weekday Ridership by Route and Market60
- Table 4-9: Estimated Annual Ridership by Route and Market.....60
- Table 5-1: Estimated Annual Revenue from Downtown Workers and Shoppers73
- Table 5-2: Estimated Annual Revenue from Visitors.....75
- Table 5-3: Summary of Estimated Annual Revenue75
- Table 5-4: Revenue from Downtown Workers and Shoppers for Alternative Scenarios.....78
- Table 5-5: Revenue from Visitors for Alternative Scenarios79
- Table 5-6: Sensitivity of Ridership and Revenue to Fares80

Table 6-1: Summary of Vehicles by Size and Fuel Type	87
Table 6-2: Summary of Advantages and Disadvantages	88
Table 6-3: Ranking of Vehicles	89
Table 6-4: Vehicle Capital Costs	90
Table 6-5: Garage Capital Costs	91
Table 7-1: Sources of Capital Funds for Downtown Circulator Vehicles	94
Table 7-2: Sources of Operating Funds for Downtown Circulator Systems	96
Table 7-3: Comparison of Fares Charged to Fare Recovery Ratios	97
Table 8-1: Possible Circulator Name Subheadings	109
Table 8-2: Summary of Initial Marketing Costs	121

List of Figures

Figure 1: Circulator Routes Alternative A.....4

Figure 2: Circulator Routes Alternative B.....4

Figure 1-1: Circulator Study Area12

Figure 2-1: Prior Circulator Route Proposals16

Figure 3-1: Annual Visitor Volumes at Core Area Attractions22

Figure 3-2: Core Area Employment Within ¼ Mile of Metrorail30

Figure 3-3: Core Area Employment Within 1/8 Mile of Metrorail30

Figure 3-4: Core Area Federal Employment Within 1/8 Mile of Metrorail30

Figure 3-5: Analysis Areas30

Figure 4-1: Circulator Routes Alternative A44

Figure 4-2: Circulator Routes Alternative B.....44

Figure 4-3: White House-Capitol Route - Alternative A Counter Clockwise44

Figure 4-4: White House-Capitol Route - Alternative A Clockwise.....44

Figure 4-5: White House-Capitol Route - Alternative B Counter Clockwise44

Figure 4-6: White House-Capitol Route - Alternative B Clockwise44

Figure 4-7: Monuments Route44

Figure 4-8: Monuments Route – Presidential Service44

Figure 4-9: North-South Route44

Figure 4-10: K Street Route44

Figure 4-11: Core Area Attractions Served by the Circulator58

Figure 4-12: Employment Served by the Circulator.....58

Figure 4-13: Federal Employment Served by the Circulator.....58

Figure 6-1: Unique Paint Scheme, Baltimore, MD - Unique Body Type, Irisbus Civis ..82

Figure 8-1: Paint Scheme Alternatives108

Figure 8-2: Marketing Strategy.....111

Figure 8-3: Example Route Map Schematic.....114

Executive Summary

The Need for the Downtown Circulator

Washington, D.C. attracts an average of 22 million visitors each year, yet there is no transit system in place to move them easily and inexpensively around the Monumental Core. The District is home to more than half a million residents, and another half a million suburban residents commute into the city each day, including some 375,000 federal workers, yet there is no transit service designed to move them around downtown once they arrive. Washington's Metrorail and bus systems do an extraordinary job of getting residents, commuters and visitors into downtown DC, but they are not efficient at moving them around the downtown and the Monumental Core. The Downtown Circulator can fill this void.

A simple, inexpensive, and easily navigable surface transit system that complements Metrobus and Metrorail can help stimulate economic activity downtown, reduce traffic congestion both downtown and around the National Mall, allow visitors safe and easy access between the Mall and downtown, and move federal employees and other workers quickly and inexpensively between offices during the workday.

Of the 22 million visitors to the nation's capital, approximately 10 percent choose to experience the premium interpretive tour service offered by Tourmobile. The remaining 20 million visitors however do not have access to basic public transportation to reach the monuments, the National Mall and downtown D.C. Long walking distances discourage pedestrian circulation among these attractions and many visitors resort to using their personal automobiles, adding to traffic congestion, and further degrading the quality of the air.

Downtown DC lies just a few blocks from the National Mall, but for the occasional visitor to the District, it might as well be miles away. The monumental buildings lining Constitution and Pennsylvania Avenues belie the pedestrian-friendly downtown that is rapidly redeveloping just beyond, and there is no apparent surface transit system to link the National Mall to the District's safe, convenient and friendly downtown.

Workers in the District of Columbia also need to get around downtown to attend meetings, grab lunch, run errands, and shop. Many destinations are often out of reach of Metrorail stations, and the descent into Metrorail's underground stations can discourage its use for short trips. The Circulator will make Downtown more accessible to more people.

The region's public transportation system has a gap, which the Downtown Circulator can easily fill, complementing Metrorail, Metrobus and other regional transit services. The Circulator will connect the National Mall to Downtown DC, extend the reach of Metrorail and Metrobus commutes, and offer frequent, convenient, and inexpensive trips across downtown. This new component of the regional transit system will accommodate not only visitors, but also workers, and residents of the city and region.

Downtown Circulator service will satisfy many currently unmet needs:

- **Visitor Mobility** - There is an unmet need for a coherent visitor transportation system that is not being met by the current mix of private tour companies and public transit services. Public transit services connect the National Mall with the larger metropolitan region, while private tour buses provide guided tours and attractions-based transportation along the Mall. Yet many tourists end up driving cars, walking greater distances than they would like to, or skipping destinations that are difficult to get to. Visitors need an efficient, friendly, and inexpensive means of transportation that is easy to understand and that serves numerous visitor destinations, while connecting to the Metrorail system.
- **Downtown Worker Mobility** - There is an unmet need for a public transportation system serving short trips within the downtown area of Washington. Downtown contains a large concentration of federal government and private offices where thousands of federal workers and other employees work and make short trips during the course of the day for meetings, shopping, dining, and entertainment. Many downtown workers end up using their cars or taxis for short trips, and numerous federal agencies have found the need to operate their own shuttle van services for employees. Federal and non-federal workers need a transportation option that is a fast, efficient, and inexpensive means of transportation for such trips within the downtown.
- **Economic Development** – There is a need to stimulate economic development downtown. A world-class transit system is the centerpiece of any great city and can stimulate economic activity and revitalization. In the Washington area, there is a clear need for a supplemental transportation system component that connects visitor attractions to downtown, and to the city’s convention center. While the downtown is a place where workers shop, dine, and go for entertainment, the existing transportation system does little to encourage visitors along the Mall to take advantage of dining and entertainment venues located within the downtown area nearby.
- **Congestion and Air Quality** – There is a continuing need to decrease traffic congestion and improve air quality in the District of Columbia. Improved transit services within the National Mall area and downtown will allow visitors and downtown workers to avoid using their automobiles. Additionally, an improved system will also allow tour buses the option of parking at the edge of downtown, thus reducing traffic congestion along the Mall. Fewer personal vehicles and tour buses downtown and along the Mall will also improve local air quality.
- **Homeland Security** – There is an unmet need to address the reduction in roadway and parking capacity resulting from federal security measures in the District. These security measures have caused increased travel times and congestion, increasing the need for transit alternatives to automobile use in the downtown. A supplementary surface transit system circulating in the downtown area can help mitigate the impacts of the restrictions imposed on the local transportation system in order to protect key federal facilities.

The Downtown Circulator will benefit the District of Columbia by reducing traffic congestion, improving air quality, and supporting economic development in the downtown. The federal government will benefit through improved services for visitors to federal facilities and attractions, reduced congestion along the Mall, a reduction in the costs and administration of federal shuttle van services, and mitigation of the negative impacts resulting from the street closures surrounding federal security measures.

The Downtown Circulator Implementation Plan

Recognizing the need for a Downtown Circulator, four agencies formed a partnership to oversee the implementation of this project. The Downtown Circulator Partner Group (DCPG) is funding and guiding the Downtown Circulator Implementation Plan. The DCPG consists of the:

- National Capital Planning Commission (NCPC)
- District of Columbia Department of Transportation (DDOT)
- Downtown DC Business Improvement District (DBID)
- Washington Metropolitan Area Transit Authority (WMATA)

Based on the identified needs, the DCPG outlined several goals for the project:

- Improve connectivity between the Monumental Core and the Central Business District
- Mitigate federal security measures
- Circulate visitors within the downtown and Monumental Core
- Enable downtown workers to make business and shopping trips
- Supplement Metrobus and Metrorail
- Reduce traffic congestion

These goals guided the development of this Implementation Plan. The plan includes an analysis of the market for the Circulator, an Operations Plan, a Fare Structure Plan, a Capital Plan, a Financing Plan, and a Marketing Plan.

Market Analysis

The market analysis demonstrated that significant markets exist for the Circulator, both for visitors and for downtown workers. The market analysis identified and quantified these markets, including trips by visitors traveling into and within the Monumental Core area, as well trips made by downtown workers and shoppers for a variety of purposes. Only existing data sources were used, including information such as monthly visitor counts at attractions. More detailed information on travel patterns for visitors was not available. The market estimates included in the analysis can be considered as a conservative estimate since new developments and redevelopment in the downtown area could bring about increased use of the circulator, and the presence of circulator service could result in new travel.

The market analysis also included an examination of downtown circulators in nine other U.S. cities. This research led to several conclusions regarding the design and implementation of a circulator for Washington, DC. The examination found that:

- Direct, fast, and reliable service was noted as an important factor in attracting the downtown worker market. Several circulators offer peak service every 5 minutes and the majority operate at least every ten minutes.
- Circulators should be low cost. Four of the nine circulator services contacted are provided free of charge. The remainder charge much less than a regular transit trip, with the highest at 50-cents.
- Unique-looking vehicles are important in attracting the visitor market. Some operators opted for the unique look of diesel-powered trolleys while the remainder have gone with compressed natural gas (CNG), electric, or hybrid engines on low-floor buses that have a more innovative look. None use conventional diesel buses.

- The public must be provided with adequate information about the service.

Operations Plan

Four circulator routes are proposed for implementation. Two options for combining these routes are being considered. These are shown in Figures 1 and 2. The four routes, and the areas they serve, are:

- **White House-Capitol Route** – serves the White House, Foggy Bottom, the State Department area, the National Mall, the Capitol, Union Station, and downtown.
- **Monuments Route** – serves the Washington Monument, Jefferson, Roosevelt, Korean War, Lincoln, Vietnam Veterans, and World War II Memorials and connects them to Metrorail and the White-House Capitol Loop.
- **North-South Route** – serves the new convention center, the downtown area, the National Mall, the L’Enfant Plaza area, the Southwest Waterfront, and connects to the White House-Capitol Route.
- **K Street Route** – serves Union Station, the new convention center, K Street, and Georgetown, and connects to the North-South Route.

Two options for combining the routes result from the two variations of the White-House Capitol Route and Monuments Route, with different streets being used in the vicinity of the White House. Each of the system’s routes will operate from 8:00 a.m. until 9:00 p.m., seven days a week, with the Monuments Route operating until 11:00 p.m. during peak visitor seasons. Service will be provided every five minutes on all routes at most times on weekdays. During the evenings and on weekends some routes will operate every ten minutes, rather than every five. During peak tourist seasons, the White House-Capitol Route and Monuments Route may need to operate as frequently as every three minutes during certain hours.

Operation of the Circulator is projected to have the following characteristics:

- Annual operating cost of approximately \$17 million
- An estimated 45 percent of operating costs recovered through fares
- An estimated 45,000 riders on an average weekday
- An estimated 16.3 million riders annually
- Over 410,000 employees (including 195,000 federal workers) within walking distance
- 91 percent of all downtown federal employees within walking distance

It is proposed that the North-South and K Street routes be implemented during the first phase of operations at an annual estimated operating cost of \$6.1 million.

The success of all of the routes will depend on good overall management of the city’s physical transportation infrastructure, as well as enforcement of traffic regulations along the rights-of-way used by the Circulator. At a minimum, several minor roadway improvements and changes in roadway restrictions will be necessary. Additionally, implementation of exclusive bus lanes could improve the service. While the system will make use of many existing bus stops, approximately 50 new stops will be required, which will eliminate about 144 parking spaces in the downtown area.

Figure 1: Circulator Routes Alternative A

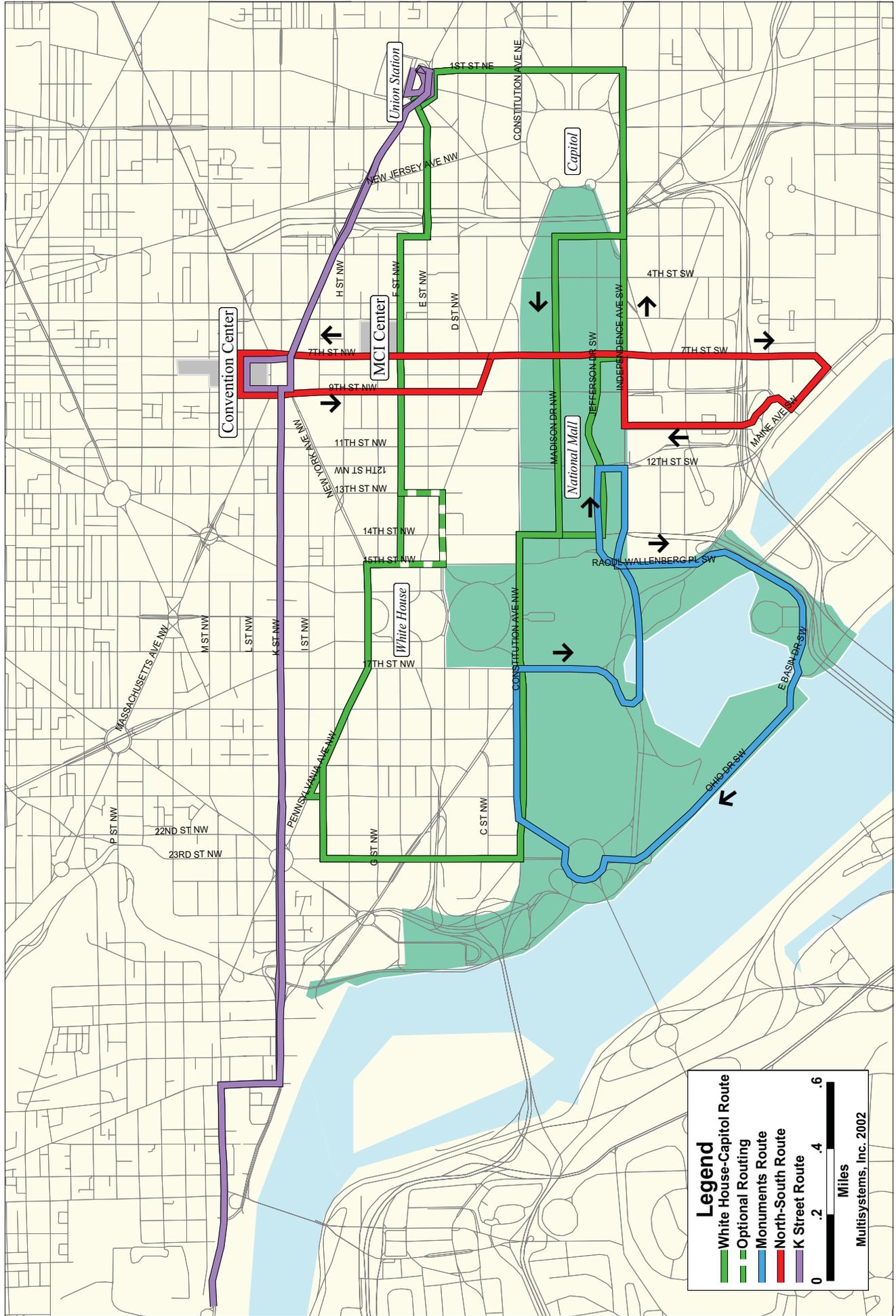
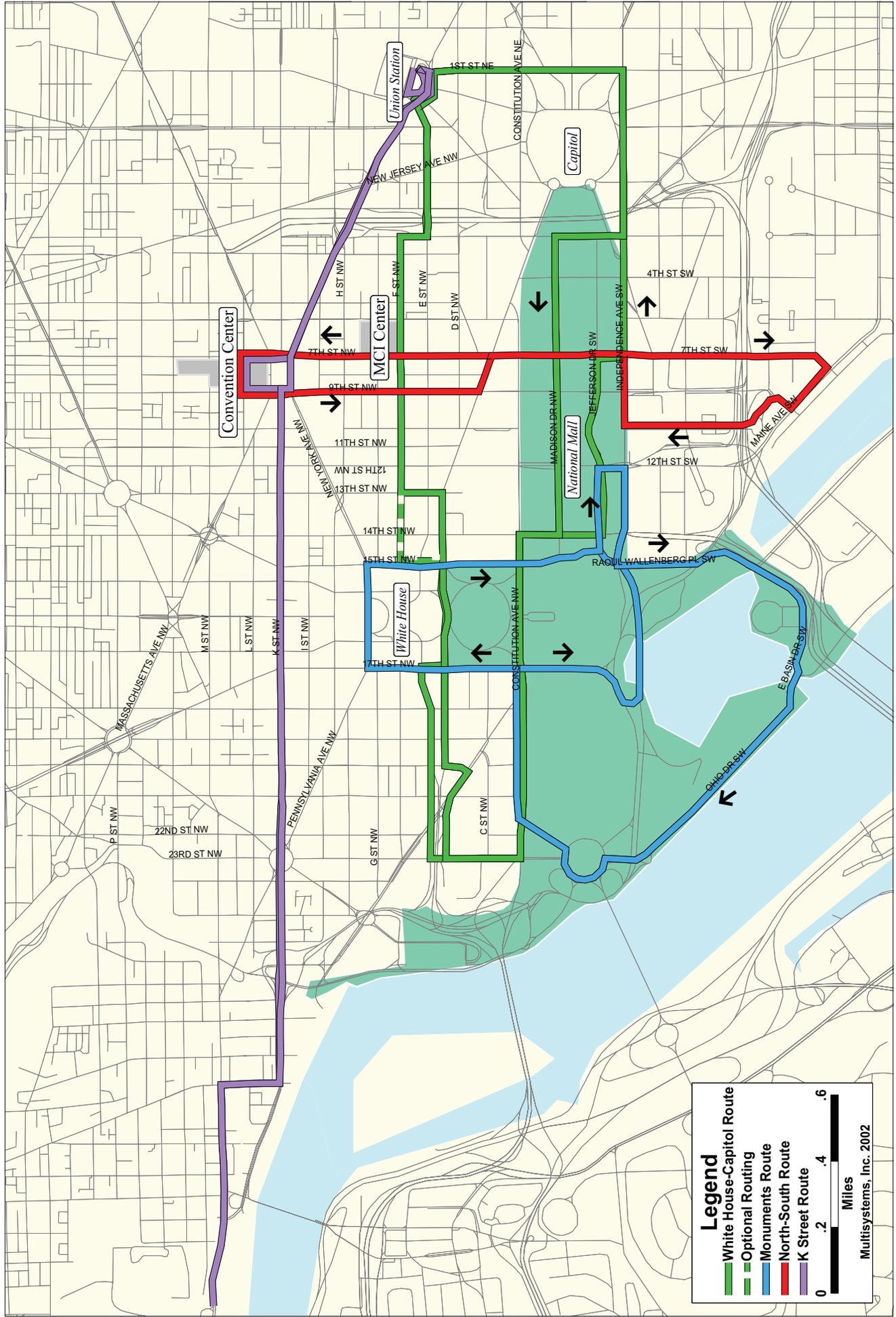


Figure 2: Circulator Routes Alternative B



Legend

- White House-Capitol Route
- Optional Routing
- Monuments Route
- North-South Route
- K Street Route

0 .2 .4 .6 Miles
Multisystems, Inc. 2002

Fare Structure Plan

The proposed fare structure and fare payment system are compatible with the SmarTrip-based fare payment system used by the Washington Metropolitan Area Transit Authority. Cash, SmarTrip cards, and visitor flash passes will be accepted on the Circulator. These three fare media will be used to offer the following fare products:

- **Single Ride Fare** – 50 cents in cash or from a SmarTrip card
- **Transfers** – discount only for riders with SmarTrip cards
- **1-Day and 7-Day Combined Metro/Circulator Passes** – \$1 (1-Day) or \$3 (7-Day) would be added to the Metro pass price. Available only to holders of SmarTrip cards.
- **Circulator-Only Flash Passes** – unlimited use flash passes as follows: 1-day (\$2), 3-day (\$4), 7-day (\$8), and monthly (\$12)
- **Circulator-Only SmarTrip Passes** – unlimited use monthly (\$12), and annual (\$120) passes available on SmarTrip.

Despite the number of pass products offered, single ride fares are still expected to account for just over half of all Circulator trips. The remainder will consist primarily of weekly Metro Combo pass holders for downtown workers and flash pass users for visitors. The average revenue per passenger is projected to be 47-cents.

Capital Plan

Vehicles will be the most significant capital expense for the Circulator, and the Capital Plan investigates a number of vehicles for possible use in the system. The DCPG established the following criteria for the identification of an appropriate vehicle:

- Low floor
- Large windows
- Clean fuels (natural gas, electric, electric-hybrid)
- Adequate capacity (55 passengers)

The DCPG was also interested in vehicles with unique body types that would make circulator vehicles more easily recognizable; therefore, several were investigated in the process. After review of 19 different vehicles, the plan recommends a vehicle that is at least 35' long, uses clean fuels, and has a proven track record of use in North America. Using these criteria, all of the possible candidate vehicles recommended for further consideration are standard buses already in wide use that offer natural gas fuel options.

The Circulator will require a fleet of 90 vehicles. Depending on the vehicle selected, the vehicle costs will be between \$23.4 and \$25.7 million. Bus stops and shelters will be provided through the District of Columbia's existing bus shelter contract so there will be no cost to the Circulator. The Circulator operator will be responsible for providing an appropriate storage and maintenance facility in the District of Columbia. Therefore, this cost will be borne by the operator and is not included as part of the Circulator implementation plan.

Financing Plan

The Financing Plan focuses on the funding sources used by the nine other downtown circulators that were reviewed as part of the market analysis. The Downtown Circulator is expected to cover about 45 percent of operating costs through fare box revenues. While this percentage is quite high relative to other public transit services and downtown circulators in other cities, it still leaves just over half of all operating costs to be paid through other sources. The DCPG is working to establish a financing plan to establish a stable set of funding sources for the service.

Marketing Plan

Selecting a name and identity for a service is one of the most important decisions to be made. The project name will help determine the circulator's "place" in the market and be decisive in determining how people will react to the service. While the DCPG is continuing efforts to develop a name and identity for the Downtown Circulator, the Marketing Plan proposes several alternatives for consideration. The name selected for the service should illustrate several desirable characteristics in a name and identity for the Downtown Circulator:

- The name itself should be short and quick
- It should suggest rides that are short and quick, not circuitous tour bus excursions
- It should reinforce the idea that DC and its downtown are experiencing an exciting transformation
- Riders should be able to use the service name as both a noun and a verb

The Marketing Plan presents an overall marketing strategy that supports a convenient, and inexpensive transportation service utilizing clean-fuel vehicles and offering tourists, business travelers, and downtown workers direct, frequent, and easy-to-understand access to key Washington, DC destinations. The strategy includes:

- An identity that suggests benefits for tourists, business travelers, and downtown workers, while also calling attention to the capital's revitalized downtown
- A corporate identity that differentiates the service from regular transit alternatives, while suggesting that it provides important links with other travel modes
- A vehicle paint scheme that is highly visible and that provides visitors and other downtown pedestrians with a clear picture of why the service is special
- Distinctive route maps in both a schematic and a full street-map format
- Route-specific bus stop signs
- An internet web site, plus graphic elements that can be incorporated in the web sites of neighboring businesses and agencies
- Encouraging visitor attractions and the downtown BID to include routes on maps displayed on the Mall and on downtown streets
- Developing graphic concepts that can be incorporated in Metrorail maps and brochures and in privately published DC maps and tour guides
- Producing a full color visitor guide and shuttle map in a single-sheet tabloid format for distribution in hotels, at Metrorail stations, and on the Mall

The Marketing Plan also identifies individual marketing elements needed for successful implementation of the Downtown Circulator.

Implementation Plan Contents

The Downtown Circulator Implementation Plan contains greater detail on each of the above elements. The plan is structured as follows:

- Section 1 – Introduction
- Section 2 – Project Background
- Section 3 – Market Analysis
- Section 4 – Operations Plan
- Section 5 – Fare Structure Plan
- Section 6 –Capital Plan
- Section 7 – Financing Plan
- Section 8 – Marketing Plan

1 Introduction

1.1 *The Need for a Downtown Circulator*

In recent years, there have been numerous proposals for a new circulation system in the core area of the District of Columbia. These have included National Park Service proposals for visitor transportation systems as well as circulation systems for downtown workers. Numerous reasons have been presented for implementing the various proposed circulator services. The major reasons can be summarized as:

- Visitor Mobility
- Downtown Worker Mobility
- Economic Development
- Congestion Relief
- Homeland Security Restriction Mitigation

Visitor Mobility - Washington, D.C. attracts approximately 22 million visitors annually, with many spending nearly their entire visit along the National Mall. The Washington Metropolitan Area Transit Authority's Metrobus and Metrorail services connect the Mall with surrounding parts of the city and the larger metropolitan region, but they do not provide transit services for trips within the Mall area. Private tour buses, including the National Park Service Tourmobile concession, provide guided tours and attractions-based transportation along on the Mall, but do not provide basic transit connections from the Mall to the rest of the city. Tourmobile and the other tour bus services serve a segment of the market seeking leisurely guided tours, but attract a relatively small share of the overall tourist market in the area. The remainder of the tourists drive cars, walk more than they would like, skip destinations that are hard to get to, and otherwise get around through a varied assortment of means of transportation.

There is a need for a coherent visitor transportation system that is not being met by the current mix of private tour companies and public transit services. In order to attract a large share of the visitor market, visitors will need a transportation system that is clearly "the way" to get around the center of the Nation's Capital, regardless of the purpose of their trip. Visitors are not simply guests in someone else's city. This is their capital city, and Washington has an obligation to provide the services visitors need to fully experience their capital. Visitors need an efficient, inexpensive means of transportation that is easy to understand and serves a comprehensive set of visitor destinations.

Downtown Worker Mobility - Adjacent to the National Mall and the Monumental Core area lies the District of Columbia's downtown. While the area has declined in importance as a retail center in recent decades, it remains a large concentration of federal government and private offices. Thousands of federal workers and other employees work in the area and make short trips within the area during the course of the day for meetings, shopping, dining, and entertainment. Metrorail is not suited for such short trips. Metrobus serves some downtown corridors but tends to serve commuter trips better than short local trips. Many downtown

workers end up using their cars or taxis for short trips, or choose not to travel beyond a short walk. Numerous federal agencies have found the need to operate their own shuttle van service between various office locations to serve the need for local business travel by federal employees.

There is a need for a downtown transportation system that is not being met by existing transit services. Federal and non-federal workers need a transportation system that is a fast, efficient, inexpensive means of transportation for short trips within the downtown. Federal agencies would benefit from a system that allows them to avoid having to provide transportation services and lets them focus on their agency's mission.

Economic Development - While the downtown is a place where downtown workers shop, dine, and are entertained, the existing transportation system does little to encourage visitors to take advantage of businesses in the downtown. The lack of a visitor transportation system that brings visitors into and through the downtown discourages visitors from exploring much of the city outside the Monumental Core. The recently completed Convention Center will attract many visitors to the edge of the downtown area, but no visitor-oriented transportation systems exist to allow them to explore the downtown, or even access the traditional visitor attractions.

There is a need for a transportation system that connects the visitor attractions, the downtown, and the convention center. The same system that visitors use to explore the Mall and the traditional visitor attractions should be there to allow them to explore the downtown and other parts of the center of the city. Such a system will encourage a new economic vitality downtown, enhance the visitor experience, and encourage visitors, particularly conventioners, to stay longer and explore the city, providing additional dollars to the region's economy.

Congestion - The National Mall, the other visitor attractions, and the downtown form the core of a major American city. This high concentration of government, commercial, and tourist activity naturally brings roadway congestion. As in any major city, viable alternatives to the automobile are required for the city to avoid being strangled by congestion. Washington's congestion is worsened by the number of tour buses operating along the Mall. Tour buses along and adjacent to the Mall are often found double-parked while waiting for passengers. This also has significant negative environmental and aesthetic impacts to the Mall area.

There is a need for a better circulator system within the National Mall area that will allow visitors and downtown workers to avoid automobile use. A better visitor circulation system will give tour bus operators an additional option of using the circulator to augment their service, while keeping some tour buses away from the Mall.

Homeland Security - An increased concern over homeland security in recent years has had negative impacts on the transportation system in downtown Washington. Several streets in the vicinity of the White House, the Capitol, and the State Department have been restricted from full traffic. Numerous other streets have had parking eliminated due to security concerns. The reduction in roadway and parking capacity as a result of these federal restrictions has increased travel times and congestion. This makes automobile use even more difficult than it would otherwise have been, and increases the need for transit services that are alternatives to automobile use in the downtown.

There is a need for a transit circulation system in the downtown area that will not only encourage less automobile use, but that could possibly make use of restricted roadways and former parking lanes to avoid delays that have been introduced by the restrictions. This could be an effective

means for the federal government to mitigate the impacts of the restrictions that have been imposed on the local transportation system in order to protect key federal facilities.

Thus, there are numerous needs that could be met by a Downtown Circulator in the core area of Washington, DC. A Downtown Circulator can serve both visitors and downtown workers. It can address needs for visitor transportation, local travel within the downtown, and visitor travel into the downtown area. The city could benefit through reduced congestion and support for economic development in the downtown. The federal government could benefit through improved services for visitors to federal facilities, reduced congestion on the Mall, reduction in costs and administration of federal shuttle van services, and mitigation of the negative impacts resulting from restrictions imposed by federal security measures.

1.2 Goals for the Circulator

Given this need for a Downtown Circulator, the Downtown Circulator Partner Group (DCPG) was formed to oversee the implementation of the project. Development of this Implementation Plan for the Downtown Circulator was guided and funded by the four key DCPG agencies:

- National Capital Planning Commission (NCPC)
- District of Columbia Department of Transportation (DDOT)
- Downtown Business Improvement District (DBID)
- Washington Metropolitan Area Transit Authority (WMATA)

The DCPG hired Multisystems, Inc. (assisted by DMJM+Harris), as the consultant to develop this Implementation Plan.

Considering the identified needs, the DCPG outlined several goals for the project:

- **Improve connectivity between the Monumental Core and the Central Business District**
 - Provide a convenient service utilizing an attractive and distinctive vehicle for trips between the Monumental Core and the Central Business District
 - Provide frequent service between the Monumental Core and the Central Business District
 - Improve transit travel times for trips between the Monumental Core and the Central Business District
- **Mitigate federal security measures**
 - Provide east-west transit service along Pennsylvania Avenue in front of the White House to mitigate the closing of Pennsylvania Avenue
 - Provide a service to accommodate trips impacted by the elimination of parking near federal facilities
- **Circulate visitors within the Monumental Core**
 - Provide a convenient service utilizing an attractive and distinctive vehicle for trips between visitor attractions

- Provide frequent service for trips between visitor attractions
- Improve travel time for trips between visitor attractions
- Provide an affordable service for trips between visitor attractions
- **Enable downtown workers to make business and shopping trips**
 - Provide a convenient service for short trips within the downtown
- **Supplement Metrobus and Metrorail**
 - Provide transit services that supplement Metrorail and Metrobus by providing a distributor service from downtown regional transit hubs
- **Reduce private automobile and tour bus congestion**
 - Provide an alternative means of transportation within the Monumental Core and Central Business District, reducing congestion and decreasing the need for automobile parking
 - Provide an alternative means of transportation within the Monumental Core and Central Business District for visitors arriving via tour bus

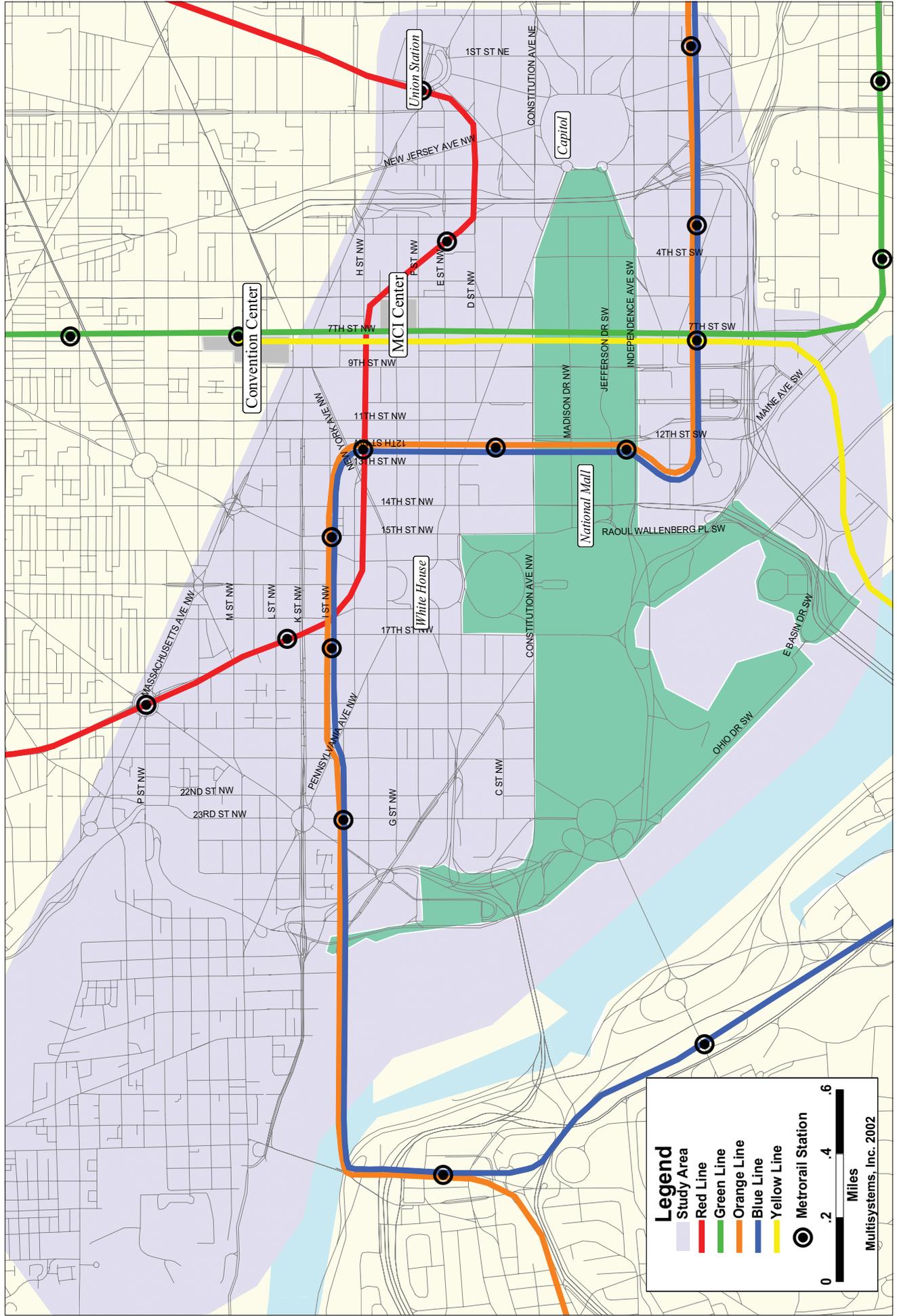
These goals guided the development of this Implementation Plan

1.3 The Implementation Plan

The study area for the Implementation Plan is shown in Figure 1-1. The area includes the traditional downtown area and the Monumental Core of Washington DC. It also includes the newer downtown along K Street and around Farragut Square, and extends to Georgetown to the northwest, and south to the southwest waterfront. The limits of the study area are roughly the Potomac River, the western and northern limits of Georgetown, Massachusetts Avenue, 2nd Street NE and SE, D Street SE and SW, and 7th Street SW.

This Implementation Plan includes an Analysis of the Market for the Circulator, an Operations Plan, a Fare Structure Plan, a Capital Plan, a Financial Plan, and a Marketing Plan. These are presented in the subsequent sections following a section presenting background information for the study.

Figure 1-1: Circulator Study Area



2 Project Background

Washington has often been described as two cities; the official “Monumental” city of government buildings and monuments and the National Mall, and the rest of the city experienced daily by residents and workers. Recent planning efforts have been undertaken to reconnect these two cities under a single vision of a “World Capital.” Plans have been developed for both the Monumental Core and the traditional downtown that would connect the two through new developments and new transportation links. Several recent development plans and transportation studies have been produced that provide a vision and a transportation framework in which a downtown circulator would be implemented. Current downtown transit services serve as a backdrop for a new downtown circulation system. This section reviews these relevant plans and existing services.

2.1 Development Plans

In 1997, the National Capital Planning Commission (NCPC) presented a bold vision for future development of the Monumental Core. *Extending the Legacy – Planning America’s Capital for the 21st Century*¹ is described as a “framework for change” in the capital city. It presents a plan to re-center the Monumental Core on the US Capitol, developing the North, East, and South Capitol Street areas with new monuments, museums, and institutions. It proposes a transportation system focused on public transit connections and the elimination of elevated highway and rail links. Multiple transit centers in the core would connect the rail and bus network with new water transportation services on both rivers and a new downtown circulation system. The proposed circulation system would cover the current Monumental Core between the Capitol and the Lincoln Memorial but also extend out North, East, and South Capitol Streets and extend to Georgetown, Arlington Cemetery, and East Potomac Park.

While “*Legacy*” focused on expanding the Monumental Core and integrating that expansion with the development of the rest of the city, in 2000 the District of Columbia’s Office of Planning produced an action plan for managing the development of the traditional downtown area north of the Mall. The *Downtown Action Agenda*² provides direction for future growth and development downtown. It proposes to strengthen the ten distinct neighborhoods within the downtown area, emphasizing the unique characteristics of each. It identifies key sites and corridors for development of housing, hotels, retail, and arts and entertainment facilities. New office development is directed eastward toward Union Station, while the area north of Massachusetts Avenue is identified for residential development. The plan envisions a focus of downtown at Gallery Place, with east-west commercial development along F Street, and a north-south retail, arts, and entertainment corridor along 7th Street. The 7th Street corridor would connect the National Mall with the convention center, retail, and hotel district under development at Mt.

¹ National Capital Planning Commission, *Extending the Legacy - Planning America’s Capital for the 21st Century*, 1997

² Government of the District of Columbia, Office of Planning, *Downtown Action Agenda*, November 2000

Vernon Square. The plan endorses the 1999 Downtown BID Downtown Circulator plan (discussed later in this section) which places circulator routes along these two corridors. It also endorses a “park once” policy for downtown visitors in which visitors will be able to access both the downtown area and the Monumental Core via transit without moving their car.

2.2 Transportation and Security Plans

Recent transportation plans have also stressed the need to connect the downtown and the Monumental Core. In the District of Columbia’s transportation plan³, a transportation vision is presented that sees the District as a World Capital, a center for tourism - but also a vibrant place to work and live. The plan endorses public transit as an alternative to driving into the city and to driving within the city. It proposes to focus transit investment on internal circulation to provide city residents with an alternative to the automobile. The District’s action plan⁴ presents a 6 year plan for transportation investment. It presents a “Current Assumptions Scenario” extrapolating current rates of investment and advocates an “Enhanced Scenario” for transportation improvements. The Enhanced Scenario includes new circulator services in the downtown area including a National Mall Shuttle and a 7th/9th Street Shuttle.

Security around government facilities in the District was an issue even before September 11th. The NCPC Interagency Security Task Force was formed in 2000 and produced a report entitled *Designing for Security in the Nation’s Capital*⁵. While the Task Force was initially formed to address the future of Pennsylvania Avenue in front of the White House, the report also recommends the preparation of a plan integrating urban design and security concerns for the entire Monumental Core. It recommended that NCPC undertake planning and concept design for streetscape, landscape and security throughout the core in order to guarantee a unified approach and avoid piecemeal actions. (An urban design and security plan was subsequently completed in October, 2002.) With regard to Pennsylvania Avenue, the task force report recommends that the street remain restricted from full traffic but that it be improved into a landscaped civic space that would not preclude the reopening of the street. It recommends that a circulator service be implemented using this section of Pennsylvania Avenue in order to partially restore this cross-town travel link and to provide visitors and residents the experience of riding in front of the White House. Additional traffic management alternatives are recommended and are analyzed in a separate document⁶.

2.3 Monumental Core and Downtown Circulation Plans

Circulation within the Monumental Core and the Downtown has been studied from the perspective of both areas. The National Park Service undertook a study in 1997, and is currently in the midst of a new study, to examine transportation needs and alternatives in the Monumental

³ Government of the District of Columbia, Department of Public Works, *A Transportation Vision , Strategy, and Action Plan for the Nation’s Capital*, March 1997

⁴ U.S. Department of Transportation and the District of Columbia Department of Public Works, *Transportation in a World Class Capital: Multimodal Transportation Needs and Candidate Actions and Investments*, (not dated)

⁵ Interagency Task Force of the National Capital Planning Commission, *Designing for Security in the Nation’s Capital*, October 2001

⁶ Parsons Transportation Group, prepared for National Capital Planning Commission, *Pennsylvania Avenue Traffic Alternatives Analysis, Final Report*, October 2001

Core. The Downtown Business Improvement District (BID) produced a study in 1999 proposing a Circulator system for downtown. They have since expanded the proposal to include more of the Monumental Core and the White House. The circulator routes contained in the recent Downtown BID proposal and those proposed in the 1997 study commissioned by the Park Service are shown in Figure 2-1. The current Park Service study has not yet resulted in any specific recommendations for visitor transportation services. Each of these studies is discussed below.

The 1997 transportation study commissioned by the National Park Service⁷ addresses vehicle circulation, parking, pedestrian movements, bicycle facilities, and visitor facility needs in the Monumental Core. It also investigates how visitor transportation systems can play an expanded role in the core while improving the visitor experience.

The study recommends a new visitor transportation system that would replace the current Tourmobile, a service operated under a concession agreement with the Park Service that expires in 2005. The study proposes a three-loop system, shown in Figure 2-1, with one loop operating between Union Station and the Washington Monument, a second operating between the Washington Monument and the Lincoln Memorial, and a third operating between the Lincoln Memorial and Arlington National Cemetery. Each loop would include stops at several key visitor locations. All services would be frequent and charge a low fare in order to attract a larger market share than the current service. The services would operate eleven hours a day, every five to ten minutes, using accessible low floor buses with a capacity of 50 people. The study calculated the capacity and cost of such a service but did not attempt to project ridership.

A key recommendation of the 1997 study is that a visitor transportation system should rely on Metrorail for access to the core. An option to expand parking and provide a shuttle bus service to the monuments was rejected as inconsistent with NCPC's long range plans.

The Park Service is currently engaged in a new process to examine visitor transportation service. They are now in the midst of a visioning process to determine the visitor services that should be offered when the current Tourmobile concession expires. They are considering several service options including service for visitors who just want to get around between the most popular sites on the Mall, as well as those who want an interpretive service. They are also considering excursion service to outlying sites. In addition to serving visitor needs, the Park Service is considering ways to increase its visibility and identity. Several service options are being studied, including opportunities for partnerships. A consultant is doing a demand analysis and an analysis of visitor needs. The Park Service expects to generate alternatives and enter into an environmental review process in 2003.

The Downtown BID has also been developing plans for a circulator system that would include service to the downtown as well as to the Monumental Core. In 1999, the BID produced a report detailing a proposed Downtown Circulator⁸. The BID proposal, including later modifications to include the White House and additional monuments, is shown in Figure 2-1. (The original 1999 proposal did not include service west of 14th Street.) The original BID proposal consisted of a

⁷ BRW, Inc. and Lee Engineering, *Final Draft Transportation Study, Memorial Core, Washington, DC*, December 1997

⁸ Parsons Transportation Group, prepared for the Downtown Business Improvement District, *Technical Report for a Downtown Circulator in Washington, DC*, April 1999

two route system. One route would be a north-south route on 7th and 9th Streets connecting the new convention center to the National Mall. The second would be a two-way loop route using F Street downtown (later moved to E Street) and serving Union Station, 1st Street, Independence Avenue, and the Mall, before returning to downtown on 14th Street. This second route was later expanded to encircle the White House and make use of Pennsylvania Avenue. The portion of this route between Union Station and the Washington Monument would essentially duplicate the easternmost loop of the 1997 proposal for the Park Service. The two routes together reflect the District Office of Planning's Downtown Action Plan goal of development along F Street and 7th Street, with a focus at a newly revitalized Gallery Place.

The Downtown BID's plan calls for a frequent, low-fare service operating nine hours per day using convenient low floor buses. The study analyzed several alternative service frequencies and recommends service every 8 minutes. The service would be targeted to tourists, conventioners, and downtown employees. The study emphasizes the potential benefits of the Circulator as encouraging a more accessible downtown, providing more effective management of tourist sites, increasing economic development, reducing traffic congestion, and improving the image of downtown.

Since the 1999 study, in addition to the changes to the two-way loop route, the Downtown BID has added a proposal for service connecting Georgetown to Downtown and a proposal for a monument loop, similar to the Washington Monument-Lincoln Memorial loop from the 1997 study for the Park Service.

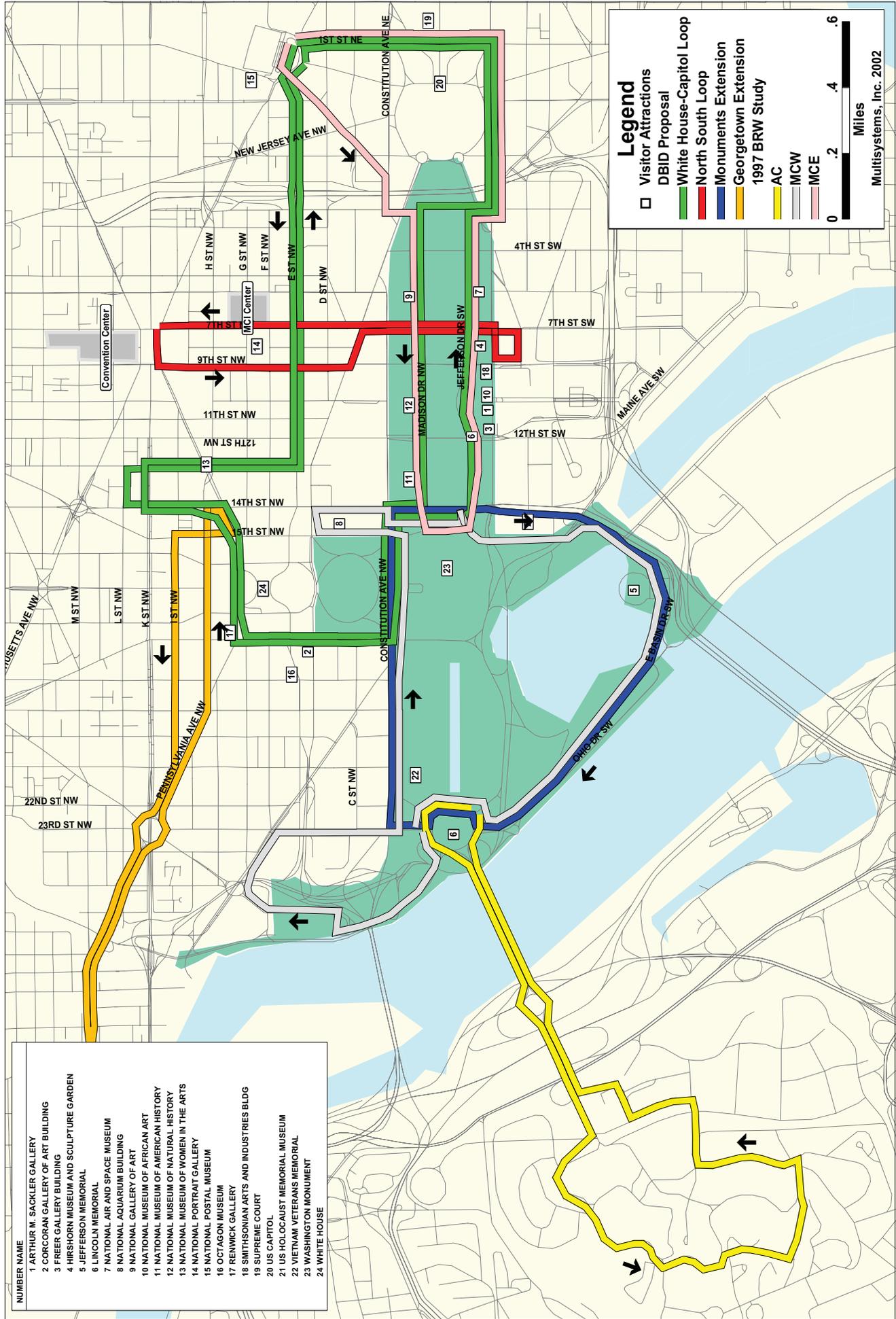
The Park Service and the Downtown BID studies form a useful basis for the current Downtown Circulator Implementation Plan study. However, additional analysis is required to more carefully examine the markets for the service and to develop a more detailed operations plan and estimate of costs.

2.4 Transportation Services in Downtown Washington

All five Metrorail lines serve the circulator study area, as was shown in Figure 1-1. Service is provided on the Orange and Blue lines from Virginia, through Foggy Bottom and Farragut Square, passing through downtown and the Mall under 12th Street, turning east past the Capitol, and continuing on to the eastern part of the District and Prince Georges County. Stations in the circulator area include Foggy Bottom, Farragut West and MacPherson Square (both near the White House), Metro Center (near F and 12th Streets NW downtown), Federal Triangle, Smithsonian (which has an entrance on the National Mall near Jefferson Drive and 12th Street SW), L'Enfant Plaza (near 7th and D Streets SW), Federal Center SW, and Capitol South (on 1st Street SE one block south of the Capitol grounds). The Orange and Blue Lines are the only lines that serve Smithsonian, the only Metrorail Station with an entrance directly onto the National Mall. Many of the visitor attractions in the study area are within walking distance of other Orange and Blue Line stations, but most are two or more blocks away.

Service is provided on the Green and Yellow lines under 7th Street, connecting to the northeast and southeast sectors of the District, Prince Georges County, and Arlington and Alexandria Virginia. Stations in the circulator area include Mt. Vernon Square (near the new convention center), Gallery Place (near F and 7th Streets NW downtown), Archives-Navy Memorial, and L'Enfant Plaza (near 7th and D Streets SW). The Green and Yellow Lines pass under the Mall but the nearest stations are two blocks north and south of Madison and Jefferson Drives. Some

Figure 2-1: Prior Circulator Route Proposals



downtown and Mall visitor attractions are within walking distance of Green and Yellow Line stations, but most are not.

Service is provided on the Red Line through downtown connecting to the northeast and northwest parts of the District, as well as Montgomery County. Stations in the circulator area include Farragut North (3 blocks from the White House), Metro Center (near F and 12th Streets NW downtown), Gallery Place (near F and 7th Streets NW downtown), Judiciary Square, and Union Station. The Red line does not serve the Mall, but many downtown visitor attractions are within walking distance, and there is a direct entrance from the Red Line into Union Station.

The five Metrorail lines, in combination, provide good access between the region and most of the circulator study area. (The exception is that Metrorail does not serve the northwestern and southwestern portions of the study area -- Georgetown and the monuments along the Potomac River.) Nevertheless, because the area is covered by five different Metrorail lines, and because many visitor attractions are several blocks from the nearest Metrorail Station, Metrorail is not always convenient for travel from one attraction to another.

Numerous Metrobus routes run through the study area, mostly in either a north-south or east-west direction, connecting the study area to the rest of the District. No bus route currently serves all portions of the project area and bus service to the southwestern portion along the river is limited. Key major bus routes relevant to this study are the Georgia Avenue/7th Street Line (passing north-south through the study area along 7th Street), the Sibley Hospital-Stadium-Armory Line (passing east-west through the study area on E, 13th, and K Streets), the Benning Road-H Street Line (serving H Street and connecting to the eastern part of the District), and the Pennsylvania Avenue Line (passing east-west through the study area on Independence, 7th, Pennsylvania, 15th and H/I Streets). The Pennsylvania Avenue Line is the only major east-west line serving the Mall. It connects the White House area, parts of downtown, the Federal Triangle, the Mall, and the Capitol.

Numerous federal agencies provide their own shuttle bus service between federal facilities in the study area. These services do not provide commuter connections to Metrorail stations, rather they serve a circulation function enabling federal workers to work and attend meetings at multiple sites. The agencies providing shuttle service in the circulator study area include:

- Department of Agriculture
- Department of Commerce
- Department of Defense
- Department of Education
- Department of Energy
- Department of Health and Human Services
- Department of Housing and Urban Development
- Department of Interior
- Department of Justice
- Department of State
- Department of Transportation
- Department of Treasury
- General Services Administration
- Environmental Protection Agency

Downtown Circulator Implementation Plan

- Federal Deposit Insurance Corporation
- Smithsonian Institution

The Circulator would serve many of the facilities served by these shuttles. It is possible that some of these services could be replaced by the circulator, saving costs for several federal agencies.

3 Market Analysis

This section identifies and quantifies the potential markets for a downtown circulator. It also summarizes information gathered from operators of downtown circulators in other cities and presents circulator service design strategies based on those findings. This analysis of potential markets assumes that a circulator would consist of the DBID proposal, that is a North-South route on or near 7th Street from Mt. Vernon Square to south of the Mall, a two-way loop including F Street and the Mall that would serve the White House and the Capitol, and a loop serving the monuments. It also assumes that the circulator would include a fourth route from Union Station to Georgetown along K Street, as proposed by DDOT. The area examined for potential markets extends to Georgetown and Dupont Circle to the northwest, Massachusetts Avenue to the north, 4th Street NE/SE to the east, and the waterfront to the southwest.

3.1 Potential Markets for the Circulator

A downtown circulator in Washington would serve existing travel markets, accommodate new demand to new downtown developments, and may also induce new travel by providing convenient transit connections that did not exist before. This subsection on potential markets focuses on quantifying the existing travel markets. The development of the framework for analyzing the markets is discussed first. The framework had to be developed in a way that accommodated the data that was available, which included visitor counts and several surveys, but included little information on actual travel patterns. The estimate of the size of each market follows, including a discussion of the methodology and the many assumptions and estimates that became necessary given the availability of data. The market estimates included in this subsection can be considered as a conservative base case estimate. New developments and redevelopment in the downtown area could bring about increased use of the circulator, and the presence of circulator service could induce new travel. These potential increases are not addressed here.

3.1.1 Defining the Potential Markets for Analysis

A circulator service in the core of Washington would be able to serve a number of different markets. The travel markets can be defined across a number of dimensions. These include trip purpose, access mode to downtown, origin/destination locations, frequency of travel, group size, and the socio-demographic and psychographic characteristics of the individuals.

The initial framework proposed for assessing the existing markets for the circulator consisted of dividing the market into visitors to the Washington metropolitan area and residents of the metro area. Visitors would be divided into tourists and business/convention travelers. This is consistent with the categories used in many travel industry surveys and reports. The data needed would consist of survey data of visitors' travel patterns, where they are staying, the attractions they visit, and the other activities that they undertake. Residents would be divided into those whose main purpose in traveling downtown is for work and those whose trip is for other purposes. The data needed would be basic travel flows into and within downtown and also some information on specific attractions visited and activities undertaken.

This market analysis needed to be based on existing data regarding travel by the various market groups. Detailed data on travel within the study area and on travel by visitors was sought from DCPG members and from the National Park service. The data obtained included the following:

- **Summary of Smithsonian Institution visitor surveys⁹:** This report describes a profile of Smithsonian Institution visitors based on surveys conducted at major Smithsonian museums in 1994 through 1996.
- **Smithsonian visitor counts¹⁰:** This report provides 1989-1999 monthly visitor counts for each Smithsonian museum.
- **National Park Service monthly visitor counts:** Monthly visitor counts for each NPS facility in the National Capitol Region were obtained from the National Park Service web site¹¹.
- **Visitor counts at other attractions:** When newer updated data was not available, counts from the DBID 1999 study were used.
- **Size and location of Washington DC hotels:** The locations of Washington DC hotels were obtained from a map produced by the Washington Convention and Tourism Corporation. The number of rooms in each hotel was obtained from the Hotel Association of Washington DC.
- **2000 Travel Trends Survey Report¹²:** This report provides information on domestic and international travelers to the greater Washington/Baltimore region. It is developed from a nationwide survey of travel behavior. It includes information on total visitor volumes; trip purpose and mode; trip duration, lodging type, and major activities; and traveler demographics.
- **Downtown BID survey reports^{13,14}:** These reports are based on street intercept surveys of tourists and metro area residents in the downtown and a telephone survey of area residents. The tourist report includes information on tourists in the downtown such as lodging, purpose, frequency of visits, demographics and spending habits. The residents report includes information such as residence location, trip characteristics, demographics, and opinions concerning the downtown.
- **Metrorail origin/destination data:** A station-by-station table of Metrorail origins and destinations for one week in April 2001 was used to identify the areas of origin for trips to the Mall.

⁹ *Visitors to the Smithsonian Institution: A Summary of Studies*, Institutional Studies Office, Smithsonian Institution, April 1997

¹⁰ *1999 Visits to Smithsonian Museums*, Institutional Studies Office, Smithsonian Institution, March 2000

¹¹ www.nature.nps.gov/stats

¹² *2000 Travel Trends Survey Report*, Washington Convention and Tourism Corporation

¹³ *A Tourist Study Conducted for Downtown DC*, Gentlemen Associates, August, 2001

¹⁴ *A Pedestrian and Telephone Research Study Conducted for Downtown DC*, Gentlemen Associates, June, 2001

- **Estimated travel patterns into and within the downtown:** Estimates of travel both into and within the core area for 2000 were obtained from the regional travel forecasting model maintained by the Metropolitan Washington Council of Governments.
- **Downtown employment levels:** Estimates of downtown employment by traffic analysis zone for year 2000 were also obtained from the Metropolitan Washington Council of Governments.
- **Downtown federal employment levels:** The number of federal employees at each federal facility in the downtown was obtained for the year 1999 from NCPC.

The study team was not able to obtain survey data from the National Park Service as their ongoing study of visitor transportation has not yet been completed. The Park Service did provide a preliminary report which included useful information on seasonal variation, day of week variation, and time of day distribution of visitors to the monuments and to the Smithsonian.

The study team found that basic information such as monthly, or at least annual, visitor counts at attractions was widely available, however, more detailed information on travel patterns for visitors was not. With the exception of the Smithsonian Institution survey data, there was no information found on how visitors combine visits to multiple attractions together into one day of sightseeing. (The Smithsonian data did determine the number of Smithsonian museums attended in a single visit, which could last multiple days.) Thus, it became difficult to determine the extent of visitor travel between attractions. Also with the exception of the Smithsonian, there was no breakdown of visitors available between metro area residents, and true “visitors” to the region.

Data was also not found on the hotels used or local addresses of visitors to the region, so that the extent of travel between downtown hotels and attractions could not be directly determined. Only a regional split between hotels and private residences was available from the *2000 Travel Trends Survey Report*, and the location and number of rooms for District hotels had to be used to approximate the origins of hotel-based trips. Metrorail origin-destination data for mid-day trips to/from Smithsonian Station were used to estimate origins of non-hotel based visitor trips.

Only a regional split between pleasure and business/convention travelers was available from the *2000 Travel Trends Survey Report*. This split was not available for any of the attractions.

For metro area residents, no directly observed data on travel patterns within the core area were identified. However, estimates from the regional travel forecasting model can be used to examine travel within the downtown area. Such regional model estimates are derived from observed behavior and other estimates, and tend to be more useful at a more regional level, but in the absence of directly observed data, they can approximate actual travel. They tend to be less accurate where there are a few large specialized travel generators, such as the museums on the Mall, but better at estimating travel among a large number of employment sites and commercial attractions.

Overall, the greatest gap in the data available appears to be the lack of information on travel patterns of visitors to the attractions. A beneficial data collection effort would be a survey of visitors at a variety of the monuments, museums, and other attractions that included questions on where they live or are staying locally (which hotel or community), which other attractions they visit that day, and what other activities (shopping, dining, etc.) they would engage in. The

National Park Service recently undertook such a survey, but the results were not available in time to aid this study.

Given the data found for this analysis, the initial framework for assessing the existing markets was modified. Instead of focusing on a visitor/resident split of travel, and a subdivision of travel within those groups, the analysis focused first on trips to and among the core area attractions, and then on trips to and within the core area made mostly by area residents. Without data on existing travel between attractions and downtown businesses, and with the substantial improvements anticipated in the downtown area, this analysis of existing markets does not attempt to quantify the market for travel between the attractions and the downtown area.

In the following subsections, both the trips to area attractions and to the core in general are discussed in terms of the initial “access” trip, that is the trip from a hotel or local address to the core area, and subsequent “circulation” trips between attractions or between points in the core area. These are preceded by a discussion of visitor counts at core area attractions.

3.1.2 Visitors to Area Attractions

As noted above, available counts and surveys at core area attractions generally did not distinguish visitors from area residents. They also did not distinguish visitors by the purpose of their visit to the Washington area. As a result, all visitors to area attractions were initially treated as a single group. (An estimate was later used to split attraction visitors between visitors to the region and metro area residents.) Data was assembled from 38 attractions in the core area, shown in Table 3-1 and in Figure 3-1¹⁵. The list of attractions was developed in consultation with the DCPG, who reviewed those included and assisted in providing information on additional attractions. The attractions were grouped into six geographic areas: 1) the Mall from the Washington Monument to the Botanical Gardens, 2) Georgetown, 3) the area around the Capitol, including the Union Station area, 4) the monuments along the Potomac, 5) the traditional downtown, and 6) the area around the White House.

For each attraction, the table and figure show the number of annual visits. In most cases, the figure is for the year 1999, since data for more recent years is lacking in many cases, and the year 2001 is considered atypical. In a few cases, 1997 data was used.

In each of the areas, the attractions are grouped closely together and visitors often visit multiple attractions on a single trip. It is therefore not appropriate to simply add the visitor counts from multiple attractions to determine the number of visitors present in an area on any given day. The table shows how an adjustment factor was used to convert the number of visits to each individual attraction to a number of visits to the area. The only observed data found that could determine this adjustment factor came from the Smithsonian survey data. Their survey indicated that Smithsonian visitors go to 1.68 Smithsonian museums per visit, although one visit can last many days¹⁶. Among visitors making one-day visits, however, the average is 1.41 museums¹⁷. If this figure is adopted as the number of museums visited per day by all visitors, then the number of daily visits to the Smithsonian as a whole is the number of individual museum visits divided by

¹⁵ A single estimate of visitors to Georgetown was used since this figure was available from the Georgetown Business Partnership and Georgetown visitors tend to be less oriented to a few large attractions.

¹⁶ *Visitors to the Smithsonian Institution, A Summary of Studies*, p. 67

¹⁷ *Ibid*

Figure 3-1: Annual Visitor Volumes at Core Area Attractions

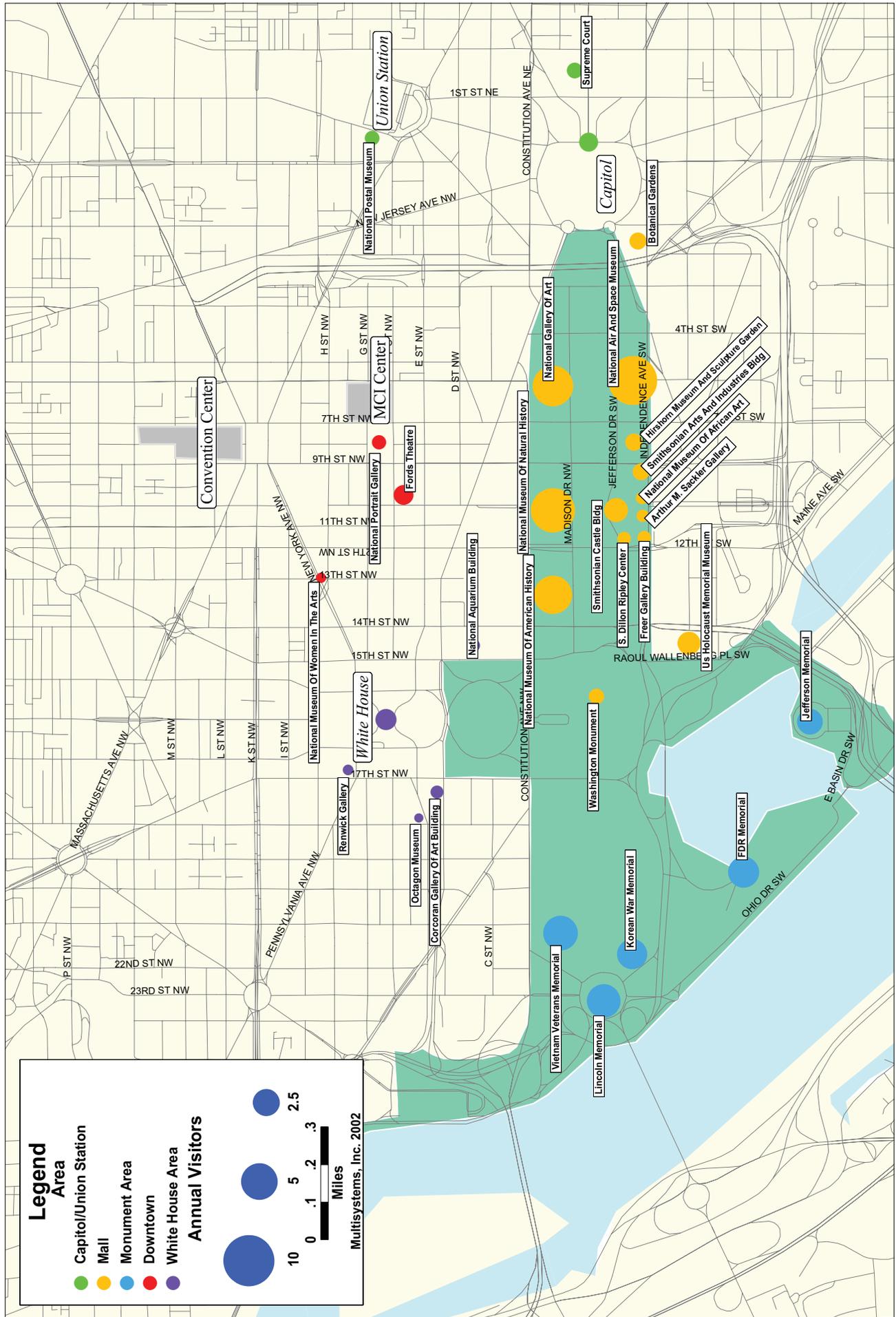


Table 3-1: Visitor Volumes for Major Attractions

<i>Attraction</i>	<i>Annual Visitors</i>	<i>Adjustment</i>	<i>Adjusted Visitors</i>
<i>Mall</i>			
Arthur M. Sackler Gallery	241,000	0.70	168,531
Arts and Industries Building	708,000	0.70	495,105
Freer Gallery of Art	359,000	0.70	251,049
Hirshhorn Mus. & Sculpture Garden	784,000	0.70	548,252
National Air and Space Museum	9,131,000	0.70	6,385,315
National Museum of African Art	257,000	0.70	179,720
National Museum of American History	5,518,000	0.70	3,858,741
National Museum of Natural History	7,469,000	0.70	5,223,077
S. Dillion Ripley Center	353,000	0.70	246,853
Smithsonian Institution Building	1,841,000	0.70	1,287,413
National Gallery of Art	6,200,000	0.70	4,335,664
US Holocaust Memorial Museum	1,700,000	0.70	1,188,811
Botanical Gardens	750,000	0.70	524,476
National Archives	1,000,000	0.70	700,000
Washington Monument	553,420	0.20	110,684
World War II Memorial	4,000,000	0.30	1,200,000
TOTAL MALL	40,864,420		26,703,691
<i>Georgetown</i>			
TOTAL GEORGETOWN	12,750,000		10,200,000
<i>Capitol/Union Station</i>			
Union Station	7,000,000	0.70	4,900,000
Capitol Visitor's Center	3,000,000	1.00	3,000,000
U.S. Supreme Court	600,000	0.30	180,000
National Postal Museum	463,000	0.70	324,100
TOTAL CAPITOL/UNION STATION	11,063,000		8,404,100
<i>Monument Area</i>			
Vietnam Veterans' Memorial	4,442,238	1.00	4,442,238
Lincoln Memorial	4,099,480	0.10	409,948
Franklin Delano Roosevelt Memorial	3,453,171	0.10	345,317
Korean War Memorial	3,249,688	0.10	324,969
Jefferson Memorial	2,218,837	0.10	221,884
TOTAL MONUMENT AREA	17,463,414		5,744,356
<i>Downtown Area</i>			
Fords Theatre	1,159,435	1.00	1,159,435
National Museum of American Art, National Portrait	432,000	0.70	302,400
Newseum	660,000	0.70	462,000
Spy Museum	500,000	0.70	350,000
National Building Museum	422,300	0.70	295,610
National Aquarium	320,000	0.70	224,000
National Museum of Women in the Arts	100,000	0.70	70,000
National Law Enforcement Officers Memorial	200,000	0.30	60,000
U.S. Navy Memorial	200,000	0.30	60,000
TOTAL DOWNTOWN AREA	3,993,735		2,983,445
<i>White House Area</i>			
White House	1,363,332	1.00	1,363,332
Corcoran Gallery of Art	310,000	0.70	216,783
Renwick Gallery	136,000	0.70	95,105
Octagon Museum	50,000	0.70	35,000
TOTAL WHITE HOUSE AREA	1,859,332		1,710,220

1.41. Since the average visitor may experience the Smithsonian at a more leisurely pace than the one-day visitor, this may tend to slightly underestimate the number of people visiting the area.

The table shows the adjustment factor applied for each attraction. The method of estimating the adjustment varied somewhat by attraction area. For Mall attractions, the Smithsonian figure ($1/1.41 = 0.70$) was used for all museums, even those not part of the Smithsonian. For the other Mall attractions, such as the Washington Monument, a lower factor was used. The factor of 0.20 for the Washington Monument reflects an assumption that 20% of Washington Monument visitors would not visit a Mall museum on the same day.

In other areas, no data was found on which to estimate an adjustment factor, so judgment was used. In each area, a factor of 1.00 was used for the attraction with the highest visitor count. Then, for the other attractions, a factor was selected to reflect the assumed percentage of visitors to that attraction that would not visit the highest volume attraction in that area on the same day. For the monuments area, for example, the Vietnam Veterans Memorial attracts the most visitors. Since visitors tend to make short visits to each memorial and visit multiple memorials, a factor of 0.10 was used for the other memorials reflecting an estimate that only 10% of visitors to those memorials would not visit the Vietnam Veterans Memorial.

The table shows the application of the adjustment factor to convert total annual visits to each *individual attraction* into visits to *each area*. The figures represent visitor-days. The number of individuals would be even less, as an individual may visit an area multiple times on a multi-day visit to the city. This estimate of visitor-days by attraction area forms the basis for the estimate of circulation trips between attraction areas and access trips to and from attraction areas in the next two subsections.

3.1.3 Circulation Trips Between Attraction Areas

An important use of the circulator will be to travel among the six attraction areas. While within each attraction area many visitors will likely walk between attractions, the distances between the attraction areas are further than most would be willing to walk. Furthermore, many of the trips between attraction areas are inconvenient by Metrorail, or would involve more walking than the circulator is likely to require.

Unfortunately, no data was found that would identify the rate at which visitors travel between attractions. Therefore, professional judgment had to be used. Table 3-2 shows the assumptions made regarding visitors traveling between two areas on a given day. For each combination of areas it was assumed that the same number of people would travel in each direction. That number was estimated for each combination and the share of total visitors in each area that that represents is shown in the table.

The number of trips within each attraction area can be estimated by subtracting the adjusted visitors from the total visitors in Table 3-1. In some areas, such as the mall and downtown, most of these trips would be too short for the circulator to be a reasonable option, while in other areas, such as the Capitol/Union Station area, attractions are spread out enough so that visitors might use the circulator. In each area, an estimate was made of the percentage of trips within the area that would be long enough so that the circulator would be a reasonable option. These estimates are shown in the last column of Table 3-2.

Table 3-3 shows the resulting annual volumes of travel among the six attraction areas. Volumes were assumed to be equal in each direction. (No visitors were assumed to visit three areas in one

Table 3-2: Estimated Percentage of Visitors Visiting Two Areas

Area	Estimated Percentage of Area Visitors who would also visit...						Est. % long walk trips <i>within area</i>
	Mall	Georgetown	Capitol Area	Monuments	Downtown	White House	
Mall		3.1%	4.7%	4.3%	2.2%	1.9%	10.0%
Georgetown	8.0%		4.1%	2.8%	1.5%	0.8%	50.0%
Capitol Area	15.0%	5.0%		6.8%	5.3%	1.0%	75.0%
Monuments	20.0%	5.0%	10.0%		5.2%	3.0%	40.0%
Downtown	20.0%	5.0%	15.0%	10.0%		5.7%	20.0%
White House	30.0%	5.0%	5.0%	10.0%	10.0%		40.0%

Table 3-3: Estimated Annual Trips Within and Between Attraction Areas

Origin	Destination						TOTAL
	Mall	Georgetown	Capitol Area	Monuments	Downtown	White House	
Mall	1,416,073	408,000	630,308	574,436	298,345	256,533	3,583,693
Georgetown	408,000	1,275,000	210,103	143,609	74,586	42,756	2,154,053
Capitol Area	630,308	210,103	1,994,175	287,218	223,758	42,756	3,388,317
Monuments	574,436	143,609	287,218	4,687,623	149,172	85,511	5,927,569
Downtown	298,345	74,586	223,758	149,172	202,058	85,511	1,033,430
White House	256,533	42,756	42,756	85,511	85,511	59,645	572,711
TOTAL	3,583,693	2,154,053	3,388,317	5,927,569	1,033,430	572,711	16,659,773

Table 3-4: Estimated Average Daily Trips Within and Between Attraction Areas

Origin	Destination						TOTAL
	Mall	Georgetown	Capitol Area	Monuments	Downtown	White House	
Mall	3,854	1,110	1,715	1,563	812	698	9,752
Georgetown	1,110	3,470	572	391	203	116	5,862
Capitol Area	1,715	572	5,427	782	609	116	9,221
Monuments	1,563	391	782	12,756	406	233	16,131
Downtown	812	203	609	406	550	233	2,812
White House	698	116	116	233	233	162	1,559
TOTAL	9,752	5,862	9,221	16,131	2,812	1,559	45,336

day.) The table shows 16.7 million annual trips, of which 7.1 are estimated between two areas and 9.6 million are estimated within a single area. (Note that the majority of within-area trips are trips among the monuments.) Table 3-4 shows these figures converted to an average day, for an estimated 45,000 daily trips. These estimates represent the total market for trips between attraction areas that could be served by the circulator, not the projected share that the circulator might attract.

3.1.4 Access Trips to Attractions Areas

The circulator can also play a role in bringing visitors to an attraction area from a Metrorail station, the convention center, or a downtown hotel. The Metrorail system does an excellent job providing access from the region to the downtown employment centers. However, with the exception of the downtown area, the other attraction areas are less directly served by Metrorail. The circulator could bring people closer to their destination from a convenient Metrorail transfer point.

The circulator could also play a significant role in bringing visitors to attractions from the new convention center at Mt. Vernon Square, and from nearby hotels. Nearly 60% of District of Columbia hotel rooms are in the circulator study area. These were grouped by the sub-areas and the total number of rooms in each area is listed in Table 3-5.

The number of visitors traveling to and from each attraction area each day was calculated in Table 3-1. However, as discussed in the previous section, some of these people would be traveling to one of the other areas, not to or from Metrorail or a hotel. These visitors need to be deducted from the Table 3-1 results before estimating the number of access trips to each area. Table 3-6 repeats the total from Table 3-3 and further calculates the percentage of visitors visiting an area who would travel *to* another area that day. (The figure is $\frac{1}{2}$ the sum of the percentages for the corresponding row in Table 3-2 since an equal share would also be arriving *from* another area that day.

The percentage calculated in the last column of Table 3-6 was used to reduce the number of access trips to or from each attraction area. This and the remaining calculations for each area are shown in Appendix A. After eliminating circulation trips, the figures were further adjusted to eliminate access trips made by people in organized tour groups. The *2000 Travel Trends Survey Report* indicated that 5% of visitors to the region are part of organized tour groups. This figure was doubled since it was assumed that tour groups are more likely to be destined for the monumental core than are visitors in general. The resulting estimate of access round trips for each area is shown in the appendix.

The number of access round trips for each area was then divided between the various Metrorail corridors, the convention center, and the downtown hotels. To estimate the number from downtown hotels, the share of attraction area visitors who are metro area residents was first removed from the total¹⁸. The results were then multiplied by the share of visitors staying in hotels¹⁹. Because no data was found indicating the specific hotels used by visitors to the

¹⁸ Smithsonian surveys indicated that 21% of visitors are from the metro area. This figure was used for the Mall, downtown, and White House areas. Half of that percentage was used for the Monument and Capitol areas.

¹⁹ 40% for the region, from the *2000 Travel Trends Survey Report*

Table 3-5: Total Hotel Rooms by Area

Hotel	Number of Rooms
Downtown	3,832
Union Station	1,730
Capitol Area	152
Mt. Vernon Square	1,093
L'Enfant	901
Pennsylvania Avenue	1,055
K Street	2,118
Massachusetts Avenue	3,425
West End	3,158
Georgetown	649
Other District of Columbia	6,811

Table 3-6: Estimated Annual Volumes of Visitors Visiting Two Areas

Area Visited	Visitors Traveling to Another Area	Total Visitors to Area	% Of All Area Visitors
Mall	2,167,621	26,703,691	8.1%
Georgetown	879,053	10,200,000	8.6%
Capitol Area	1,394,142	8,404,100	16.6%
Monuments	1,239,945	5,744,356	21.6%
Downtown	831,372	2,983,445	27.9%
White House Area	513,066	1,710,220	30.0%
TOTAL	7,025,199		

attractions, hotel users were allocated among *all* District hotels in proportion to the number of rooms²⁰. The number in hotels in the circulator study area was then reduced by an estimated number of trips that might originate at the convention center rather than at a hotel²¹. Finally, those staying in hotel areas where the circulator could be used to access a particular attraction area were identified, as were those within walking distance to a particular attraction.

²⁰ This may underestimate the number staying near downtown since visitors to the attractions may be more likely to stay downtown. However, it may also overestimate since only District, and no suburban or Arlington hotels, were considered.

²¹ According to the *2000 Travel Trends Survey Report*, 7.4% of visitors are attending conventions. Therefore 7.4% of *all* visitors were assumed to be conventioners and one half of the trips to attractions made by these visitors were assumed to originate at the convention center.

The numbers of visitors in hotels served by the circulator, or within walking distance, were subtracted from the number of access round trips for each area. The remaining access trips were allocated to the various Metrorail corridors using Metrorail fare gate data showing the origin or destination of all mid-day trips to or from Smithsonian Metrorail Station during a representative week. The result is the estimated breakdown of the market for access round trips by Metrorail corridor, circulator hotel, convention center, and walking for each of the six attraction areas shown in the appendix. This is summarized in Table 3-7 showing annual and average daily access round trips. (Note that while these trips are categorized by Metrorail corridor, they are not necessarily made by public transit. The Metrorail corridor categorization reflects where they would be coming from *if* they used public transit.)

The circulator could play a significant role in serving many of these trips since it would generally provide a closer connection to many of the attractions than would Metrorail, and could replace a transfer between Metrorail lines. When faced with a Metrorail transfer and a longer walk, users may choose to transfer to the circulator instead, and have a shorter walk. Trips to some attractions from some lines, however, can be eliminated from consideration since Metrorail access is good. For example, visitors to the downtown attractions are unlikely to benefit from the circulator no matter which Metrorail line they use since downtown is well-served by all Metrorail lines. Similarly, visitors to the Capitol area and the Mall from the Blue/Orange Line would have little need for the circulator. If these trips are eliminated from consideration, Table 3-8 shows the estimated average daily access round trips that could be served by the circulator. The table shows 74,000 daily access round trips (148,000 one-way trips) that could possibly use the circulator. The largest group would be Red Line users. Area hotel users represent a possible market of about 4,000 round trips²². People attending conventions represent a market of about 3,900 round trips. (The potential market share that could be obtained from these groups is probably much higher than for other users.)

This average day calculation is sufficient for assessing the various markets for a circulator. However, future planning and design of the circulator will require estimates of seasonal variation. The Smithsonian visitor count data included monthly breakdowns of visitors. This data showed that the peak months are April and July when 13% of annual visitors attend in each month. The lowest month is January with only 3.7% of annual visitors. National Park Service visitor counts also included monthly breakdowns. The NPS data showed that the peak month is May when 14.9% of annual visitors attend, and the lowest month is January with only 3.1% of annual visitors. These counts demonstrate that the markets related to travel to, from, and between attractions can be as much as four or five times larger in the peak month than in the lightest month.

3.1.5 Access Trips by Employees and Shoppers in the Core Area

The circulator could also serve trips that are not related to any of the visitor attractions. Thousands of metro area residents travel to, from, and within the core each day. The large number of people in the core area can be illustrated by examining data on employment in the

²² Note that including Massachusetts Avenue, West End, and Georgetown hotels would increase the estimated market substantially.

Table 3-7: Annual and Average Daily Access Round Trips to Attraction Areas

Annual Trips to Attraction Areas							
Origin	Mall	George-town	Capitol Area	Monument	Downtown	White House Area	TOTAL
Blue/Orange Line	12,564,948	4,670,481	3,425,865	2,299,663	1,057,643	593,470	24,612,070
Yellow/Green Line	2,424,931	921,201	683,948	439,487	212,692	116,804	4,799,063
Red Line East	1,664,612	677,202	469,501	301,689	146,004	80,181	3,339,189
Red Line West	4,218,290	1,551,083	1,130,733	775,726	361,827	197,307	8,234,966
Convention Center	646,728	245,684	208,886	134,224	56,725	35,673	1,327,920
Circulator Area Hotels	497,150	305,196	345,633	103,180	70,425	16,235	1,337,820
TOTAL	22,016,659	8,370,846	6,264,567	4,053,969	1,905,316	1,039,671	43,651,027
Average Daily Trips to Attraction Areas							
Origin	Mall	George-town	Capitol Area	Monument	Downtown	White House Area	TOTAL
Blue/Orange Line	34,509	12,827	13,121	6,316	2,905	1,630	71,308
Yellow/Green Line	6,660	2,530	2,619	1,207	584	321	13,921
Red Line East	4,572	1,860	1,798	829	401	220	9,680
Red Line West	11,585	4,260	4,331	2,130	994	542	23,842
Convention Center	1,776	675	800	369	156	98	3,873
Circulator Area Hotels	1,365	838	1,324	283	193	45	4,049
TOTAL	60,468	22,990	23,993	11,134	5,233	2,855	126,673

Table 3-8: Estimated Average Daily Circulator Market for Access Trips

	Mall	George-town	Capitol Area	Monument	Downtown	White House Area	TOTAL
Blue/Orange Line	-	12,827	-	6,316	-	1,630	20,773
Yellow/Green Line	6,660	2,530	2,619	1,207	-	321	13,337
Red Line East	4,572	1,860	1,798	829	-	220	9,279
Red Line West	11,585	4,260	4,331	2,130	-	542	22,848
Convention Center	1,776	675	800	369	156	98	3,873
Circulator Area Hotels	1,365	838	1,324	283	193	45	4,049
TOTAL	25,959	22,990	10,872	11,134	349	2,855	74,159

core. The Metropolitan Washington Council of Governments maintains estimates of employment in the region using a system of traffic analysis zones (TAZ's). Figure 3-2 shows the distribution of employment in the core area by zone. Each dot represents 50 employees. Note that the dots do not represent actual addresses of employment. Rather, employment in each zone is distributed evenly across the zone.

Trips to access employment in the core area are generally now made either by auto or by public transit (Metrorail and Metrobus). Typically, locations are considered accessible by public transit if they are within ¼ mile of a transit station or stop. Figure 3-2 also shows a shaded area illustrating areas within ¼ mile of a station entrance. The figure shows that Metrorail serves the vast majority of jobs in the core. The most significant exception is the area in the West End around the State Department. Although the circulator may be helpful for these employees, it appears unlikely that Metrorail users in general would find a need to use the circulator to access jobs in great numbers. Thus, trips to access core area employment do not appear to constitute a likely potential market for the circulator and are therefore not considered further.

Comparable data on downtown shopping and other destinations were not found. However, given the extensive Metrorail coverage in the area it also appears unlikely that shoppers would find a need to use the circulator to access their destinations from Metrorail.

3.1.6 Circulation Trips by Employees and Shoppers in the Core Area

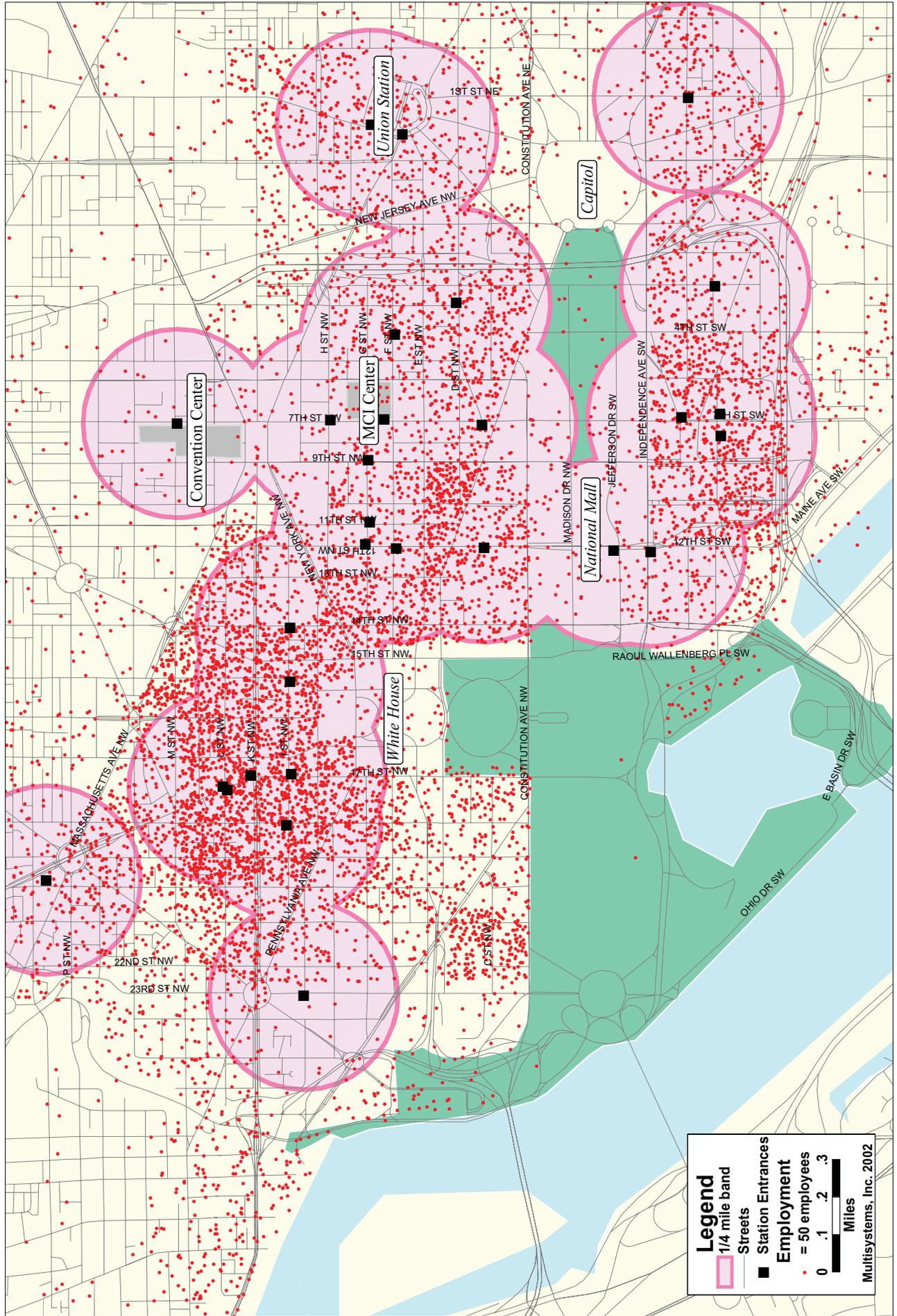
Once workers and shoppers arrive downtown, they may need to make short trips within the core area. For such short trips, a ¼ mile walk to *and* from downtown Metrorail station entrances, plus the time entering and exiting the stations, may be enough to discourage such short trips by Metrorail. Figure 3-3 again shows employment and Metrorail entrances, but with a smaller 1/8 mile shaded area around station entrances. Higher employment concentrations outside the shaded area could point to a market for downtown circulation trips on the circulator. Such areas include 14th Street and the FBI building downtown, the area northwest of Farragut Square, the area to the north and east of 16th and K Streets, the area west of the White House, and areas south of the Mall. Figure 3-4 shows the same 1/8 mile shaded area along with the locations of federal employees in the downtown.

Because no directly observed data on travel patterns within the core area were identified, estimates from the regional travel forecasting model were used to examine travel within the downtown area. Such regional model estimates tend to be more useful at a more regional level, but in the absence of directly observed data, they can approximate actual travel. They tend to be less accurate where there are a few large specialized travel generators, such as the museums on the Mall, but better at estimating travel among a large number of smaller employment sites and commercial attractions. A Year 2000 origin-destination trip table was obtained from the Metropolitan Washington Council of Governments and used to examine travel within the core area.

To estimate the current level of travel within the core that could be served by the circulator, traffic analysis zones in the core were grouped into 17 areas shown in Figure 3-5. These areas correspond closely to the hotel areas and to the five attraction areas discussed above. Year 2000 model estimates of daily trips among these areas are shown in Table 3-9.

To determine which of these trips realistically constitute a market for the circulator, two adjustments were made to the estimates in Table 3-9. These adjustments are shown in Appendix B. These adjustments assumed the circulator system proposed in Section 4. The

Figure 3-2: Core Area Employment Within 1/4 Mile of Metrorail



Legend

- 1/4 mile band
- Streets
- Station Entrances
- Employment
- = 50 employees
- 0 .1 .2 .3
- Miles

Multisystems, Inc. 2002

Figure 3-3: Core Area Employment Within 1/8 Mile of Metrorail

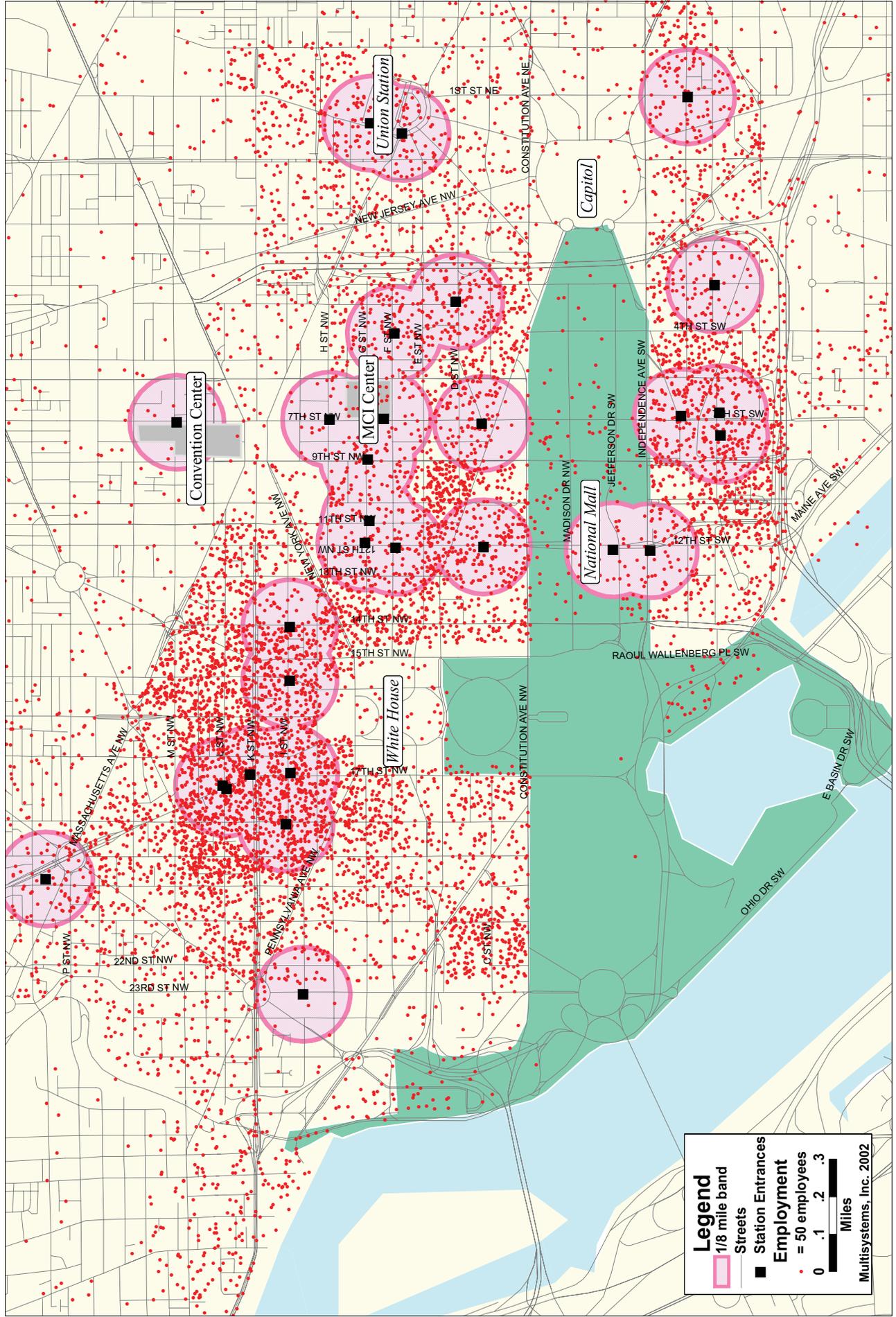


Figure 3-4: Core Area Federal Employment Within 1/8 Mile of Metrorail

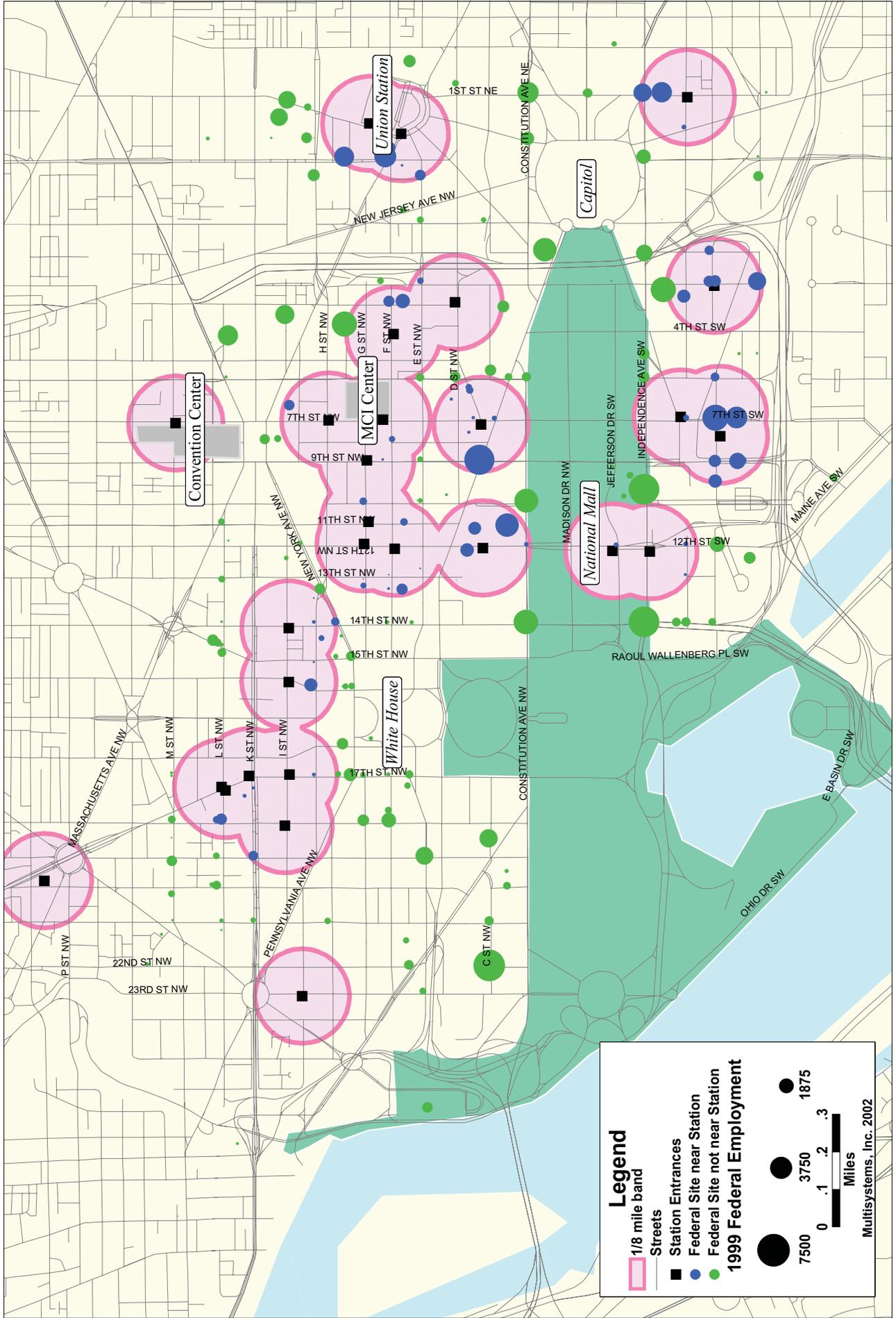


Figure 3-5: Analysis Areas

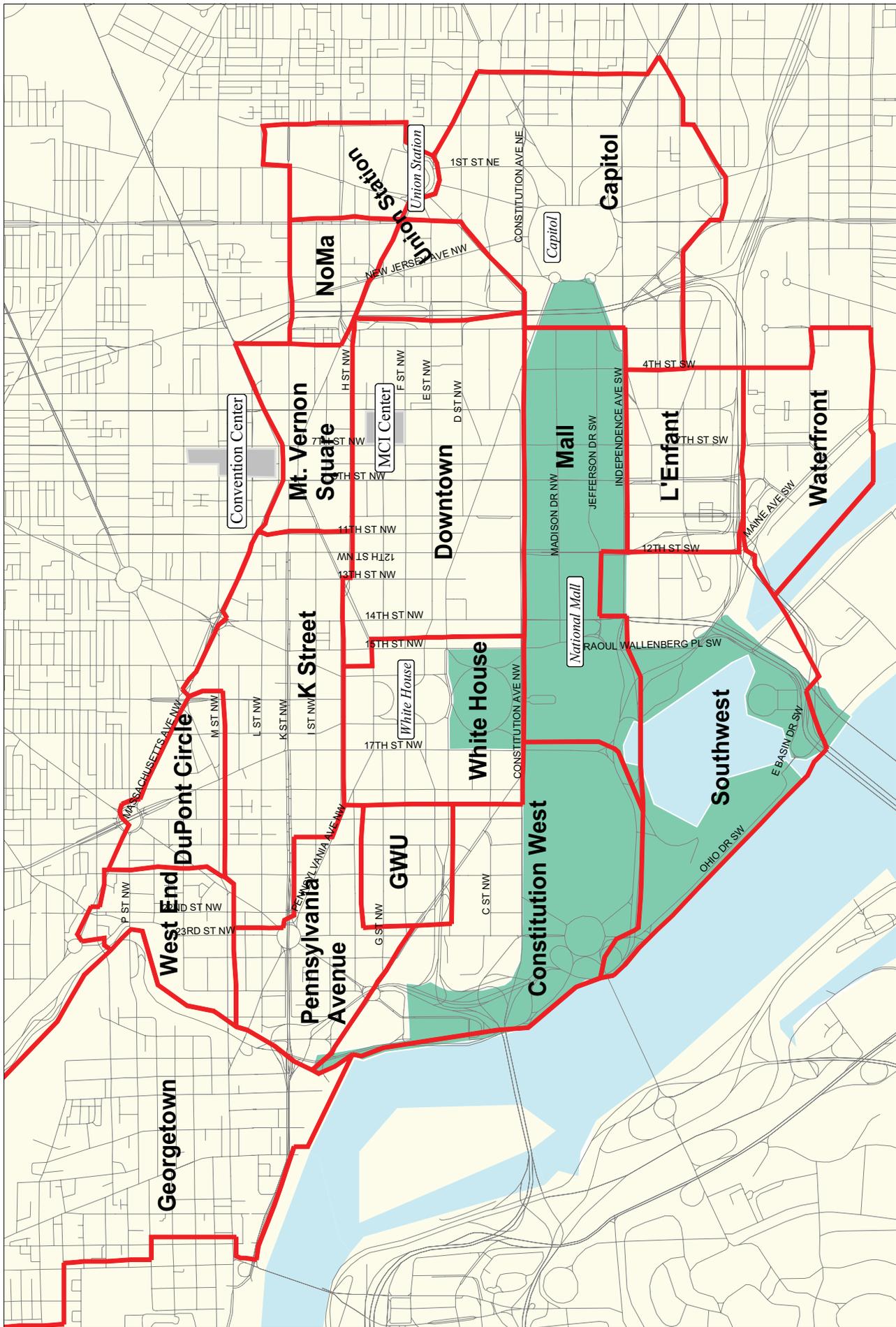


Table 3-9: Estimated Daily Trips Between Areas from COG Model

		Destination																	
		Downtown	Union Sta.	NoMa	Capitol	Mall	White House	Mt. Vernon	L'Enfant	Waterfront	Southwest	Const. West	GWU	Penn. Ave.	K Street	DuPont Circle	West End	Georgetown	TOTAL
Origin	Downtown	2,781	461	143	811	124	391	130	651	252	226	290	212	342	1,842	321	190	1,017	10,181
	Union Sta.	466	1,011	59	288	37	110	39	212	73	67	82	53	84	555	94	47	266	3,541
	NoMa	141	58	149	83	11	34	12	59	21	17	22	16	28	171	30	18	80	946
	Capitol	806	287	82	2,191	64	193	55	433	147	128	138	94	133	857	136	74	362	6,176
	Mall	124	36	12	67	35	29	6	58	19	18	22	16	25	136	24	13	66	703
	White House	390	106	36	193	29	630	28	161	59	63	97	71	124	609	105	63	336	3,096
	Mt. Vernon	129	40	13	55	11	27	62	52	17	14	22	15	23	158	24	15	71	745
	L'Enfant	664	210	60	434	59	168	52	1,181	143	118	134	88	129	764	126	72	378	4,777
	Waterfront	257	73	20	150	22	62	17	143	676	40	44	30	43	284	48	24	135	2,064
	Southwest	223	67	18	130	17	58	14	116	38	252	46	31	46	261	42	21	119	1,497
	Const. West	290	82	23	138	21	97	20	126	42	46	457	57	85	421	75	48	244	2,268
	GWU	207	53	15	92	15	72	17	84	29	33	58	254	64	314	53	35	182	1,574
	Penn. Ave.	342	85	27	132	22	117	22	123	43	47	88	64	426	582	100	64	328	2,608
	K Street	1,843	570	168	860	139	577	159	724	280	266	430	319	588	6,156	561	329	1,744	15,708
	DuPont Circle	315	89	31	136	24	103	22	120	44	42	72	58	100	549	559	61	307	2,629
	West End	190	48	16	74	16	60	16	70	25	23	49	34	65	332	60	266	201	1,542
	Georgetown	1,024	269	82	358	70	334	70	368	137	118	244	179	328	1,718	313	199	4,879	10,687
TOTAL	1,553	459	231	1,322	91	436	334	536	1,081	149	575	587	1,471	2,992	953	1,536	10,712	70,737	

first adjustment eliminates trips that are too short to use the circulator or are not likely to have a circulator connection. Trips within an area were also eliminated in most cases. Exceptions were made in several areas where the areas are large and circulator service is expected to be extensive. In these cases, only 50% of estimated trips were excluded. For trips between adjacent areas, 15% of estimated trips were excluded to represent trips that may be short enough to walk.

The second adjustment reduces the circulator market where there is direct Metrorail service. Where direct Metrorail service is available to most travelers between the areas, 50% of trips were excluded from the likely circulator market. Where direct Metrorail service is available to only some travelers between the areas, 25% of trips were excluded from the likely circulator market. The resulting estimated daily market for circulation trips on the circulator is shown in Table 3-10. The table shows a potential market of over 35,000 circulation trips in the core area.

3.1.7 Summary of Potential Circulator Markets

The potential markets for the circulator can be thought in terms of both access trips and circulation trips related to both area attractions and core area employment and commercial activity. The total estimated potential daily market in each category is as follows in Table 3-11.

Table 3-10: Estimated Daily Circulator Market for Trips Between Areas

		Destination																	
		Downtown	Union Sta.	NoMa	Capitol	Mall	White House	Mt. Vernon	L'Enfant	Waterfront	Southwest	Constitution West	GWU	Penn. Ave.	K Street	DuPont Circle	West End	Georgetown	TOTAL
Origin	Downtown	1,391	196	143	608	79	391	110	325	189	0	290	159	257	783	0	0	1,017	5,935
	Union Sta.	198	0	50	245	37	110	39	212	73	0	82	53	84	278	0	0	266	1,724
	NoMa	141	49	0	83	11	34	10	59	21	0	22	16	28	171	0	0	80	722
	Capitol	604	244	82	1,096	40	193	55	184	147	0	138	47	67	429	0	0	362	3,685
	Mall	79	36	12	42	18	25	6	37	19	0	22	12	18	102	0	0	66	492
	White House	390	106	36	193	25	315	28	161	59	0	82	60	105	517	0	0	336	2,412
	Mt. Vernon	109	40	11	55	11	27	0	52	17	0	22	15	23	134	0	0	71	585
	L'Enfant	332	210	60	184	37	168	52	0	91	0	134	44	65	382	0	0	378	2,135
	Waterfront	193	73	20	150	22	62	17	91	0	0	44	30	43	284	0	0	135	1,162
	Southwest	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Constitution West	290	82	23	138	21	82	20	126	42	0	229	48	85	0	0	0	0	1,183
	GWU	155	53	15	46	11	61	17	42	29	0	49	0	0	0	0	0	0	478
	Penn. Ave.	257	85	27	66	16	99	22	62	43	0	88	0	213	291	0	0	278	1,546
	K Street	783	285	168	430	104	490	135	362	280	0	0	0	294	2,309	0	0	1,744	7,382
	DuPont Circle	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	West End	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Georgetown	1,024	269	82	358	70	334	70	368	137	0	0	0	278	1,718	0	0	1,220	5,926
TOTAL	1,157	330	172	837	73	367	251	368	528	0	248	140	875	1,806	0	0	5,951	35,368	

Table 3-11: Summary of All Potential Circulator Markets

Access to/from Attractions ²³	148,318
Circulation among Attractions	45,336
Access to/from Employment/Shopping	0
Circulation of Employees and Shoppers	35,368

²³ This figure is twice the figure in Table 3-8 since it reflects one-way trips rather than round trips.

The likely share of each market that could be captured by the circulator will vary substantially by market and within each market. The circulator is unlikely to capture a large share of access trips to attractions from Metrorail lines, but the market is large. A larger share of access trips from hotels could be captured, but these represent a small share of access trips. Circulation trips are more likely to make use of the circulator, particularly those between attractions and those within the primary circulator service area.

3.2 Review of Circulators in Other Cities

In order to gain insights into the potential market and develop an operations plan for a downtown circulator in Washington, DC, Multisystems contacted nine operators of U.S. downtown circulator systems. Discussions were held by telephone with some contact by e-mail.

Representatives of the following services were contacted:

- Austin, TX ('Dillo routes)
- Chattanooga, TN (Downtown Electric Shuttle)
- Dallas, TX (M-Line Trolley Bus)
- Denver, CO (Cultural Connections Trolley and 16th Street Mall Shuttle)
- Los Angeles, CA (Downtown DASH routes)
- Miami Beach, FL (Electrowave)
- Milwaukee, WI (Milwaukee County Transit Trolley)
- Oklahoma City, OK (Oklahoma Spirit Trolley)
- Orlando, FL (Lynx Lymmo)

A basic description of each of these downtown circulators is given in Table 3-12. Table 3-13 summarizes various characteristics of the circulator services. The remainder of this section summarizes the findings of the review using the following categories.

- Routes and Physical Elements
- Service Elements
- Fare Structure
- Vehicles
- Public Information
- Capital and Operating Costs

3.2.1 Routes and Physical Elements

The number of circulator routes varied among the cities. Four of the nine cities have only one downtown circulator route. Miami Beach has two. Milwaukee has three. Austin has five, while Los Angeles and Oklahoma City each have six. The circulator routes tend to be relatively short in distance. All of the routes are less than 8.5 miles round trip and most are around 3 miles round trip. The routes serve a number of different attractions in the downtown area, including government office buildings, hotels, cultural attractions, restaurants, and major shopping areas. In cities with multiple circulator routes, different routes may have different purposes. For example, one or two of the routes may be geared towards tourists and the other routes may focus on downtown office workers.

In all cases, the circulator service has its own signage and, in four cases, unique shelters that distinguish it from the other transit services in the downtown area. In Oklahoma City, major stops have unique shelters that have been designed to fit in with the surrounding environment

Table 3-12: Examples of Cities with Downtown Circulators

City	Name of Service	Operating or Funding Agency	Characteristics
Austin, TX	"Dillo" routes	Capital Metropolitan Transportation Authority	Historic reproductions of trolley cars provide circulator service to downtown Austin, the Capitol Complex, University of Texas campus, and free Park and Ride lots. The service consists of 5 routes and is offered free of charge. The Dillo routes serve a number of destinations, including shops, restaurants, the convention center, major employers, and tourist attractions.
Chattanooga, TN	Downtown Electric Shuttle	CARTA	The Downtown Electric Shuttle in Chattanooga has played a key role in the downtown area's redevelopment. It operates 7 days a week with a 5 minute headway and is free to riders. The service is provided with low-floor, electric vehicles and the operating costs are partially subsidized with parking revenues.
Dallas, TX	M-Line Trolley Bus	DART	DART operates a downtown circulator, the M-Line shuttle trolley bus, that serves the heart of the downtown area. The service operates 7 days a week and the fare is the same as other DART buses (\$1.00). In addition to major attractions in the downtown area, the shuttle also provides connecting service to the McKinney Ave. trolley station.
Denver, CO	Cultural Connections Trolley and 16th Street Mall Shuttle	RTD	RTD initially operated the Cultural Connections Trolley, which was primarily geared towards tourist attractions. Because the service did not produce adequate ridership, it is now being contracted to a private company. However, Denver does operate a circulator on the 16th Street Mall, which is provided free of charge and operates in its own right-of-way. It is RTD's best-performing route.
Los Angeles, CA	DASH	Los Angeles DOT	Los Angeles's DASH service operates seven circulator routes in the downtown area. Fares are \$0.25 and service is provided every 5 to 10 minutes on weekdays. On weekends, three of the routes operate, with a 15 to 20 minute headway. The circulators serve a number of destinations, including cultural attractions, city hall, the courthouse, restaurants, and employer sites.
Miami Beach, FL	Electrowave	Miami Beach Transportation Management Association	The ELECTROWAVE shuttles serve the heart of South Beach on Washington Avenue and Collins Avenue. The service enables tourists, residents, visitors, and local employees/employers to get around South Beach for only \$0.25. The service is provided with electric vehicles that are wrapped in art work by various local artists.
Milwaukee, WI	Milwaukee County Transit Trolley	Milwaukee County Transit System	The MCTS Trolley serves the major events and attractions in downtown Milwaukee. The service consists of four routes (Lake Route, River Route, Valley Route, and Walker's Point extension). Trolleys run on 10 to 12 minute headways and the fare is \$0.50 per one-way trip. Hours of operation vary among the routes.
Oklahoma City, OK	Oklahoma Spirit Trolley Service	COPTA	The Oklahoma Spirit trolley service, connects the Downtown/Bricktown area and the I-40/Meridian hotel and restaurant district. The trolleys provide shuttle service seven days a week. There are 6 lines (red, blue, green, brown, orange, and yellow) that serve a number of major destinations, such as hotels, major employers, universities, tourist locations, and restaurants. The fare varies on the different lines.
Orlando, FL	LYMMO	LYNX	Lynx's LYMMO service provides transportation for employees and visitors in downtown Orlando. The service is provided with low-floor buses decorated with whimsical designs. During office hours, LYMMO operates every 5 minutes. After hours and on weekends, the service operates on a 10 to 15 minute headway. LYMMO has its own lane and controls its own traffic signals in order to ensure that it is never slowed down by traffic. The service is free to riders.

Downtown Circulator Implementation Plan

Table 3-13: Downtown Circulator Characteristics

City	Service	Number of Routes	Roundtrip Length (miles)	Connecting modes / services	Span of Service	Peak Headway	Off-Peak Headway	Dedicated Right-of-Way?	Fare Structure	Annual Ridership
Austin	Dillo Service	5	3.5-8.5	Local buses	M-F 6:30am-8:30pm; Sat. 7am-6:30pm; Sun. 9am-6:30pm; Varies by route	8-10 minutes commuter; 20-30 minutes tourist	8-10 minutes commuter; 20-30 minutes tourist	No	Free	1,118,523
Chattanooga	Downtown Electric Shuttle	1	3	Local and express buses; parking	M-F 6am-9:30pm; Sat. 9am-9:30pm; Sun. 9am-8:30pm	5 minutes	5 minutes	No	Free	900,000
Dallas	M-Line Trolley Bus	1	2	Streetcar; light rail	M-F 7:30am-10pm; Sat. 10:30am-10:30pm; Sun. 12:30pm-10pm	15 minutes	30 minutes	No	\$0.50; No free transfers; Integrated with other services	125,000
Denver	16th Street Mall Shuttle	1	2.8	Local and express buses; light rail, Amtrak	M-F 5am-1:35am; Sat. 5:30am-1:35am; Sun. 7am-1:35am	4-8 minutes	15-30 minutes	Yes	Free	16,700,000
Los Angeles	Downtown DASH routes	6	3-7	Local and express buses; heavy rail; Amtrak, commuter rail	M-F 6am-7pm; Sat. 6:30am-5pm; Sun. 10am-5pm; Varies by route	5-12 minutes	5-12 min.; 20 min. Downtown (weekends)	No	\$0.25; One free transfer; MTA passes accepted; Single-ride tickets and monthly passes	500,000
Miami Beach	Electrowave	2	1.5-3	Local and express buses	M-Sat 8am-1am; Sun. 10am-1am	10-12 minutes	10-12 minutes	No	\$0.25; Seniors and disabled free; May pay with parking meter debit card; Museum and hotel patron passes	700,000
Milwaukee	Milwaukee County Transit Trolley	3	5	Local and express buses	M-Th 6:30am-10pm; F 6:30am-midnight; Sat. 10am-midnight; Sun. 10am-6pm;	10-20 minutes	10-20 minutes	No	\$0.50; \$0.25 for seniors and disabled; Free transfers from local and express routes	500,000
Oklahoma City	Oklahoma Spirit Trolley	6		Parking	M-Sat 7am-11pm; Sun. 7am-6:30pm; Varies by route	10-20 minutes; 60 minutes on tourist route	10-25 minutes; 60 minutes tourist route	No	\$0.25-\$0.50; \$0.10-\$0.25 for seniors and disabled; 3-day pass available for \$2	
Orlando	Lymmo	1	2.7	Parking	M-Th 6am-10pm; F 6am-midnight; Sat. 10am-midnight; Sun. 10am-10pm	5 minutes	10-15 minutes	Yes	Free	

Table 3-13: Downtown Circulator Characteristics (cont.)

City	Service	Type of Vehicle	Type of Fuel	Vehicle Seating Configuration	Facilities at stops	Cost per Vehicle	Capital Funding Sources	Operating Cost / Revenue Vehicle Hour	Operating Funding Sources
Austin	Dillo Service	Trolley	Diesel	Perimeter and forward-facing	Distinctive signs that are a different color and have an armadillo icon.	\$269,000	Local funding	\$62 (weekday) / \$45 (weekend)	Sales tax, investment income, other local revenue sources
Chattanooga	Downtown Electric Shuttle	Low-floor bus	Electric	Perimeter	Simple shelters	\$200,000	FTA; State DOT; Local MPO		Parking revenues
Dallas	M-Line Trolley Bus	Trolley	CNG	Perimeter and forward-facing	Posts with trolley decal and "Guide-a-Ride"	\$300,000	80% FTA; 20% local	\$64	10% fares; Sales tax revenue (DART portion); Downtown Improvement District
Denver	16th Street Mall Shuttle	Low-floor bus	Electric/CNG hybrid	Perimeter	Stations at end of route	\$450,000	FTA; local funding	\$51	RTD general funding (sales tax funds)
Los Angeles	Downtown DASH routes	Low-floor bus	Propane	Perimeter	Posts with DASH symbol; Eye-level information	\$260,000	LADOT	\$47	12-13% fares; Remainder sales tax revenue
Miami Beach	Electrowave	Low-floor bus	Electric	Perimeter	Posts with Electrowave sign	\$212,000	FTA; State DOT; Toll revenues	\$32	60% city; 20% State DOT; 15% concurrency funds; Remainder fares, grants, and advertising revenue
Milwaukee	Milwaukee County Transit Trolley	Trolley	Diesel	Perimeter and forward-facing	Eye-level signs showing routes and schedules	\$250,000	80% FTA; 20% local	\$72	80% CMAQ grant; 10% fares; Local casino and BID contribute funds
Oklahoma City	Oklahoma Spirit Trolley	Trolley	Diesel	Perimeter and forward-facing	Some stops have specially designed shelters	\$270,000	Sales tax	\$38	4% fares; 18% federal funding; Remainder local; Area attractions contribute some funding
Orlando	Lymmo	Low-floor bus	CNG	Perimeter seating and lean bars	Stations have unique shelters		FTA; State DOT, Local match		Downtown property tax; Parking revenues

(for example, in Bricktown, the shelter has a brick façade). Chattanooga and Orlando also designed unique shelters that would distinguish their circulators from other transit services. Denver's 16th Street Mall Shuttle connects two state-of-the-art inter-modal transit stations that include dynamic signage directing riders to their bus bays.

Most of the circulator services do not have exclusive bus lanes or traffic signal priority. The exceptions to this are Lynx's Lymmo service, which operates in its own right-of-way and has signal priority, and Denver's 16th Street Mall Shuttle, which operates in a pedestrian mall. Vehicles on Los Angeles's downtown DASH service are also equipped with transponders that give them some level of control over traffic signals.

3.2.2 Service Elements

During the week, services generally start early in the morning (between 5am and 7am) and run until at least 7pm. Seven of the nine cities operate their circulators until after 9pm on weekdays, and two of the cities (*Denver, Miami Beach*) operate after midnight.

All of the cities provide at least some service on weekends, although this service may be only a subset of the routes operated during the week. Weekend services start later in the morning than weekday service and may run until later in the evening. Four of the cities (*Denver, Orlando, Miami Beach, Milwaukee*) operate weekend services until or past midnight. Los Angeles operates only two of its regular DASH routes on weekends and adds a separate Downtown Discovery tourist route.

Two of the cities change their service levels seasonally. Milwaukee cuts back on service during non-summer months since demand is lower during this time. During the summer, the circulator has two extensions to popular attractions. During the remainder of the year, these extensions are not operated and the service frequency is lower. Oklahoma City's tourist route operates only from June through September.

The circulators typically experience three peaks in ridership: morning, lunchtime, and evening. Five of the cities (*Chattanooga, Miami Beach, Milwaukee, Los Angeles, Austin*) do not vary the headways on their circulators throughout the day. The remaining cities have more frequent service during the AM peak, lunchtime, and the PM peak. Three of the cities (*Austin, Los Angeles, Oklahoma City*) have longer headways on their tourist-oriented routes than their routes that serve downtown workers.

During peak hours, five of the cities (*Chattanooga, Denver, Orlando, Austin, Los Angeles*) provide service with headways less than 10 minutes. Three cities (*Miami Beach, Milwaukee, Oklahoma City*) offer peak headways of 10-20 minutes. Dallas has a 15-minute peak headway.

During off-peak hours, three of the cities (*Chattanooga, Austin, Los Angeles*) provide service with headways less than 10 minutes. Four of the remaining cities (*Orlando, Miami Beach, Milwaukee, Oklahoma City*) have off-peak headways ranging from 10 to 20 minutes. Denver and Dallas have off-peak headways as high as 30 minutes on their circulators.

Most of the agencies reported that their ridership is a mix of downtown workers, conventioners, residents, and visitors. Agencies believe that different service characteristics are important to different market segments. According to the interviewees, the most important service characteristics for attracting downtown workers are shown in Table 3-14.

Table 3-14: Important Service Characteristics for Each Market

Downtown Workers	Tourists and Visitors
<p>Most Important</p> <ul style="list-style-type: none"> ▪ Frequency ▪ Directness of service ▪ Travel time ▪ Reliability ▪ Simple schedule 	<p>Most Important</p> <ul style="list-style-type: none"> ▪ Information/signage ▪ Uniqueness of the vehicles ▪ Serve tourist attractions
<p>Also Important</p> <ul style="list-style-type: none"> ▪ Cleanliness ▪ Low Fare ▪ Perimeter seating 	<p>Also Important</p> <ul style="list-style-type: none"> ▪ Friendliness of drivers ▪ Knowledgeable drivers ▪ Availability of a day pass

3.2.3 Fare Structure

The fare on these services is generally lower than that on other services in the city. Four of the cities (*Austin, Chattanooga, Denver, Orlando*) do not charge a fare on their circulator services. Fares in the remaining cities are as follows:

- Dallas: \$0.50 (regular fares are \$1.00)
- Los Angeles: \$0.25 (same on all DASH routes)
- Miami Beach: \$0.25
- Milwaukee: \$0.50; \$0.25 for seniors/disabled (regular cash fare is \$1.50)
- Oklahoma City: \$0.25 for downtown; \$0.50 if travels outside of downtown zone. (regular cash fare is \$1.10)

Passes for the circulator services are only an issue for the five systems that charge a fare. In Oklahoma City, riders can purchase a 3-day magnetic stripe pass for \$2, which gives them unlimited use of the trolley service. These passes cannot be used on the regular fixed-route system. Other interviewees acknowledged that having such a pass would make the service more attractive to visitors. In Los Angeles, riders can purchase a monthly pass from LA DOT that can be used on all DASH services. Miami Beach is currently working on a program to provide free unlimited-ride passes to hotel patrons and partners with the Convention & Visitors Bureau to provide a \$10 museum pass. This pass allows holders to access five area museums and ride the Electrowave for free.

Of the five cities that do not provide free service, three (*Dallas, Milwaukee, Los Angeles*) have integrated their fare structure with that of other transit services. These systems allow riders to board for free with passes from other services/systems. In Milwaukee, riders who have a pass from the fixed route system can board the trolley for free. MTA riders in Los Angeles can use their monthly passes on the DASH service. However, DASH does not accept passes from any of the other operators in Los Angeles. Los Angeles is in the process of implementing a regional smart card system, and once this is completed the smart cards will be accepted on the DASH routes. The M-Line trolley bus in Dallas is part of the DART system, so regular passes can be used on the downtown circulator. While Oklahoma City has not integrated the fare structure on

the trolley service with other local transit services, patrons of their parking facilities can ride the trolleys for free by showing their parking ticket.

3.2.4 Vehicles

All interviewees pointed to the importance of having unique-looking vehicles. While four of the agencies (*Austin, Dallas, Milwaukee, Oklahoma City*) have opted for the “retro” look provided by trolleys (which are primarily diesel-fueled), the remainder have gone with CNG, electric, or hybrid low-floor buses that have a more innovative look. In general, having comfortable seating on the vehicles was seen as an important factor in attracting riders. Three of the circulator services (*Chattanooga, Miami Beach, Los Angeles*) have vehicles with perimeter seating only, while the others have a combination of perimeter and forward-facing seats. The agencies with perimeter seating thought it was desirable because it provides space for more standees and allows people to easily communicate with each other.

It is important to purchase vehicles with large, clear windows. In this way, people on the street can see that other people are actually using the service and the people in the bus can clearly see the attractions along the route. Also, a unique vehicle type can be important in attracting riders.

3.2.5 Public Information

All interviewees pointed to the importance of providing the public with adequate information about the service – particularly at stops along the routes. Oklahoma City has produced pocket-size guides to its trolley service that are easy for downtown workers and visitors to carry around with them. Five of the nine cities (*Chattanooga, Dallas, Miami Beach, Milwaukee, Los Angeles*) mentioned having eye-level information at circulator stations and stops.

Only two of the circulator services (*Orlando and Oklahoma City*) provide real-time wayside information for riders; however, many of the interviewees thought this would be a desirable addition to service.

3.2.6 Capital and Operating Costs

Vehicle costs range from \$200,000 to \$300,000 each. Only two of the nine cities did not receive funding from the FTA for the purchase of their circulator vehicles. Los Angeles and Oklahoma City paid for their vehicles entirely with local funding. Costs for shelters depend on the size and level of customization and range from \$18,000 (Chattanooga) to \$55,000 (Oklahoma City) each. Agencies that don’t have shelters along their trolley routes typically use an information post with eye-level information, at a unit cost of around \$100.

Operating costs range from \$32/revenue vehicle hour to \$72/revenue vehicle hour. Interviewees indicated that operating costs are not significantly different from traditional transit services.

There are many different sources for operating funds:

- Fares (for services that are not free) generally cover between 5% and 15%.
- CMAQ grant (Milwaukee)
- Downtown BID
- Parking fees
- Downtown property owners tax
- Sales tax
- Local funding (city)
- Concurrency funds (impact fees on local development)

- Museums and other cultural attractions
- Advertising revenues
- Convention and Visitors Bureaus
- Other private entities, such as shopping malls and casinos

3.2.7 Service Design Strategies to Target Circulator Markets

The findings from the review of other circulators lead to several conclusions that are informative in the design and implementation of a circulator for Washington, DC.

Routes and Physical Elements

While several cities operate just a single circulator route, just over half of those interviewed operate multiple routes. Los Angeles, in fact, has six downtown circulator routes. Washington's plan for four routes seems consistent with what other cities have done. Most circulator routes identified are around three miles in length for a round trip. None were found over 8.5 miles. Direct, fast, and reliable service was noted by operators as an important factor in attracting the downtown worker market. The proposed Washington routes, at 4.2 to 9.2 miles round trip are at the high end of the range, with the K Street route, at 9.2 miles round trip, longer than any other circulator examined. With routes this length, it becomes more difficult to maintain consistent intervals between buses, which can jeopardize the reliability that was noted as a key service characteristic for this type of service. The construction of the busway along K Street should allow reliable service to be provided in the corridor.

Most of the services identified serve a variety of functions, carrying downtown workers, shopping and entertainment trips, and visitors. Those with multiple routes often have one or two-tourist-oriented routes with other routes following the travel patterns of downtown workers. The routes in Washington's proposed system would also have a mix of trip purposes that varies from route to route. In several cities, the circulator functions as a distributor service for downtown parking facilities, and to some extent for commuter transit services. The proposed Washington circulator differs from these in that it is more oriented to circulation within the Monumental Core and downtown, and to providing and access to visitor attractions, than it is to serving commuter trips. In Washington, most commuter trips can be served adequately by Metrorail and Metrobus.

Service Elements

Most of the circulators typically operate from around 6 or 7 a.m. to at least 9 p.m. This reflects the commuter orientation of most circulators in the morning and the dinner and downtown evening entertainment market at the end of the service day. Several services operate past midnight on weekends. All provide at least some weekend service. The lower expectation for commuter ridership in Washington needs to be considered in selecting an appropriate morning start time and service levels. Evening service should be considered, but the early closing of Mall attractions, late closing of the monuments, and varied closing hours for downtown entertainment venues will have to be taken into account.

Frequent service was noted as an important service characteristic, especially for the downtown worker market. Several circulators offer peak service every 5 minutes and the majority operate at least every ten minutes. In off-peak periods, only three have at least one route operating more frequently than every 10 minutes, while the majority run at least every 20 minutes. In several cases, tourist oriented routes are operated less frequently than downtown worker-oriented routes.

Washington's proposed service level of every five minutes at most times is better than most circulator services examined.

Most circulators experience three peak periods, morning rush, lunch, and afternoon rush. Thus it is important to provide adequate mid-day service. Washington circulator service should be carefully designed to accommodate expected peak travel flows for the markets being served.

Fare

Four of the nine circulator services studied are provided free of charge. The remainder charge much less than a regular transit trip (the highest is \$0.50). Three of the five charging a fare accept regular transit passes. Thus, in most cases, the circulator offers a nearly seamless transfer for regular transit users. For tourists, only one of the five systems charging a fare offers a short-duration pass, although one is developing a program to provide passes to hotel patrons and to include free use of the circulator to holders of a new museum pass. Washington would be different from all other cities if it charges more than a nominal fare or does not accept Metro passes. Washington could consider an arrangement to provide passes to hotel patrons, however, arrangements that tie passes to admissions to attractions offer less promise since most major attractions in Washington are free of charge.

Vehicles

All interviewees pointed to the importance of having unique-looking vehicles, especially in attracting the visitor market. Some have opted for the unique look of diesel-powered trolleys while the remainder have gone with CNG, electric, or hybrid low-floor buses that have a more innovative look. None use diesel conventional buses. Washington should identify a unique look for its vehicles that is appropriate for the type of service and the historical, monumental Washington DC environment. Alternative fuel vehicles can be used and have been proven successful for other downtown circulators.

Service Identity / Public Information

All interviewees pointed to the importance of providing the public with adequate information about the service – particularly at stops along the routes. In all cases, the circulator service has its own signage, but only four of the nine cities have unique shelters that distinguish it from the other transit services in the downtown area. The Washington circulator should be implemented with adequate information on the street, as well as in Metrorail stations, parking facilities, hotels, visitor attractions, and in tourist guides.

4 Operations Plan

This Operations Plan for the Downtown Circulator presents the proposed design of the Circulator service, including routes, stops, and running way elements, as well as travel times and service levels. It also presents the estimated resources required and the estimated ridership and impacts of the service. Finally, plans for the phasing in of the service and evaluation of the effectiveness of the service are presented.

4.1 Service Design

This section presents the proposed circulator routes and services.

4.1.1 Routes and Physical Elements

This Implementation Plan covers four routes proposed for implementation. This section presents the proposed routes, including the locations of all Circulator bus stops, followed by a discussion of routing options that were considered and rejected as part of the service design process.

Finally, other physical elements, such as shelters, and possible running way improvements are discussed.

The market analysis determined that a very large market exists for visitor travel. The market for travel by downtown workers and shoppers is significant, but smaller than the visitor market. This directed the initial implementation recommendations toward routes that would serve visitors and routes that would serve a mixture of visitors and downtown workers. The need for short, direct routes emphasized by other circulator operators, along with cost concerns, kept the proposed route design simple and led to the rejection of several routing changes that were considered.

Routes and Stops

The four routes proposed for implementation are shown in Figure 4-1 and Figure 4-2. The four routes, and the areas they serve, are:

- **White House-Capitol Route** – serves the White House, Foggy Bottom, the State Department area, Federal Triangle, the National Mall, the Capitol, Union Station, and downtown
- **Monuments Route** – serves the Washington, Jefferson, Roosevelt, Korean War, Lincoln, Vietnam Veterans, and World War II Memorials and connects them to Metrorail and the White-House Capitol Route.
- **North-South Route** – serves the new convention center, the downtown area, the National Mall, the L’Enfant Plaza area, and the Southwest Waterfront.
- **K Street Route** – serves Union Station, the new convention center, K Street, and Georgetown.

The exact alignment followed by each route is outlined below and shown in Figures 4-3 through 4-10.

The White House-Capitol Loop will run both clockwise and counter-clockwise. There are two alternatives being considered. Between 15th Street and 23rd Street, Alternative A would use Pennsylvania Avenue, whereas Alternative B would use E Street. Starting at Jefferson Drive and 12th Street in a counter-clockwise direction, Alternative A would run:

- east on Jefferson Drive SW;
- right onto 7th Street SW (southbound);
- left onto Independence Avenue SW (eastbound);
- left onto 1st Street (northbound) SE;
- right onto Massachusetts NE (eastbound);
- into Union Station drop-off area;
- right onto Massachusetts NE (westbound);
- left onto E Street NE (westbound);
- right onto 3rd Street NW (northbound)
- left onto F Street NW (westbound);²⁴
- right onto 15th Street NW (northbound);
- left onto Pennsylvania Avenue NW (westbound);
- left onto 21st Street NW (southbound);
- right onto Eye Street NW (westbound);
- left onto 23rd Street NW (southbound);
- left onto Constitution NW (eastbound);
- right onto 14th Street NW (southbound);
- left onto Jefferson Drive SW (eastbound).

Alternative B would be identical to Alternative A until F Street. With the segment that differs from Alternative A shown in italics, Alternative B would run:

- east on Jefferson Drive SW;
- right onto 7th Street SW (southbound);
- left onto Independence Avenue SW (eastbound);
- left onto 1st Street (northbound) SE;
- right onto Massachusetts NE (eastbound);
- into Union Station drop-off area;
- right onto Massachusetts NE (westbound);
- left onto E Street NE (westbound);
- right onto 3rd Street NW (northbound)
- left onto F Street NW (westbound);²⁵
- *left onto 13th Street NW (southbound);*
- *right onto Pennsylvania Avenue South NW (westbound);*
- *straight onto E Street NW (westbound);*

²⁴ An option is also being considered that would turn left from F Street (westbound) onto 13th Street (southbound), right on Pennsylvania Avenue South (westbound), right onto 15th Street (northbound), and continue as above.

²⁵ An option is also being considered that would continue on F Street (westbound), turn left onto 15th Street (southbound), right on E Street (westbound), and continue as above.

Figure 4-1: Circulator Routes Alternative A

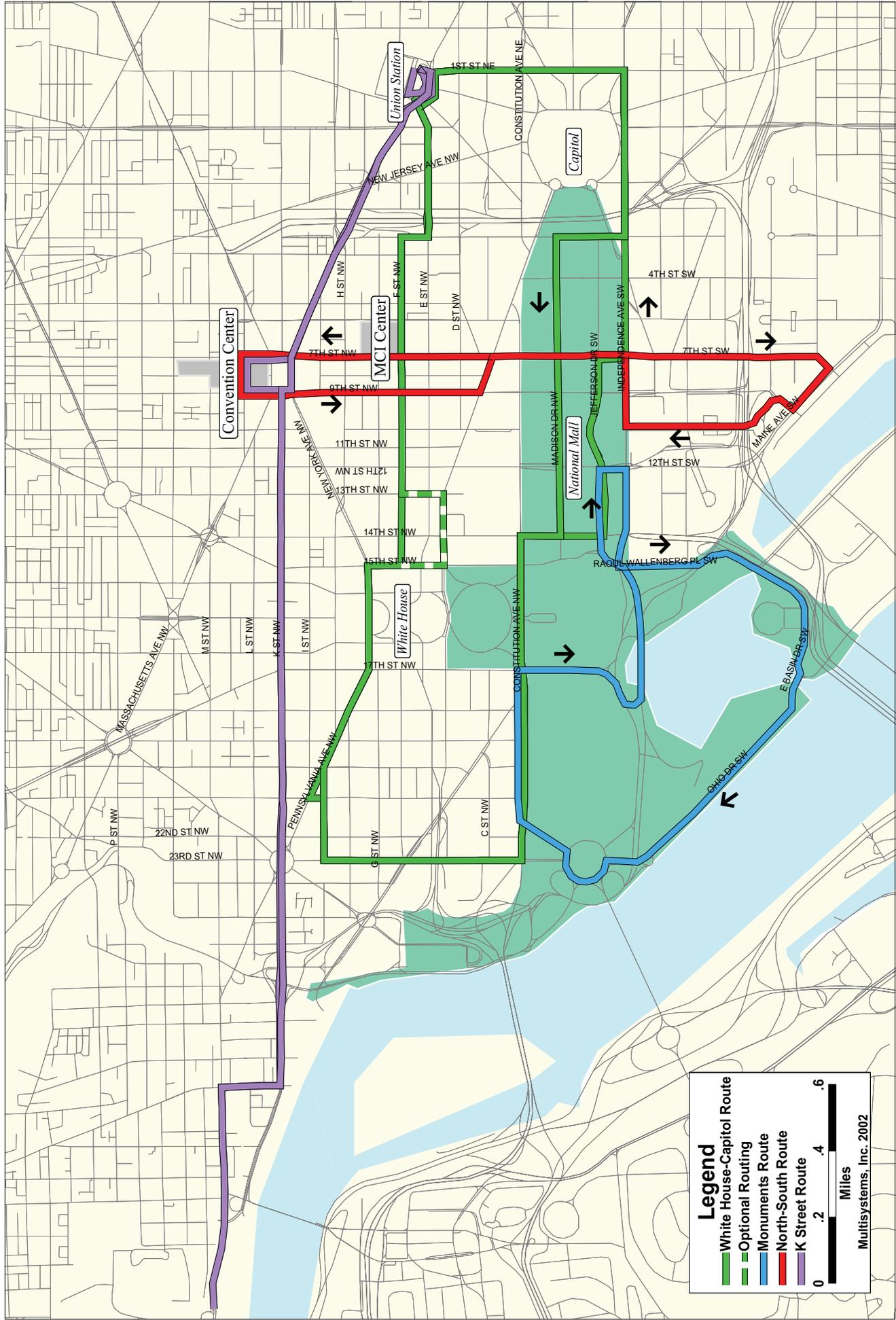
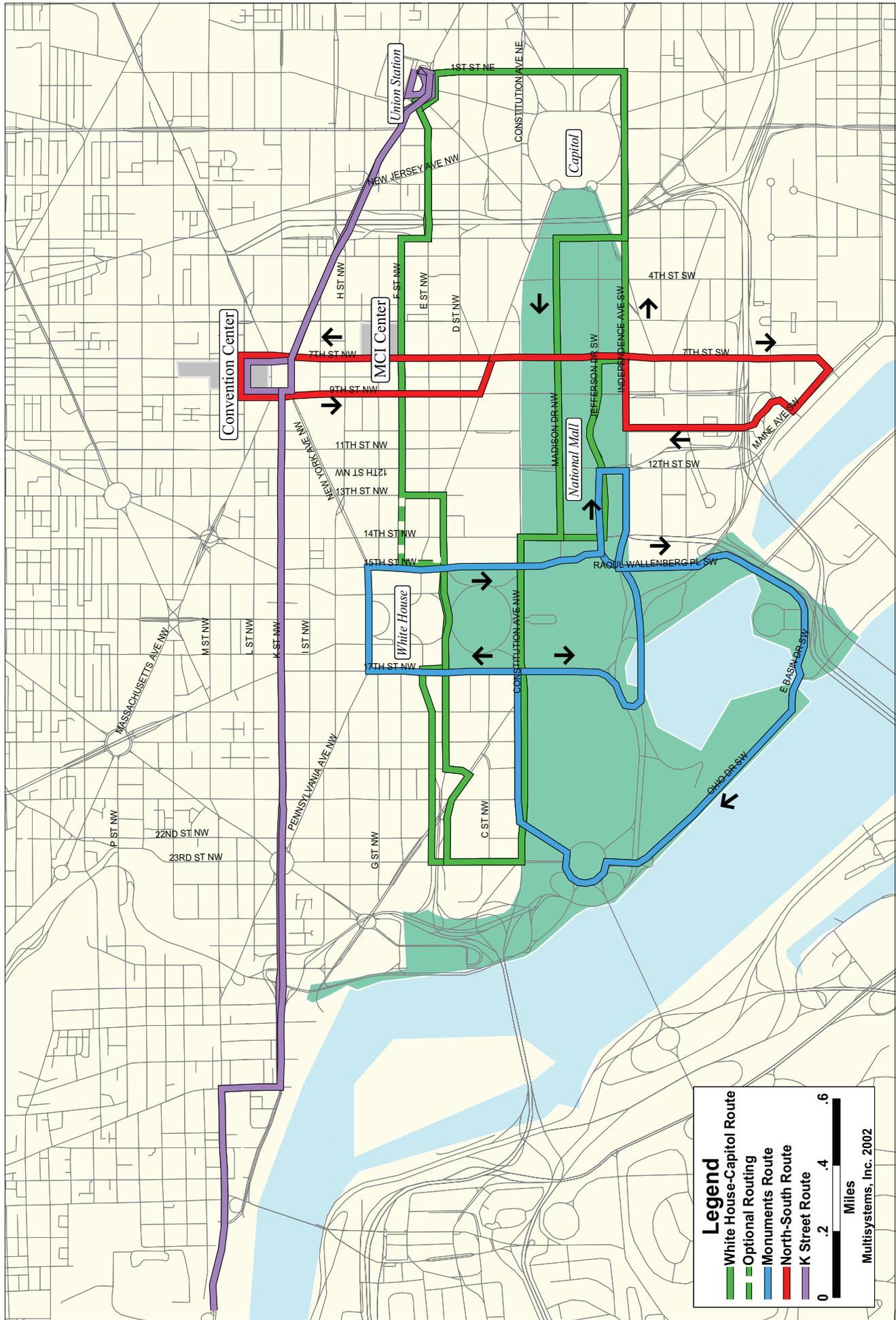


Figure 4-2: Circulator Routes Alternative B

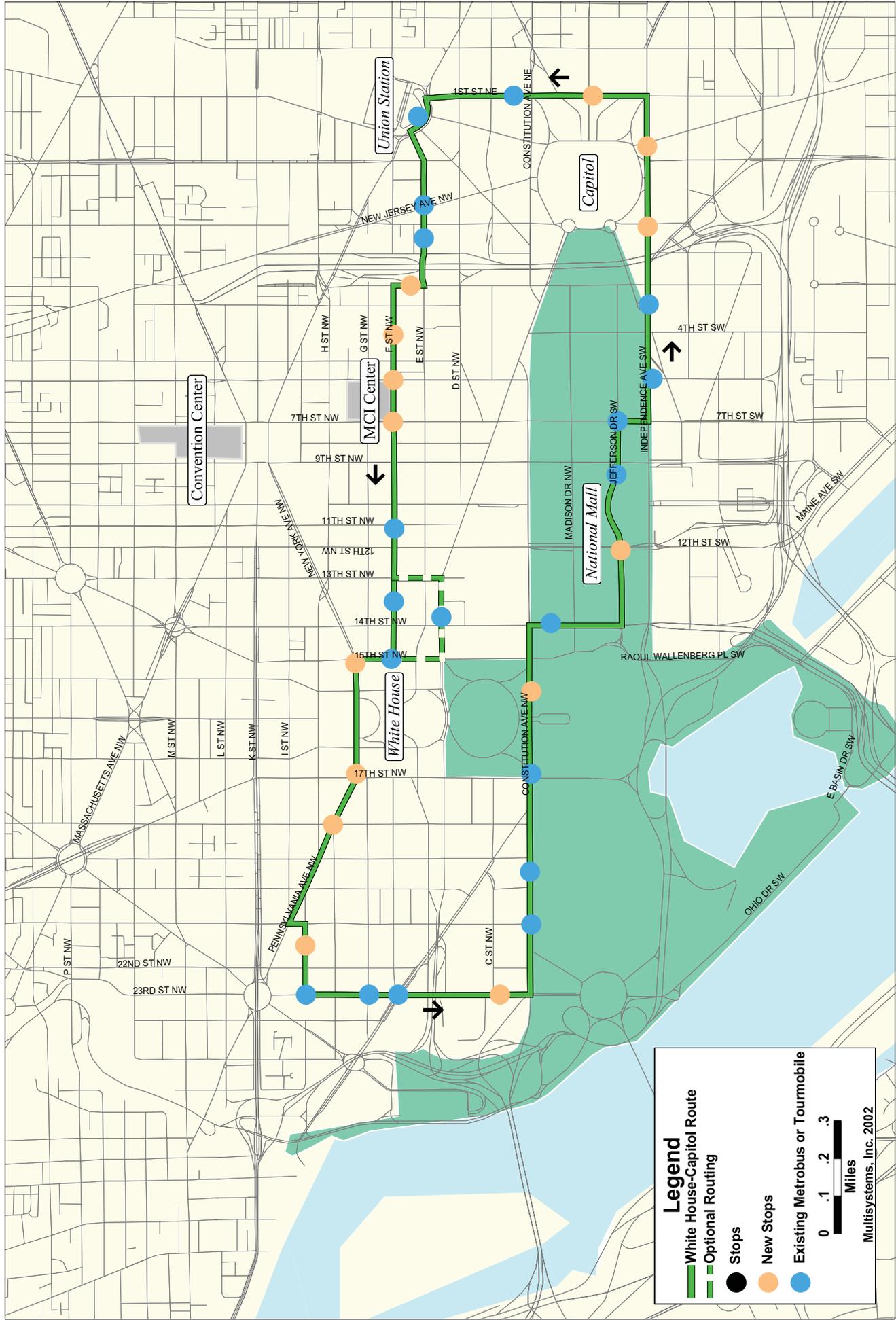


Legend

- White House-Capitol Route
- Optional Routing
- Monuments Route
- North-South Route
- K Street Route

0 .2 .4 .6 Miles
Multisystems, Inc. 2002

Figure 4-3: White House-Capitol Route-Alternative A Counter Clockwise



Legend

- White House-Capitol Route
- - - Optional Routing
- Stops
- New Stops
- Existing Metrobus or Tourmobile

0 .1 .2 .3
Miles
Multisystems, Inc. 2002

Figure 4-4: White House-Capitol Route-Alternative A Clockwise

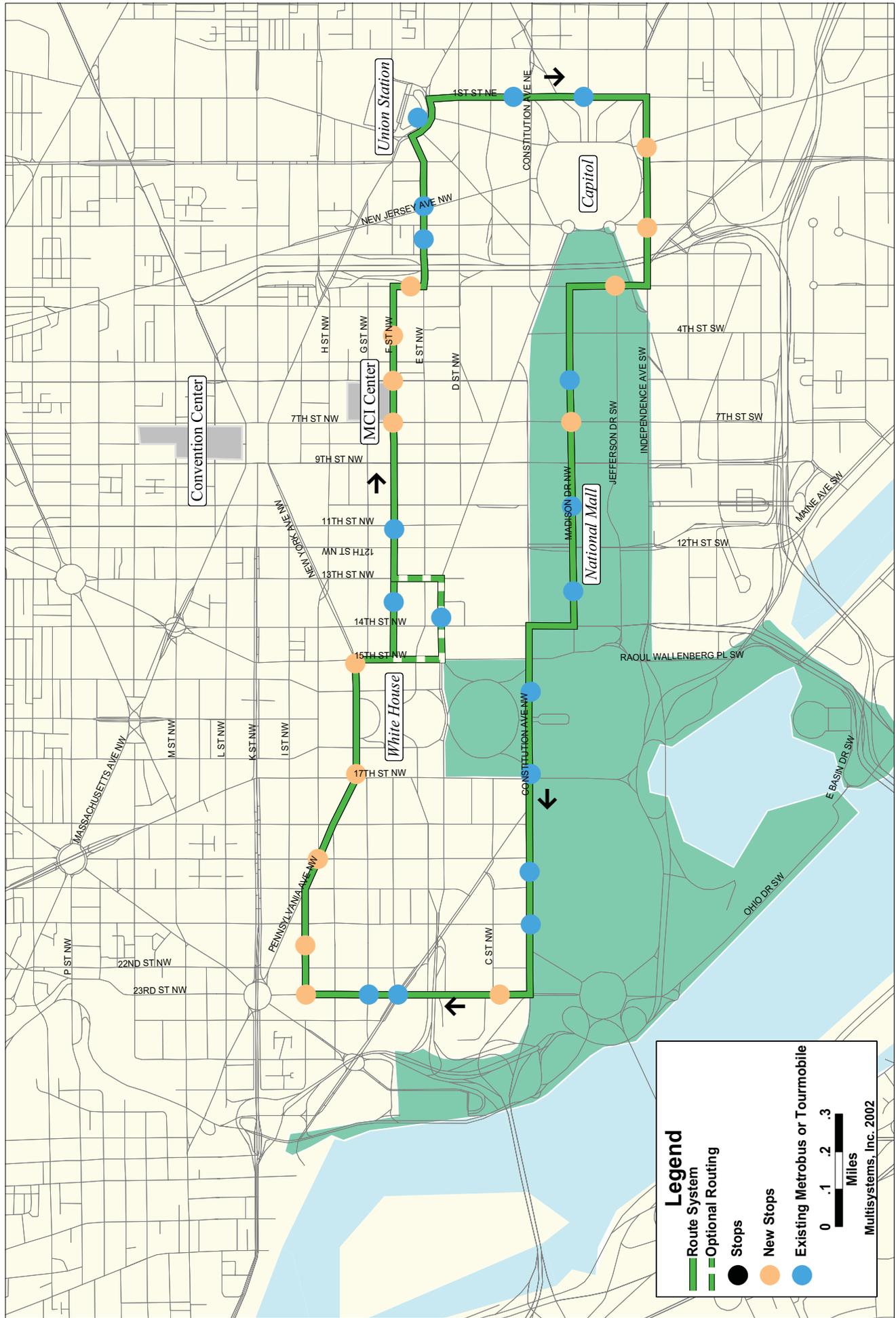


Figure 4-5: White House-Capitol Route-Alternative B Counter Clockwise

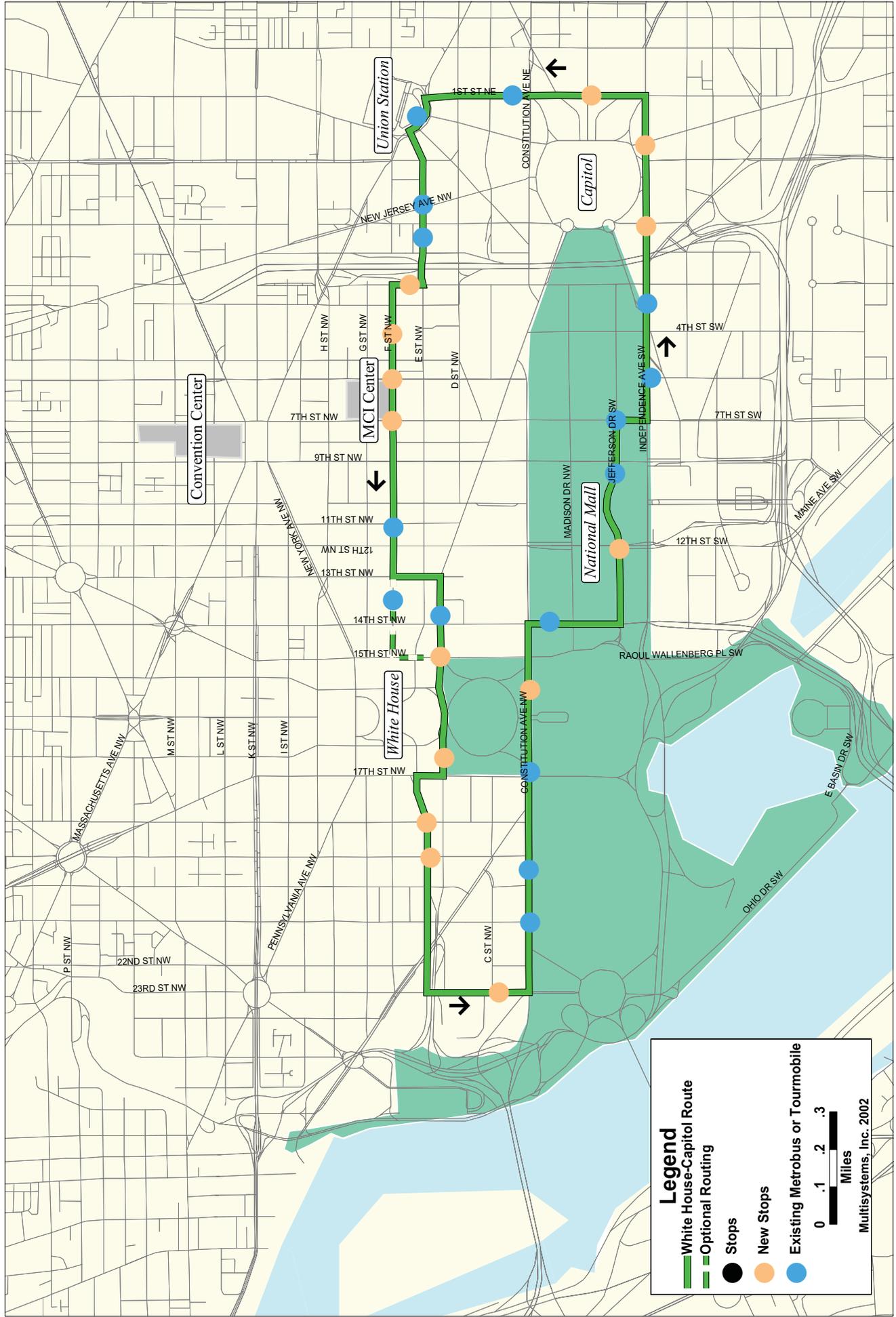


Figure 4-7: Monuments Route



Figure 4-8: Monuments Route- Presidential Service

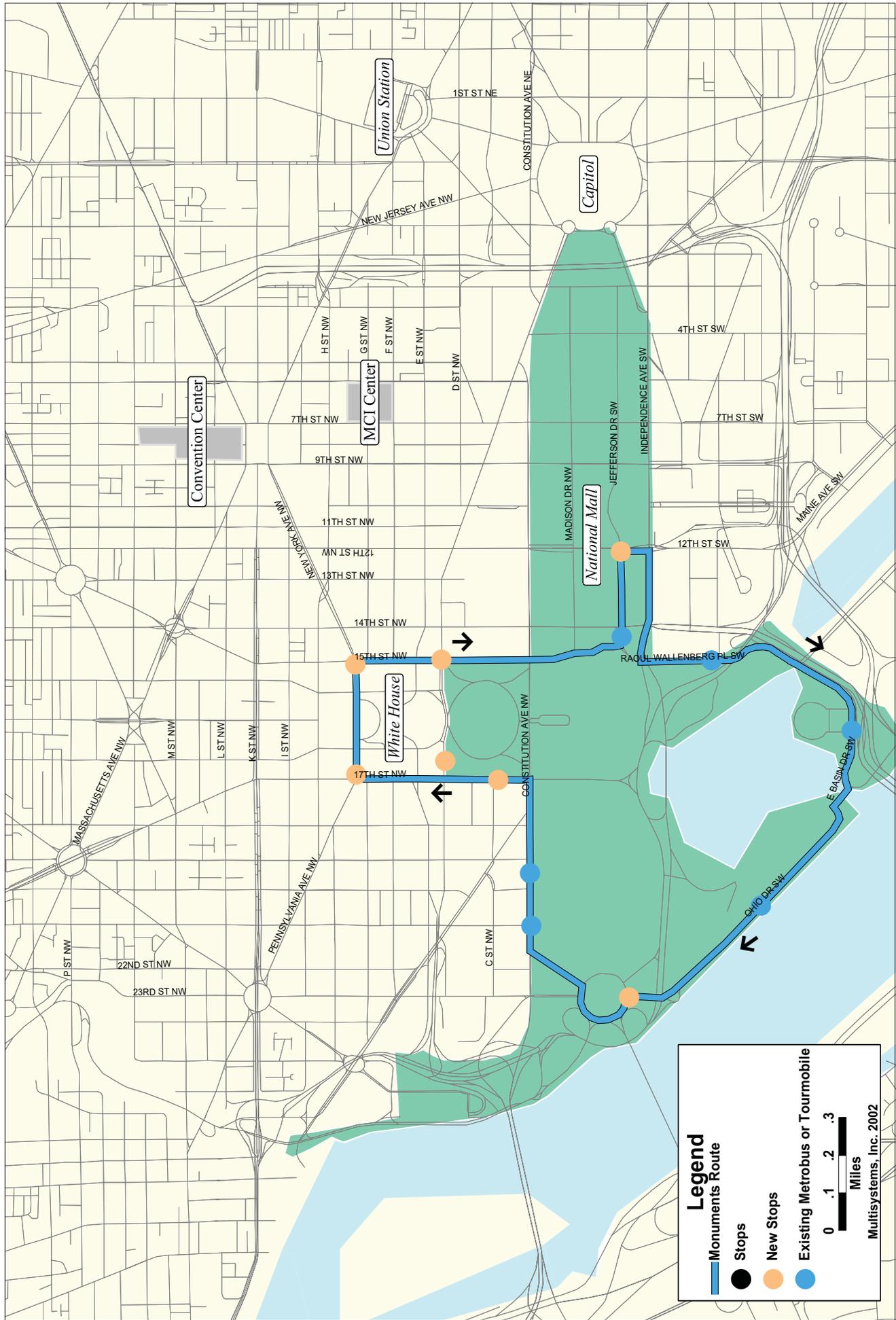
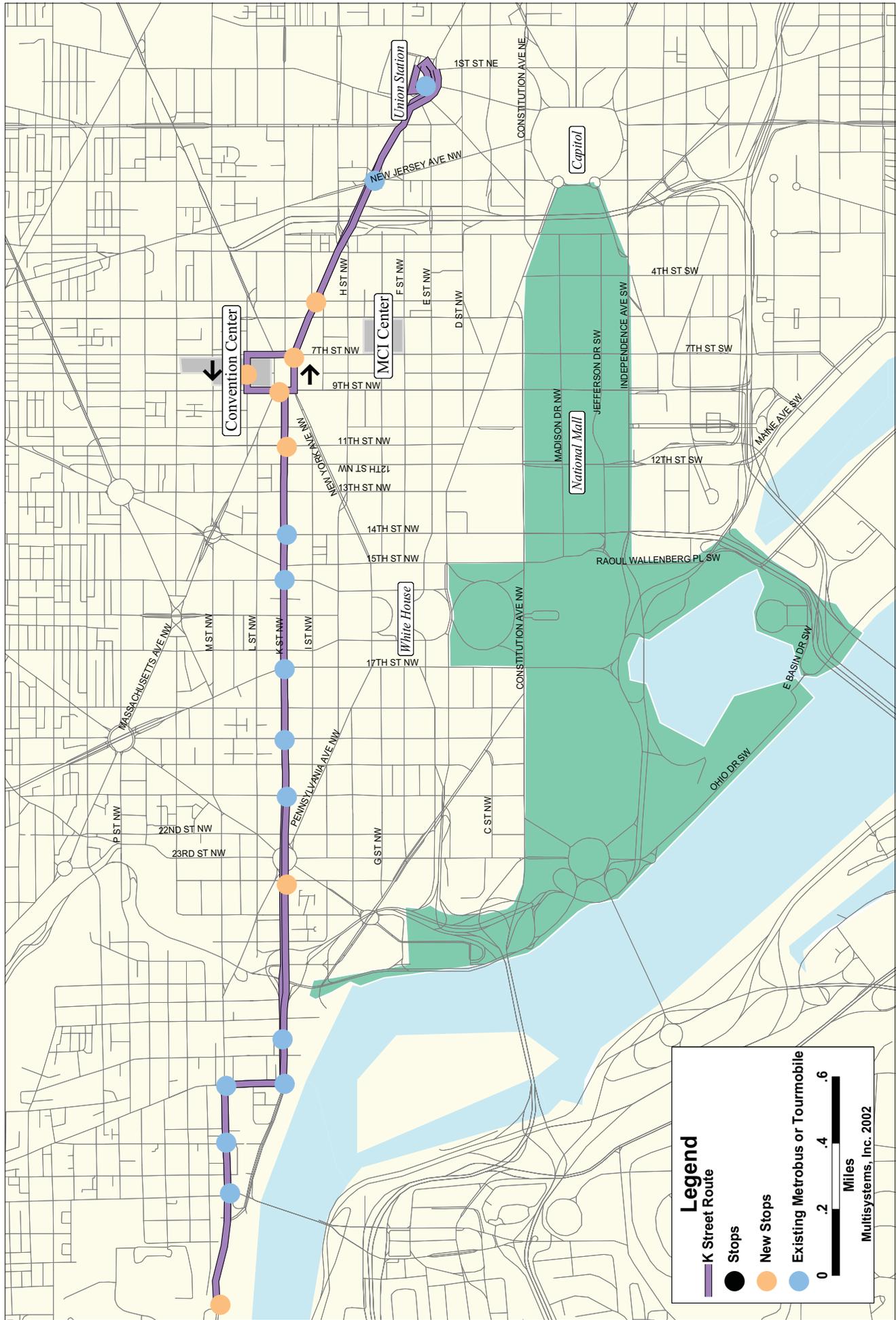


Figure 4-10: K Street Route



- left onto 23rd Street NW (southbound);
- left onto Constitution NW (eastbound);
- right onto 14th Street NW (southbound);
- left onto Jefferson Drive SW (eastbound).

The clockwise route for both alternatives will run on the same streets as the counter-clockwise direction, except along the Mall where they will utilize 3rd Street and Madison Drive between 3rd and 14th Streets rather than Jefferson Drive, 7th Street, and Independence.

The Monuments Loop would operate as a one-way loop along the southern portion of the project area, circling the western portion of the National Mall. Starting at Jefferson Drive and 12th (Smithsonian Metrorail), the Circulator routing would be:

- right onto 12th Street SW (southbound);
- right onto Independence Avenue SW (westbound);
- left onto Raoull Wallenberg Place SW (southbound);
- left onto Maine Avenue SW (eastbound);
- right onto East Basin Drive SW (southbound);
- merge onto Ohio Drive SW (northbound);
- merge onto 23rd Street SW (northbound);
- merge onto Henry Bacon Drive NW (northbound);
- east in private right-of-way parallel to Constitution;
- merge onto Constitution NW;
- right onto 17th Street NW (southbound);
- merge onto Independence Avenue SW (westbound);
- left onto U–turn to Independence Avenue SW (eastbound);
- left onto 15th Street SW (northbound);
- right onto Jefferson Drive SW (eastbound).

If Alternative B is selected for the White House-Capitol Route, a limited number of trips on the Monuments Route will use the “Presidential Routing”. The Presidential Routing would be:

- right onto 12th Street SW (southbound);
- right onto Independence Avenue SW (westbound);
- left onto Raoull Wallenberg Place SW (southbound);
- left onto Maine Avenue SW (eastbound);
- right onto East Basin Drive SW (southbound);
- merge onto Ohio Drive SW (northbound);
- merge onto 23rd Street SW (northbound);
- merge onto Henry Bacon Drive NW (northbound);
- *right onto Constitution NW - main roadway (eastbound);*
- *left onto 17th Street NW (northbound);*
- *right onto Pennsylvania Avenue NW (eastbound);*
- *right onto 15th Street NW (southbound);*
- *left onto Jefferson Drive NW (eastbound).*

The North-South Route will cross the Mall on 7th Street. South of the Mall it will follow a clockwise loop on 7th Street and L’Enfant Promenade. North of Pennsylvania Avenue it will follow a counter-clockwise loop on 7th Street and 9th Street. Starting at 9th Street and L Street NW, the Circulator would run:

- south on 9th Street NW
- left onto Pennsylvania Avenue NW (eastbound);
- right onto 7th Street NW (southbound);
- right onto Maine Avenue SW (westbound);
- right onto 9th Street SW (northbound);
- left onto L’Enfant Promenade SW (northbound);
- right onto Independence Avenue SW (eastbound);
- left onto 7th Street SW (northbound);
- left on L Street NW (westbound).

The K Street Route will run along on Massachusetts Avenue, K Street, and M Street between Union Station and Georgetown. Starting at Union Station, the Circulator would run:

- right onto Massachusetts Avenue NE (westbound);
- right onto 7th Street NW (northbound);
- left onto L Street NW (westbound);
- left onto 9th Street NW (southbound);
- right onto K Street NW (westbound);
- around Washington Circle NW (surface level)
- continue on K Street NW (westbound);
- right onto Wisconsin NW (northbound);
- left onto M Street NW (westbound);
- end at Canal Road entrance to Georgetown University.

From Georgetown to Union Station, the Circulator would return along the same route except that it would use the south side of Mt. Vernon Square, instead of L Street, between 9th and 7th.

Based on the above descriptions, the round trip length of each route would be as follows:

White House-Capitol Route (clockwise)	6.9 miles (Alt. A) / 6.5 miles (Alt. B)
White House-Capitol Route (counter-clockwise)	6.9 miles (Alt. A) / 6.5 miles (Alt. B)
Monuments Route	4.2 miles / 4.8 miles (Presidential)
North-South Route	4.2 miles
K Street Route	9.2 miles

Circulator stop locations have been identified for each stop on all four routes. The circulator routes will make use of existing Metrobus stops when operating on streets with Metrobus

service, although not all Metrobus stops on those streets will be used.²⁶ On the Mall, the circulator will make use of many of the existing Tourmobile stops. Several circulator stops, however, will need to be instituted in places where there is no existing Metrobus or Tourmobile stop. Figures 4-3 through 4-10 show the locations of all proposed stops, and indicate whether stops are existing or need to be created. A complete listing of all proposed stops by route is contained in Appendix C. Under Alternative A, 52 new bus stops would be added and 69 existing Metrobus and Tourmobile stops would be used by the Circulator. Under Alternative B, 55 new bus stops would be added and 64 existing stops would be used.

Route Options Rejected

Several route alignment options were considered for each proposed route. On the White House-Capitol Route, several alternatives were considered for the part of the route west of 14th Street. An early option using 17th Street between Pennsylvania and Independence was replaced by the preferred alternatives A and B in order to serve more federal and non-federal workers west of the White House and in the Federal Triangle. Options that provided closer service to the World War II Memorial and the Washington Monument stop at 15th and Jefferson were rejected in order to provide closer service to Federal Triangle buildings near Constitution and 14th Street. A diversion of the clockwise loop along Jefferson, 12th, and Independence, directly serving the Smithsonian Metrorail Mall entrance, was considered desirable but was rejected due to the impacts of the additional travel time on through riders, the indirectness of the route, and increased operating costs.

An extension of the Monuments Route further east along the Mall was considered. The extension along Jefferson Drive to 3rd Street, returning along Madison Drive and 15th, would eliminate a transfer for visitors traveling between the monuments and the museums at the eastern end of the Mall. This extension was rejected when it was determined that the expansion of this route to overlap with the White House-Capitol Route would not translate into any cost savings on the White House-Capitol Route, while the cost of a two mile (round trip) extension of the Monuments Route would be significant. Also, the extension of the White House-Capitol Loop to 23rd Street would provide direct service between the Lincoln, Vietnam Veterans, and Korea Memorials to the eastern part of the Mall.

Numerous alternatives were examined for the North-South Route. Alternatives that would serve visitors better by connecting the route more directly with more Mall destinations, including a direct tie-in to the proposed hub location at the Smithsonian Metrorail Mall entrance, were rejected in order to provide a connection between the downtown area and the employment centers south of the mall to serve trips by downtown workers. Alternatives were also considered that included service on a single street instead of the loops, service using dedicated bus lanes. The chosen option was selected in order to provide direct access to more businesses and offices despite the possibly longer travel times for riders resulting from the loops.

Several options were considered in the Pennsylvania Avenue and K Street corridors before Pennsylvania Avenue, west of the White House, was added to the White House-Capitol Route. East-west routes that extended to the Capitol or to the mall were rejected because of the overlap with the White House-Capitol and North-South Routes. Options were also considered that did

²⁶ On several Streets, such as F Street and 7th Street, many Metrobus routes turn onto and off of the street so there are more bus stops than would be necessary with a single straight route.

not extend as far west as Georgetown. Service to the Kennedy Center was deferred until such time as adequate infrastructure is in place to serve the center from 23rd Street.

Running Way Improvements and Restrictions

It is generally feasible for the proposed circulator routes to operate on existing rights-of-way, but there are several locations where improvements are needed or restrictions need to be modified.

These include:

- **Pennsylvania Avenue between 15th and 17th Streets NW** – Pennsylvania Avenue between 15th and 17th Street has been restricted from full traffic since 1995 for security reasons and is expected to remain so. The National Capital Planning Commission, as part of its new security plan²⁷, has developed a concept design for this section of Pennsylvania Avenue that includes a right-of-way for the circulator. The proposed White House-Capitol circulator route is consistent with the NCPC design concept. This street would be used by the White House-Capitol Route Alternative A. If Alternative B is chosen, this street would be used by the Presidential Routing of the Monuments Route.
- **E Street between 15th and 17th Streets NW** – E Street between 15th and 17th Street is also restricted from full traffic for security reasons. This street would be used by the White House-Capitol Route Alternative B. Access for circulator buses would be needed.
- **E Street eastbound between 23rd Street and Virginia Avenue NW** – E Street between 23rd Street and Virginia Avenue is restricted from full traffic for security reasons due to its proximity to the State Department. This street would be used by the White House-Capitol Route Alternative B. Access for circulator buses would be needed.
- **Jefferson Drive and 12th Street SW** – The Monuments Route requires a right turn from Jefferson Drive onto 12th Street. The turning radius for that turning movement is currently restricted by the presence of a temporary structure on Jefferson Drive bridging the 12th Street underpass. For a circulator vehicle to make that turn, either that temporary structure must be removed or the corner must be cut back to increase the turning radius.
- **14th Street and Constitution NW** – The clockwise direction of the White House-Capitol Route includes a left turn from 14th Street to Constitution Avenue. This turn is prohibited by current traffic regulations. This restriction will need to be removed for circulator buses.
- **Independence and 1st Street SE** – The counter-clockwise direction of the White House-Capitol Route includes a left turn from Independence Avenue to 1st Street. This turn is prohibited by current traffic regulations from 4:00 to 6:30 p.m. This restriction will need to be removed for circulator buses.
- **K Street NW** – The District of Columbia Department of Transportation is currently developing a plan for a major reconfiguration of K Street between Mt. Vernon Square and Washington Circle. This implementation plan assumes that this project has been completed.

²⁷ National Capitol Planning Commission, *The National Capitol Urban Design and Security Plan*, July 2002

There are also locations where the Monuments circulator route would travel that are currently restricted to National Park Service Tourmobile vehicles. These are a short section of the Circle behind the Lincoln Memorial and the dedicated right-of-way just inside the Mall parallel to Constitution Avenue between Henry Bacon Drive and just before 17th Street. Both the Monuments and White House-Capitol Routes would make use of existing Tourmobile turn-outs on the Mall.

Future Bus Lanes

In the future, it would be advantageous to consider improving travel times on the White House-Capitol Route by implementing exclusive bus lanes and intersection improvements at key places on the alignment. Preliminary analyses examined the possibility of converting existing traffic or parking lanes to exclusive bus lanes and examined the possible travel time and cost benefits of such actions.

Each street traversed by the circulator was first analyzed to understand whether existing travel lanes could be converted to Circulator-only use. Due to the heavy peak hour traffic in Washington DC, no possible cases were found. The next step was an examination of streets to be used by the circulator in the downtown (not including the Mall) that would have relatively slow bus travel times, but also either have on-street parking, or have had on-street parking removed for security reasons. These would be possible initial candidates for conversion of the curb lane to an exclusive Circulator lane. Those identified include:

- **1st Street Southbound between Union Station and Independence** – The clockwise direction of the White House-Capitol Route passes along the east side of the Capitol where parking has been removed and there are few conflicting turning movements. It appears feasible that an exclusive Circulator lane could be instituted in the curb lane beginning either at Massachusetts Avenue (eliminating some parking) or at D Street and ending with the right turn onto Independence Avenue. The proposed lane would provide little benefit to Metrobus with only one all-day Metrobus line and some peak-only routes able to use a part of the lane.
- **F Street (both directions) between 15th and 7th Streets** – F Street in the downtown area would be served by the White House-Capitol Route. Between 15th and 7th Street there is parking on both sides although there are several existing Metrobus stops. It appears feasible that an exclusive Circulator lane could be instituted in the curb lane on both sides in this area. Circulator buses would have to share this lane with right-turning traffic at most of the eight intersections. Metrobus Routes 42 and 54 could make effective use of the lanes for short segments.

In addition, there are several intersections where improvements should be investigated in order to speed the operation of the circulator. These include:

- 1st Street southbound right turn onto Independence Avenue
- 3rd Street northbound left turn lane onto Madison Drive
- Madison Drive at 7th Street allow through buses to use right turn lane

Others locations should also be investigated for future bus priority and traffic improvements.

Stops and Shelters

The circulator will make use of approximately 70 existing Metrobus and Tourmobile stops. At these stops, circulator signage will be added but no other improvements are anticipated. At the approximately 50 circulator stops that will be new stops, standard shelters will be added under the District's existing bus shelter contract. Shelters without advertising will be installed where advertising is prohibited, such as on the National Mall.

4.1.2 Service Elements

Service Span

Service span is the term used to describe the time of day at which service begins and ends. The service span needs to be long enough to cover the hours during which most potential users are traveling. As indicated in the market analysis, potential users for the circulator include visitors accessing the attractions that are furthest from Metrorail stations, visitors traveling among the various attractions, and downtown workers and shoppers making trips within the core area. The circulator will need to operate during the hours that visitors are traveling and during the hours that downtown workers and shoppers are traveling within the core. The circulator is not expected to carry a significant number of commuters to downtown, since the Metrorail and Metrobus systems generally provide good access to most of downtown, so service during commuting hours is not a necessity, although commuters may elect to use the Circulator to complete commute trips originating on Metro.

The mall museums are generally open from 10 a.m. to 5:30 p.m. every day except Christmas. The monuments are officially open from 8 a.m. to 11:45 p.m. every day. However, 90% of monument visitors visit between 10 a.m. and 9 p.m., and nearly 97% of monument visitors visit between 8 a.m. and 9 p.m. Only 3% visit after 9 p.m. The Washington Monument, Capitol, and White House generally require visitors to arrive before 8 a.m. in order to obtain the limited number of tickets available each day. These people would generally be arriving at those locations from their hotels by Metrorail or by tour bus, but at 8 a.m. many people leave those locations to visit other sites and return later in the day at their scheduled visitation time.

While some downtown workers may arrive before 8 a.m., most workers and shoppers would not be making local trips until at least 8 or 9 a.m. Most business-related local trips would generally end by about 6 p.m. and dinner-related trips would end by 8 or 9 p.m. While people visiting downtown in the evening for entertainment purposes could stay past 9 p.m., they would generally be able to access Metrorail directly for the late trip home.

In order to serve these markets adequately, it is recommended that service on all four circulator routes be provided from 8 a.m. until 9 p.m., seven days a week. The 8 a.m. beginning of service will accommodate all but the earliest visitors to the monuments, will serve people who receive scheduled time tickets when they are distributed at 8 a.m., and is early enough to serve any local trips in the downtown made by downtown workers. The 9 p.m. end of service will accommodate evening trips between downtown offices, restaurants, and entertainment venues, and will serve early evening trips to the monuments. It is recommended that later service, until 11 p.m. be provided on the Monuments Route only in peak tourist seasons to accommodate larger crowds and provide an after-dark viewing experience in the spring and summer.

Running Times and Cycle Times

The travel time required by a bus to make a complete round trip (called the *round trip running time*) was estimated for each route. Several sources of information were used. On streets where

Metrobus service operates, Metrobus schedules were used to estimate the running time for the circulator at various times of day. Along the mall, where there is little to no Metrobus service, travel times were measured by automobile²⁸. Estimated running times from the previous circulator study were also considered²⁹. Finally, on some streets, bus travel speeds were estimated based on the speeds used for similar streets. Speeds on K Street were assumed to be somewhat higher than on other streets, due to the planned busway facility. The round trip running time for each route, by time of day and day of week, is shown in Table 4-1. Note that the White House-Capitol Route is shown as two routes (a clockwise route and a counter-clockwise route) since, operationally, it would function as two separate routes, with one set of buses always traveling clockwise, and another set traveling counter-clockwise. Both alternatives for the White House-Capitol Route are shown.

Running times typically represent average travel times on a bus route. If schedules only allowed the average time then any disruption, or even random variation, in travel time could cause delays and trigger the bunching of buses. Therefore, additional time is usually added to the schedule to allow drivers to catch up when delayed. This helps keep the service reliable and on schedule. The total time allowed in the schedule for a round trip is called the *cycle time*. Typically, cycle times are 10% to 25% longer than round trip running times. Minimum cycle times, also shown in Table 4-1, were calculated for each circulator route, by time of day and day of week, by adding 15% to the round trip running time. (Actual cycle times may need to be a bit longer, in order to schedule buses at the desired frequency.)

The additional time added to the round trip running time to get the cycle time is often referred to as *layover*. Scheduled layover time insures that the next trip starts on time. On a typical bus route, the layover time is spent at the end of the line with the bus empty so that no delay is experienced by passengers. This will work best on the Monuments Route and the K Street Route where layover can occur at the Smithsonian Metrorail mall entrance, Union Station, and Georgetown University. On the North-South Route, layover should probably occur at the Convention Center under the assumption that few riders will ride through at that point, with most choosing to walk between 7th and 9th. On the White House-Capitol Route, however, there is no place where the bus will be empty. Layover time will have to be distributed in smaller increments around the route. It may be possible in this case to reduce the cycle time as more experience is gained with the operation, but care must be taken to balance the reduction of passenger delays with increased variability in the frequency of service and the potential for bus bunching.

Frequency of Service

The frequency of service, expressed as the *headway*, or time interval between buses, is typically determined by a combination of demand and a policy decision as to the longest acceptable passenger wait time. The longest acceptable passenger wait time, (also called the *policy headway*), may vary by time of day and day of week. The DCPG has adopted the policies shown in Table 4-2. These policies reflect the desire of the DCPG to provide a high quality service that

²⁸ A limited amount of automobile travel time data was collected in August 2002. Because traffic was relatively light at the time due to the Congressional recess, the measured travel times were increased by 40-50% to account for heavier traffic and the need for buses to make frequent stops.

²⁹ Parsons Transportation Group, prepared for the Downtown Business Improvement District, *Technical Report for a Downtown Circulator in Washington, DC*, April 1999

Table 4-1: Circulator Running Times and Cycle Times

	Running Time			Minimum Cycle Time		
	Saturday	Sunday	Weekday	Saturday	Sunday	Weekday
White House/Capitol Route – Clockwise – Alternative A						
8-10a	56	49	54	64	56	62
10a-1p	58	55	59	67	63	68
1p-5p	58	55	64	67	63	74
5p-7p	58	55	65	67	63	75
7p-9p	47	47	49	54	54	56
White House/Capitol Route-Counter Clockwise – Alternative A						
8-10a	47	45	54	54	52	62
10a-1p	57	52	61	66	60	70
1p-5p	57	52	63	66	60	72
5p-7p	57	52	64	66	60	74
7p-9p	46	43	50	53	49	58
White House/Capitol Route – Clockwise – Alternative B						
8-10a	56	49	53	64	56	61
10a-1p	57	55	59	66	63	68
1p-5p	57	55	63	66	63	72
5p-7p	57	55	63	66	63	72
7p-9p	45	44	46	52	51	53
White House/Capitol Route-Counter Clockwise – Alternative B						
8-10a	45	43	50	52	49	58
10a-1p	53	50	58	61	58	67
1p-5p	53	50	59	61	58	68
5p-7p	53	50	59	61	58	68
7p-9p	42	40	46	48	46	53
Monuments Route						
8-10a	22	22	25	25	25	29
10a-8p	26	26	26	30	30	30
8p-11p	21	21	22	24	24	25
Monuments Route – Presidential Routing (with Alternative B only)						
8-10a	32	32	37	37	37	43
10a-8p	36	36	36	41	41	41
8p-11p	31	31	31	36	36	36
North-South Route						
8-10a	27	27	30	31	31	35
10a-4p	33	33	33	38	38	38
4-7p	33	33	36	38	38	41
7p-9p	30	30	30	35	35	35
K Street Route						
8-10a	52	50	63	60	58	72
10a-4p	58	57	64	67	66	74
4-7p	58	57	68	67	66	78
7p-9p	54	52	59	62	60	68

Table 4-2: Circulator Maximum Passenger Wait Time

Tourist-only routes (Monuments Route)	every day 10 a.m. to 8 p.m.	5 minutes
	all other times	10 minutes
White House-Capitol	weekdays 8 a.m. to 7 p.m.	5 minutes
	weekends 10 a.m. to 7 p.m.	5 minutes
	All other times	10 minutes
All other routes	weekdays 8 a.m. to 7 p.m.	5 minutes
	All other times	10 minutes

is attractive to the target markets. Passengers will generally perceive up to a five minute wait to be inconsequential for a short distance trip such as those on the Circulator. Longer wait times could discourage ridership. The policies also reflect the common transit planning practice of focusing resources on providing a higher level of service during times when the most users will benefit, while still providing a lower but adequate level of service at other times.

When the demand for service would exceed the capacity of the vehicle, frequency can be increased to provide enough capacity. Ridership estimates (documented later in this plan) were used to determine the need for additional capacity during various hours of the day and days of the week. To accomplish this, the service day was divided into five periods, morning peak, mid-day, afternoon, evening peak, and evening. Similarly the year was broken into three seasons, winter (December through February), peak season (April through August), and the intermediate season (March, September, October, and November). Average daily ridership was then estimated for each season using seasonal factors from National Park Service and Smithsonian data. Park Service and Smithsonian data was also used to estimate ridership during the peak hour of each of the five daily time periods for weekdays, Saturdays, and Sundays. Weekday ridership during peak tourist season was further distinguished between the higher ridership weekdays (Wednesday through Friday) and the lower ridership weekdays. The resulting ridership estimates were then used to determine the average number of passengers that would be on board at the points where the maximum passenger loads occur.

The analysis concluded that, during both the winter and intermediate seasons, the policy headways could be operated on all routes with no overcrowding. These headways are shown in Table 4-3. Overcrowding was considered to occur when the number of passengers (both seated and standing) on board the vehicle at the most crowded location is expected to average more than what is considered to be the *design capacity* of a bus. For purposes of this analysis, the design capacity was considered to be 55 passengers, which represents approximately 40 seated passengers and 15 standees.

Table 4-3: Circulator Headways and Vehicle Requirements – Off-Peak Season

	<i>Off-Peak Season (7 months)</i>								
	Headway			Cycle Time			Buses		
	Sat.	Sun.	M-F	Sat.	Sun.	M-F	Sat.	Sun.	M-F
<i>White House/Capitol Route - Clockwise</i>									
8-10a	10	10	5	70	60	65	7	6	13
10a-1p	5	5	5	70	65	70	14	13	14
1p-5p	5	5	5	70	65	75	14	13	15
5p-7p	5	5	5	70	65	75	14	13	15
7p-9p	10	10	10	60	60	60	6	6	6
<i>White House/Capitol Route-Counter Clockwise</i>									
8-10a	10	10	5	60	60	65	6	6	13
10a-1p	5	5	5	70	60	75	14	12	15
1p-5p	5	5	5	70	60	75	14	12	15
5p-7p	5	5	5	70	60	75	14	12	15
7p-9p	10	10	10	60	50	60	6	5	6
<i>Monuments Route</i>									
8-10a	10	10	10	30	30	30	3	3	3
10a-2p	5	5	5	30	30	30	6	6	6
2p-8p	5	5	5	30	30	30	6	6	6
8p-9p	10	10	10	30	30	30	3	3	3
<i>North-South Route</i>									
8-10a	10	10	5	40	40	35	4	4	7
10a-4p	10	10	5	40	40	40	4	4	8
4-7p	10	10	5	40	40	45	4	4	9
7p-9p	10	10	10	40	40	40	4	4	4
<i>K Street Route</i>									
8-10a	10	10	5	60	60	75	6	6	15
10a-4p	10	10	5	70	70	75	7	7	15
4-7p	10	10	5	70	70	80	7	7	16
7p-9p	10	10	10	70	60	70	7	6	7
Total							45	42	61

Table 4-4: Circulator Headways and Vehicle Requirements – Peak Season

	Peak Season (5 months)											
	Headway				Cycle Time				Buses			
	Sat.	Sun.	M/T	W/Th/F	Sat.	Sun.	M/T	W/Th/F	Sat.	Sun.	M/T	W/Th/F
White House/Capitol Route - Clockwise												
8-10a	10	10	5	5	70	60	65	65	7	6	13	13
10a-1p	3.5	4.5	4.5	4	70	68	72	68	20	15	16	17
1p-5p	3.5	4.5	4.5	4	70	68	77	76	20	15	17	19
5p-7p	5	5	5	5	70	65	75	75	14	13	15	15
7p-9p	10	10	10	10	60	60	60	60	6	6	6	6
White House/Capitol Route-Counter Clockwise												
8-10a	10	10	5	5	60	60	65	65	6	6	13	13
10a-1p	4	5	5	4	68	60	75	72	17	12	15	18
1p-5p	3	3.5	4	3.5	66	63	76	74	22	18	19	21
5p-7p	3	4	4	4	66	60	76	76	22	15	19	19
7p-9p	10	10	10	10	60	50	60	60	6	5	6	6
Monuments Route												
8-10a	8	10	10	10	32	30	30	30	4	3	3	3
10a-2p	4	5	5	5	32	30	30	30	8	6	6	6
2p-8p	3	4.5	4.5	3.5	30	32	32	32	10	7	7	9
8p-9p	4	5	5	5	28	25	30	30	7	5	6	6
9p-11p	5	5	5	5	25	25	30	30	5	5	6	6
North-South Route												
8-10a	10	10	5	5	40	40	35	35	4	4	7	7
10a-4p	10	10	5	5	40	40	40	40	4	4	8	8
4-7p	10	10	5	5	40	40	45	45	4	4	9	9
7p-9p	10	10	10	10	40	40	40	40	4	4	4	4
K Street Route												
8-10a	10	10	5	5	60	60	75	75	6	6	15	15
10a-4p	10	10	5	5	70	70	75	75	7	7	15	15
4-7p	10	10	5	5	70	70	80	80	7	7	16	16
7p-9p	10	10	10	10	70	60	70	70	7	6	7	7
Total									63	51	68	74

During the peak season, both the Monuments Route and the White House-Capitol Route would require additional service beyond the minimum service levels. This would occur between 10 a.m. and 7 p.m. on the White House-Capitol Route nearly every day, and throughout the service day on the Monuments Route. The recommended headways are shown in Table 4-4.

Peak Vehicle Requirements

Tables 4-3 and 4-4 show, in addition to the headways, the recommended cycle times and vehicle requirements for Alternative A. (The cycle times here differ slightly from the minimums in Table 4-1 since the actual cycle time operated must be an even multiple of the headway operated.) The vehicle requirements are determined simply by dividing the cycle time by the headway. Cycle times and vehicle requirements for Alternative B are shown in Appendix D.

The tables show that, under Alternative A, the White House-Capitol Route will require 30 vehicles during the off-peak season on weekdays during the peak hours between 1 p.m. and 7 p.m. This increases to 40 vehicles in the peak season. The Monuments Route will require six buses at most times outside peak season, but will require up to nine buses on weekdays and ten on Saturdays in peak season. The North-South Route will require nine buses on weekdays and four on weekends during all seasons. The K Street Route will require 16 buses on weekdays and seven on weekends during all seasons.

4.2 Resources and Impacts

This section presents the transportation impacts of the proposed circulator system, including the resources required to operate the system. Non-transportation impacts are documented separately in an Environmental Study.

4.2.1 Resource Requirements

The operation of the Circulator will require substantial resources. Day to day operation of the circulator is expected to be the responsibility of a contractor. The contractor would be paid by the sponsoring agency to operate the service. The details of the operation of the service (such as staffing levels, etc.) would be the contractor's responsibility. The contractor would provide all of the necessary operations, maintenance, and administrative staff and would also be responsible for providing a vehicle storage, fueling, and maintenance facility. It is anticipated that the vehicles themselves would be provided by the sponsoring agency, with the contractor responsible for maintenance. The District of Columbia would provide shelters and signs. The resources required, therefore, include the operating costs paid to the contractor and vehicles needed.

Operating Costs

Operating costs to private contractors are typically based on a unit cost for service, most commonly the cost per *revenue-vehicle-hour* of service. A revenue-vehicle-hour is time spent by a vehicle actually providing service. This typically includes the time the vehicle is moving and available to passengers, the time spent at stops, and the time spent in normal layover at the end of the route between trips. It does not include deadhead time spent traveling to or from the storage facility, nor time spent when the vehicle is parked for extended periods without an operator. In some cases, operating costs may also include a component that is based on the number of *revenue-vehicle-miles* of service. Revenue-vehicle-miles are calculated in a manner similar to revenue-vehicle-hours. WMATA uses a revenue-vehicle-hour basis in determining the cost of local service reimbursed by local jurisdictions. However, the Metropolitan Washington Regional

Bus Study developed cost factors for bus service in the region based on a combination of revenue-vehicle-hours and revenue-vehicle-miles.

The number of annual revenue-vehicle-miles was determined by multiplying the length of each route by the number of trips that would be provided in a year based on the headways and length of each time period shown in Tables 4-3 and 4-4, and the number of days of each type in a year for both peak and off-peak seasons. The number of annual revenue-vehicle-hours was determined by multiplying the number of buses on each route in each time period by the length of each time period as shown in Tables 4-3 and 4-4, and the number of days of each type in a year for both peak and off-peak seasons. The WMATA operating cost factors for non-regional service used in the Metropolitan Washington Regional Bus Study³⁰ were used to determine the annual cost of circulator operation. The resulting estimated annual revenue-hours and –miles and annual operating costs for the two alternatives are shown in Tables 4-5 and 4-6. The tables show that approximately half of the \$17 million annual operating cost would be for the White House-Capitol Route. One fourth would be for the K Street Route and the remaining one fourth would be for the North-South and the Monuments Routes.

Table 4-5: Annual Resource Requirements and Operating Costs – Alternative A

	Annual Revenue-Miles	Annual Revenue-Hours	Annual Operating Cost (millions)
White House/Capitol Route	757,225	128,567	\$8.643
Monuments Route	248,897	29,877	\$2.212
North-South Route	191,318	30,628	\$2.089
K Street Route	417,256	56,472	\$4.032
TOTAL	1,614,697	245,544	\$16.976

Table 4-6: Annual Resource Requirements and Operating Costs – Alternative B

	Annual Revenue-Miles	Annual Revenue-Hours	Annual Operating Cost (millions)
White House/Capitol Route	720,773	124,364	\$8.327
Monuments Route	242,563	29,003	\$2.150
Presidential route	48,316	10,108	\$0.648
North-South Route	191,318	30,628	\$2.089
K Street Route	417,256	56,472	\$4.032
TOTAL	1,620,227	250,575	\$17.247

³⁰ WMATA non-regional cost factors are \$50.79 per revenue-vehicle-hour plus \$2.79 per revenue-vehicle-mile.

Vehicle Fleet Requirements

The total vehicle fleet required to operate a transit service is calculated based on the maximum number of vehicles scheduled in service at any time, plus an increment to account for vehicles out of service for maintenance. Federal Transit Administration guidelines indicate that this increment should be 15% of the maximum vehicles in service. As noted in the previous section, operation of all four circulator routes under Alternative A would require 61 vehicles in the off-peak season and as many as 74 vehicles in the peak season. Alternative B would also require 74 vehicles in peak season so there would be no difference between the alternatives in terms of vehicle requirements. With 74 vehicles in maximum service, the circulator would require a fleet of 86 vehicles. The Capital Plan for the circulator, included as a later section of this Implementation Plan, is based on the purchase of a fleet of 86 vehicles.

4.2.2 Service Coverage

The circulator is designed to be accessible to the vast majority of downtown workers and visitors. Typically, transit service is considered accessible if a target location or population lies within $\frac{1}{4}$ mile of the transit route. Given the location of the circulator in a dense downtown area, the orientation of the circulator toward very short trips, and the need for a high level of convenience to attract the target markets, it is also of interest to consider whether target locations lie within an even shorter distance of the routes. The locations of riders in three target markets for which data was available were compared to the area within $\frac{1}{4}$ mile and within $\frac{1}{8}$ mile of the proposed circulator routes. This comparison is shown in Figures 4-11, 4-12, and 4-13. In each figure, the area within $\frac{1}{8}$ mile of the circulator area is shown. Figure 4-11 also shows the major visitor attractions and annual visitor volumes that were shown in Figure 3-1. Virtually all of the attractions are $\frac{1}{8}$ mile or less from a circulator route. Figure 4-12 shows downtown employment based on COG estimates of employment by traffic zone that was shown in Figures 3-2 and 3-3. The vast majority of downtown employment is covered within $\frac{1}{8}$ mile. (Note that these locations are approximated within each zone. These are not based on actual addresses.) Figure 4-13 shows the actual locations and numbers of federal employees in the core area that was shown in Figure 3-4. Only a few federal employment sites are not within $\frac{1}{8}$ mile, mostly in the Federal Triangle, Federal Center Southwest, and near Union Station. Virtually all of these are within $\frac{1}{4}$ mile. (Note that this figure uses the actual locations of federal work sites.)

Table 4-7 shows the number and percentage of total and federal employees in the core area that are within $\frac{1}{4}$ and $\frac{1}{8}$ mile of the circulator. For purposes of this analysis, the core area was defined by M Street (north), 3rd Street (east), M Street (south), and the Potomac River. For either alternative, over 75% of core area federal employees are within $\frac{1}{8}$ mile of a circulator route and over 90% are within $\frac{1}{4}$ mile.

4.2.3 Ridership Impacts

The potential markets for the circulator were summarized in Section 3. The detailed estimates of the potential market shown in Tables 3-4, 3-8 and 3-10 formed the basis for ridership estimates for the circulator. The ridership estimates presented in this section are documented in Appendix E.

For the visitor market, little to no data exists on current share of trips using public transit. Therefore, shares of the market that might be captured by the circulator were estimated for each individual entry in Tables 3-4 and 3-8. For visitor circulation trips between attractions, the estimated shares of the market that would be captured ranged between 10% and 50%. Lower

Figure 4-11: Core Area Attractions Served by the Circulator

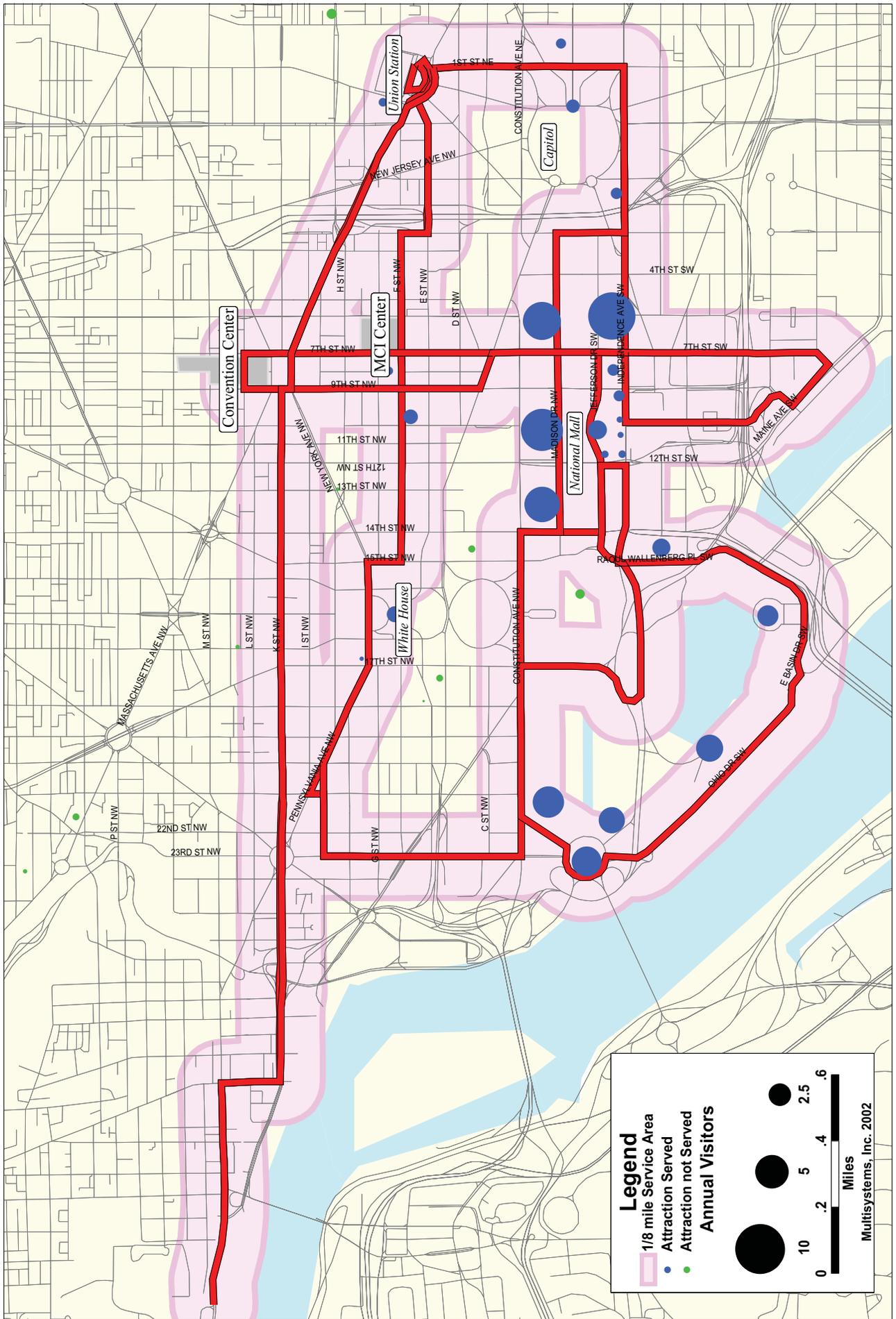


Figure 4-12: Employment Served by the Circulator

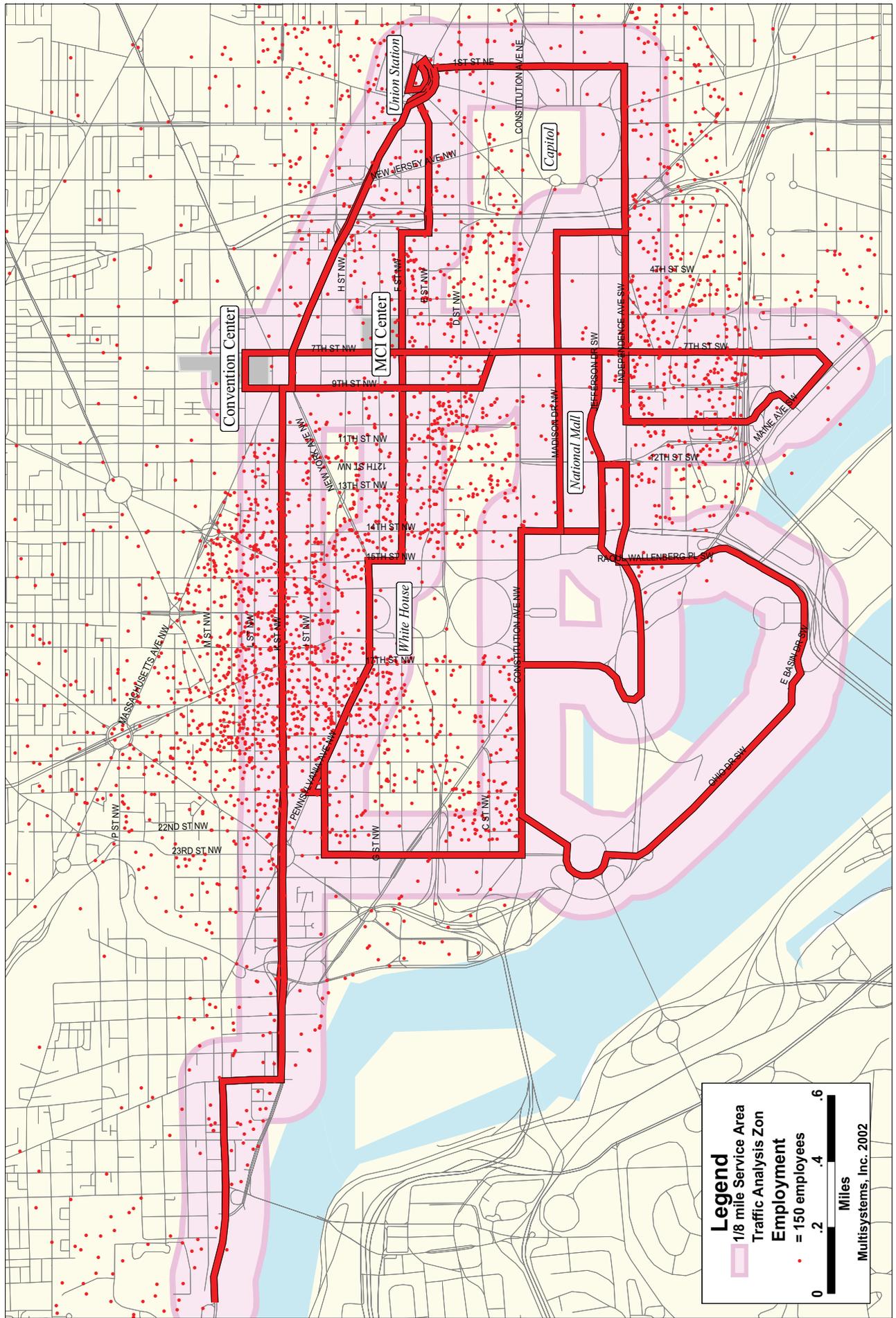


Figure 4-13: Federal Employment Served by the Circulator

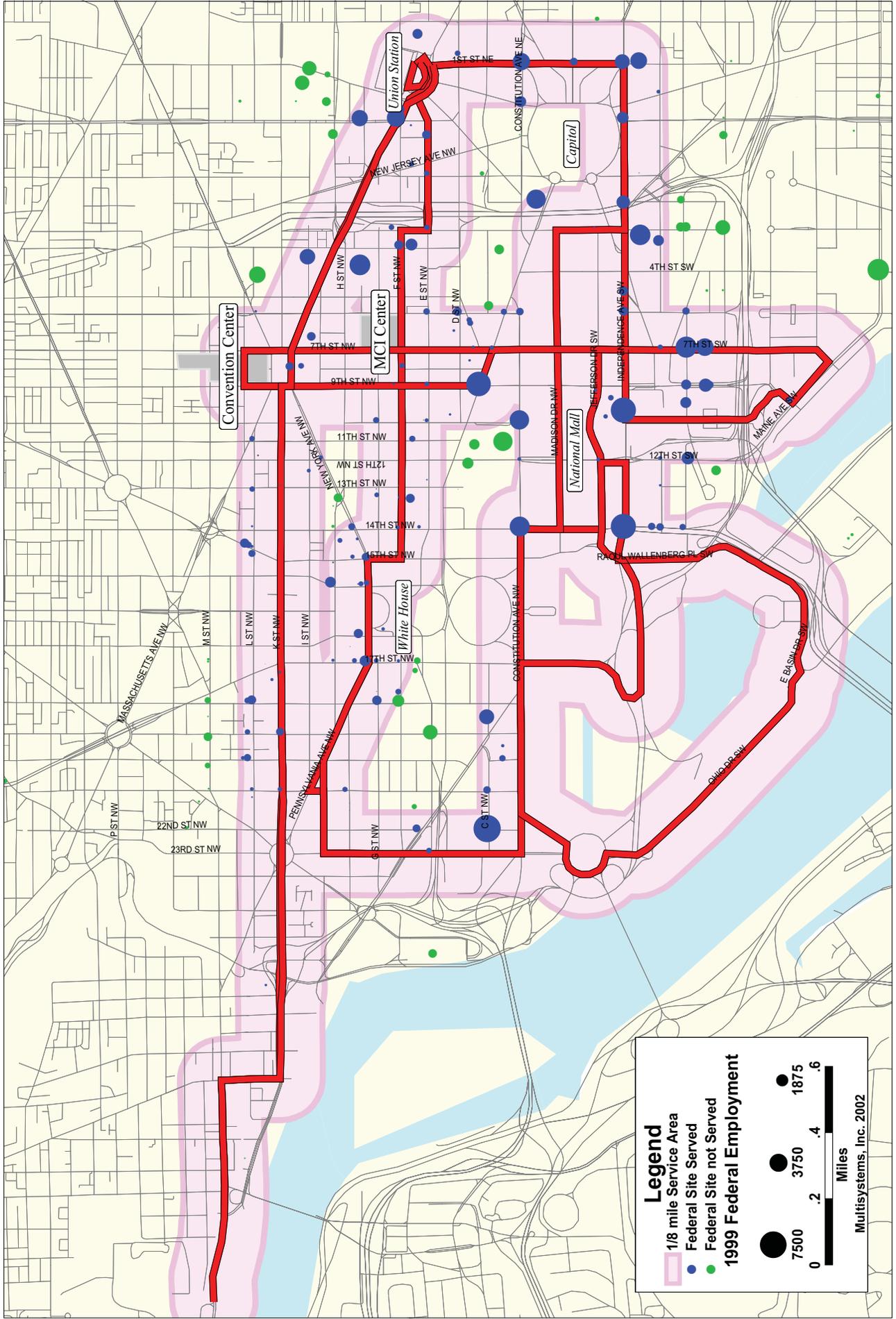


Table 4-7: Employment Coverage of Circulator Routes

	Employment within 1/8 Mile			Employment within 1/4 Mile		
	All Employees	Federal	% of Core Federal	All Employees	Federal	% of Core Federal
Alternative A	288,421	165,614	78%	411,218	194,694	91%
Alternative B	278,375	161,848	76%	412,100	197,259	93%

values were used where circulator connections would not be as good and where other transit options exist. The highest values were used for trips to the monuments where circulator service would be good and parking is limited.

For visitor access trips from around the region, estimates ranged from 2% to 10% for most areas, while from downtown hotels and the convention center, estimates ranged from 5% to 30%. The exception to this was the Monuments area where estimated shares ranged from 15% to 45%.

For local trips in the core area made by employees and shoppers, shares were estimated based on current transit shares for each origin-destination as indicated by the data obtained from the COG regional model. A figure lower than the current share was used where good transit alternatives exist and the circulator could capture some of the market. A figure higher than the current share was only used in a few cases where the circulator is expected to be a major improvement in providing transit connections.

Riders were assigned to routes assuming the most logical path between each origin and destination. The estimated number of riders on each route, by market, is shown in Table 4-8. These ridership figures are average weekday riders³¹. Peak season ridership is expected to be considerably higher. Off-peak season ridership would be lower. Annual ridership was derived from the annual figure for visitors plus an expansion of average weekday non-visitor riders using an appropriate annualization factor for non-visitor travel³². The annual ridership by market is shown in Table 4-9. The tables show that the majority of riders on the circulator system would be visitor circulation or access/egress trips. This is also true on three of the four routes.

The White House-Capitol Route ridership would be 76% visitor trips. The major visitor markets served by this route would use the segment connecting Union Station, the Capitol Visitors' Center, and the Mall. The major non-visitor markets served would be for travel between the downtown and both the Capitol area and the area west of the White House.

The Monuments Route would serve only visitors. The very high ridership levels on this route reflect the fact that many riders would board and alight this route several times in one visit, stopping at several stops to visit the many attractions.

³¹ The average daily trips in visitor markets in Tables 1-4 and 1-8 were converted to average weekday using data on Smithsonian attendance by day of week. In the employee/shopper market, figures in Table 1-10 are already average weekday.

³² Average weekday non-visitor ridership was converted to annual ridership assuming 292 weekday equivalents annually. This is consistent with Regional Bus Study methodology.

Table 4-8: Estimated Average Weekday Ridership by Route and Market

	Visitor Circulation	Visitor Access/ Egress	Employee/ Shopper Circulation	Total
White House/Capitol Route	3,434	6,454	4,291	14,179
Monuments Route	8,475	8,684	0	17,159
North-South Route	2,245	401	1,832	4,478
K Street Route	2,146	699	6,325	9,170
TOTAL	16,300	16,239	12,448	44,987

Table 4-9: Estimated Annual Ridership by Route and Market

	Visitor Circulation	Visitor Access/ Egress	Employee/ Shopper Circulation	Total
White House/Capitol Route	1,373,481	2,581,672	1,253,025	5,208,178
Monuments Route	3,240,467	3,320,489	0	6,560,956
North-South Route	898,173	160,557	534,849	1,593,579
K Street Route	858,276	279,679	1,846,991	2,984,946
TOTAL	6,370,396	6,342,398	3,634,864	16,347,658

The North-South Route ridership would be 66% visitor trips. The major visitor markets served by this route would use the segment connecting the Convention Center, the downtown, and the Mall. The major non-visitor markets served would be for travel between the area north of the Mall and area south of the Mall.

Only the K Street Route would serve a majority of non-visitor trips, with only 38% visitor trips. The major visitor markets served by this route would be local trips within Georgetown and trips from Metrorail to Georgetown that would transfer at Farragut or Mt. Vernon Squares. The major non-visitor markets served would be for travel along the K Street corridor and between the K Street corridor and Georgetown.

In order to determine the required frequency of service previously shown in Tables 4-3 and 4-4, ridership estimates were used to calculate passenger loads at the maximum load point on each route. This was done by first determining the origin-destination pairs that would contribute to the passenger volumes at the peak load point on each route. The average daily visitor ridership was factored up or down to reflect day-of-week and seasonal variation based on data from the Smithsonian. Non-visitor ridership was not varied seasonally, but was adjusted to reflect lower ridership levels on weekends.

4.2.4 Other Transportation Impacts

Traffic Impacts

Roadways throughout the study area carry heavy volumes of vehicle traffic and often operate during failing or near failing levels of service at peak hours. The analysis of impacts of the

Circulator service on existing levels of service were calculated from Average Annual Daily Traffic (AADT) volumes obtained from the District of Columbia DOT using a traffic planning program developed by the Florida DOT. Traffic level of service (LOS) was calculated for each intersection and segment of roadway in the study area. This analysis was used to compare the impacts of the Circulator to existing conditions

The White House-Capitol route would add 12 to 17 buses per hour in each direction during weekday peak-hours, for a total of 24 to 34 buses. The North-South and K Street routes would add 12 buses per hour in each direction during weekday peak-hours, for a total of 24 buses. The Monuments route, which is one-way, would add a total of 12 to 17 buses per hour in one direction to roadways. On weekends, the White House-Capitol Route and the Monuments route would add up to 20 buses per hour in each direction.

No significant traffic impacts are anticipated along any of the roadways traversed by the circulator. Analysis utilizing traffic analysis software shows that high existing volumes of traffic, high levels of congestion, and small increments of traffic being added by the preferred alternative would result in no adverse traffic impacts.

Parking Impacts

A variety of private and public parking facilities exist in the project area, including parking garages, surface lots, and on-street parking. On-street parking within the project area is often subject to restrictions, such as no peak-hour parking, time or zone restrictions or is metered. The removal of existing on-street parking may be required at new bus stops. Of the 51 new bus stops proposed, 36 would require the elimination of parking. As a result, the elimination of a total of 144 on-street spaces would be required for the 36 new bus stops.

Impacts on Other Transit Services

The circulator is intended to supplement existing regional transit services, not duplicate or replace them. It is anticipated that some trips now made within the downtown on Metrobus and Metrorail could be diverted to the circulator, due to the circulator's lower cost, better frequency and more convenient access. On the other hand, the circulator could also encourage additional trips on the regional transit network, making transit a more attractive option by providing greater mobility within the downtown once riders arrive downtown using the regional system. These impacts have not been quantified, but are not expected to have a major net impact on regional transit ridership.

The circulator could provide a more cost-effective alternative for federal agencies who operate their own shuttle services in the core area. It is possible that many of these services could be curtailed or eliminated once the Downtown Circulator becomes operational. The National Capital Planning Commission is currently studying the possible ramifications for federal agency shuttles.

4.3 Implementation Phasing

The proposed Downtown Circulator system is an extensive 74 bus system that would serve a variety of markets in the core area. Because there are multiple routes, it would be possible to start with a smaller number of routes and do a phased implementation. Phasing would allow the system to begin to build ridership and recognition in the market at a lower cost, address operational issues with a smaller network, and establish and refine the fare structure and fare

media distribution network. A smaller initial system might also allow the service to be operated from an existing garage facility, shortening the necessary startup time.

At the same time, care must be taken to implement an initial system that is viable, both financially and in establishing a large enough ridership base. It is also important to select an initial system that can be implemented without delays due to difficult unresolved issues or controversies. The Circulator will serve trips by downtown workers and shoppers, conventioners, business travelers, and tourists. The White House-Capitol and Monuments Routes will depend largely on the visitor market for success. These routes will also depend on successful agreements with the Park Service on operating rights on the National Mall, and on successful agreements regarding operations on the streets around the White House that are restricted from full traffic. The North-South and K Street Routes do not face these hurdles and are also expected to attract more of a mix of downtown workers and visitors (especially conventioners). The K Street route is ultimately dependent on the K Street busway to operate efficiently and reliably, however, it could begin operations before the busway is complete. The ability to attract funding in a timely manner for the various routes could also affect the routes chosen for initial implementation.

Considering these factors, the DCPG has elected to implement the North-South and K Street Routes first. This would be an approximately 25 peak bus system. It could be implemented relatively quickly, without substantial negotiations regarding Mall operations or White House security. These routes would address a substantial amount of the ridership demand by downtown workers and shoppers as well as the conventioners market. While tourists may find these routes useful accessing the downtown and Georgetown, much of the marketing to tourists would be delayed until the second phase, when a more coordinated visitor transportation strategy involving the National Park Service could be implemented.

The initial phase would require at least 25 peak buses and, as shown in Table 4-10, would cost \$6.1 million in annual operating costs. (It should be noted that slower initial operations on K Street, before the busway is completed, would slightly increase initial operating costs and vehicle requirements over these estimates.)

Together, the two initial routes would serve much of the downtown employment base. A majority of federal workers (55%) would work within ¼ mile of the two routes. The federal workers not served would be those around the State Department and those in the western part of the Federal Triangle.

Ridership was not estimated separately for this initial system. Of the 4.6 million annual riders projected for these routes under full implementation, the 2.4 million who are downtown workers and shoppers could be expected to use the two routes as an initial phase. Of the 2.2 million visitors, many, especially conventioners, may still be attracted to these routes even though the Circulator would not yet be a complete visitor transportation network for the area.

As with full implementation, traffic impacts are expected to be negligible, with only 12 buses per hour in each direction on each route. The two routes would require 21 new stops, of which 18 would require the elimination of parking, resulting in a loss of approximately 72 parking spaces in the downtown.

Table 4-10: Annual Resource Requirements and Operating Costs – Initial Phase

	Annual Revenue-Miles	Annual Revenue-Hours	Annual Operating Cost (millions)
North-South Route	191,318	30,628	\$2.089
K Street Route	417,256	56,472	\$4.032
TOTAL	608,574	87,100	\$6.121

4.4 Evaluation Methods and Procedures

The DCPG, or sponsoring agency for the circulator, should establish a monitoring and evaluation program to assess both the performance of the contract operator and to evaluate the effectiveness of the circulator in meeting its goals. The evaluation will include startup activities, ongoing and periodic data collection activities, and evaluation activities.

4.4.1 System Startup

It typically takes a period of at least several months for any new transit service to develop its ridership base and achieve some level of ridership stability. Local area residents will, after a few weeks or months, become familiar with the services and their benefits. Visitor familiarity will depend on the familiarity of those providing them with information - hotels, visitor attractions, tour companies, etc. Early monitoring of the initial stage of the system, or any additional route startups, should focus on ensuring that information is being provided to the public and that the service is being operated as planned.

Initial monitoring activities should focus on ensuring that the system is operating as intended. Monitoring activities should be concentrated on checking that scheduled travel times and cycle times are sufficient and are not excessive, as deviations either way could create undesirable variability in headways and damage service reliability. Service reliability should be spot-checked at several points on the routes, with deviations from the scheduled headway noted. Running time and reliability problems should be investigated further and either schedule or operational adjustments should be made to address them. Spot-checks should also be done to insure that early ridership does not exceed capacity, though this is unlikely.

Collection of daily ridership data should begin at system startup, however, such early data would not be an accurate indicator of the service’s effectiveness.

4.4.2 Data Collection

The data needs for system monitoring and evaluation can be divided into ongoing data collection activities and periodic and special data collection activities.

Ongoing Data Collection

Ongoing data collection should consist of assembling data through non-labor intensive methods. The contractor should be required to provide daily information on the service provided, ridership, and revenue collected on-board the vehicles.

The levels of service provided, expressed as the number of revenue-vehicle-hours provided on each route, should be specified by the service schedules. Deviations from the scheduled service

levels, either trips missed or additional service provided to meet unusual demand, as well as any significant disruptions in service, should be reported by the contractor. This should be reported by route and day and provided on at least a monthly basis.

Ridership and revenue collected on-board the vehicles should also be reported by route and day. The fareboxes purchased and the fare media and procedures adopted will determine the methods and ease of collection of this data. Fareboxes purchased for the circulator will have smart card capability and be compatible with fareboxes being installed on all Metrobuses. Systems that require the least driver intervention to record boardings will produce the most reliable information. Systems that require drivers to record some categories of fare media will require spot-checks or estimation procedures to accurately report ridership. The contractor should be able to provide accurate reports of on-board revenue provided that adequate revenue control procedures are in place.

Some revenue will not be collected on-board, such as that obtained through the sale of passes and transfers. This revenue will need to be reported at least monthly.

Periodic and Special Data Collection

After an initial startup period of at least three, but preferably six, months, on-board ridership counts (“ride checks”) should be conducted to identify actual maximum load points on each route at various times of day. This should also be repeated during the height of the tourist season (or during the off season, depending when the initial counts are conducted.) These counts will establish the locations where periodic monitoring of passengers volumes should occur in order to insure that service levels are matched to passenger demand. Once these maximum load points have been identified, periodic one-day counts (“point checks”) should be conducted at those locations to gauge the need to adjust service levels to meet demand. These counts can also be used to assess the variability of the actual headways as a measure of service reliability. The frequency of these one-day counts can be reduced over time as ridership stabilizes and service levels are refined. Initially, they should be done at least monthly and should be done on different days of the week. The results should be compared to the daily ridership counts to determine how maximum loads relate to the less labor-intensive daily counts on different days of the week and in different seasons.

If the success of the circulator in attracting riders in the various target markets is to be determined, on-board rider surveys will have to be conducted. These should be done during a peak tourist month (preferably April) and during a typical off-season month (such as October). They should be done at the first opportunity, but at least three months after implementation. Questions should focus on rider characteristics, travel patterns, and opportunities to improve the service.

4.4.3 Evaluation

The data collection activities should provide information to refine and improve the service as well as monitor the quality and evaluate the effectiveness of the service.

The nature of the markets served by the circulator will make ridership fluctuate more throughout the week and over the course of the year than is typically true of transit service. As a result, monitoring and refinement of ridership and service levels will be necessary to fine tune the service to both meet demand and avoid unnecessary costs. Maximum loads from the first ride checks and point checks should be related to daily ridership counts so that the daily counts can be used to judge whether the scheduled service levels are adequate at various points in the season

and throughout the week. Then the daily ridership counts can be used to identify when ridership changes enough to warrant further investigation or changes in service. Early spot checks and ongoing point checks should also be used to monitor the reliability of service and identify whether schedule changes or modified operational procedures are required.

Regular reports of ridership, revenue, and service provided should be used to conduct ongoing evaluations of each route and of the service as a whole. Ridership information should be available at the route level on a daily basis. Measures such as average daily ridership, passengers per vehicle-hour and cost per passenger should be calculated on a monthly basis, separating weekdays and weekends. Depending on the chosen fare media and fare collection procedures, it should be possible, with some degree of accuracy, to estimate revenue by route from the daily ridership counts. This will allow the calculation of the average fare and of the cost recovery ratio (revenue divided by cost) for each route.

This information will allow the DCPG, or the sponsoring agency, to evaluate the performance and effectiveness of the service, identify areas where additional information is needed, and develop strategies to address identified problems, deficiencies, and service needs.

5 Fare Structure Plan

This Fare Structure Plan for the Downtown Circulator begins with a discussion of ongoing fare structure changes at Metro. This is followed by an explanation of the recommended fare structure and the necessary sales and distribution mechanisms. The estimated utilization of the various fare options and the projected revenue are then presented. Revenue is estimated for a scenario in which each rider selects the lowest cost fare option, as well as several variations on the fare structure.

5.1 Metro Fare Changes

There are two major changes in Metro's fare structure and fare payment system currently underway. The first is a change in base fare and fare structure that recently took effect. The second is the full implementation of the SmarTrip program on all Metro services.

Metro raised fares and simplified its pass structure on June 29, 2003. The Metrobus and minimum Metrorail fare increased from \$1.10 to \$1.20 while the maximum Metrorail fare increased from \$3.25 to \$3.60. The cost to board a Metrobus with a Metrorail transfer increased from \$0.25 to \$0.35. All 28-day passes were eliminated and the combined Metrorail/Metrobus pass was eliminated. The remaining passes are either 1-day or 7-day/weekly passes. The two 1-day pass products are Metrorail (\$6) and Metrobus (\$3). The 7-day/weekly pass products include the 7-day Metrorail Fast Pass (\$30), the 7-day Metrorail Short Trip Pass (\$20), the weekly Metrobus pass (\$11), and the weekly Metrobus Senior/Disabled pass (\$6). Metrorail Visitor Passports, sold only to groups of 50 or more, are still available in 2-day (\$14), 3-day (\$21), and 4-day (\$28) valuations.

The second major change will occur when all Metrobuses are equipped to accept the SmarTrip card.³³ At that time Metro intends to eliminate all paper transfers and passes. Pass and transfer products will be available only with a SmarTrip card. On Metrorail, the traditional magnetic paper media will be used only for cash fares, and SmarTrip cards will be used either as stored value cards or as passes, depending on the user's choice. On Metrobus, cash will be accepted for a single ride fare without a transfer. SmarTrip cards will be required for passes but SmarTrip cards will also be able to be used as stored value cards for single ride fares and transfers. The manner in which the discount for a rail-bus transfer is applied will also change as Metro switches to a "balanced transfer" policy. Instead of the full \$0.85 round trip discount being applied when a rider transfers to a Metrobus from Metrorail, each transfer boarding (whether rail-to-bus or bus-to-rail) will be discounted \$0.40 when the second vehicle is boarded. (Bus-to-bus transfers will continue to be free.) At this time, Metrobus weekly passes will be converted to 7-day passes good for 7 days from first use, the same as for Metrorail passes.

³³ SmarTrip cards are "smart cards" capable of storing value in a chip contained in the card. They can be used as "stored value" cards, where value is deducted from the card for each trip, or they can be programmed as an unlimited use pass.

By the time Metro implements this change, all Metrobuses will be equipped with fareboxes capable of handling cash and SmarTrip cards, but no magnetic media. These fareboxes will be the standard fareboxes used by all bus operators in the DC area. It is possible to add the capability to accept magnetic media, as the Maryland MTA is doing, but the magnetic media they could accept would not be readily compatible with the magnetic media used by Metrorail, since the bus fareboxes and the Metrorail faregates are provided by different vendors. Metro has chosen not to attempt to develop magnetic media that would be compatible with both systems and has instead elected to use SmarTrip cards as the universally accepted regional fare medium.

These changes will have significant impacts on the fare structure that can be implemented for the Circulator. The reduction in the number and types of passes leaves fewer possible passes which can be combined with Circulator passes. The elimination of non-SmarTrip passes and transfers restricts the ability to offer discounted transfers and combined passes to visitors since they are unlikely to have a SmarTrip card. The SmarTrip card is a good mechanism for regional fare integration and standardization, but the Circulator will still need other media to meet the needs of its largest target market, visitors to the core area.

5.2 Proposed Structure

The fare structure proposed for the Downtown Circulator will make use of the anticipated wide usage of SmarTrip cards, while providing an array of pass products available to visitors. The proposed fare structure includes a single ride fare (using cash or stored value on a SmarTrip card), transfers (with SmarTrip), 1-Day and 7-Day combined Circulator/Metro passes, and circulator-only passes in a variety of durations. Each are described below:

Single Ride - 50 cents in cash or from a SmarTrip card. (\$0.25 for seniors and persons with disabilities.) It is expected that infrequent riders will pay the single ride fare for Circulator trips. It is anticipated that many visitors will pay with cash and downtown workers and shoppers will either use cash or a SmarTrip card.

Transfers from/to Metrorail – For riders with SmarTrip cards using the stored value payment method, the \$0.40 discount used by Metro for rail-bus transfers would be applied making the Circulator trip only \$0.10 for riders transferring from Metrorail. In the opposite direction, the full \$0.50 would be charged on the Circulator and a \$0.40 discount would be charged on the rail fare. This is consistent with the discount applied by Metro to rail-bus transfers.

Transfers from/to Metrobus – For riders with SmarTrip cards using the stored value payment method, the transfer from Metrobus to the Circulator would be free. In the opposite direction, the full \$0.50 would be charged on the Circulator and a \$0.50 discount would be charged on the Metrobus fare to make the whole trip equivalent to a single Metrobus fare. This is consistent with the Metro policy of free bus-bus transfers with SmarTrip. If Metro elects to retain paper bus-bus transfers, then these would be both accepted and issued on the circulator.

Circulator Transfers – For riders with SmarTrip cards using the stored value payment method, transfers between Circulator routes would be free. There would be no free transfer for riders paying with cash unless Metro elects to retain paper bus-bus transfers. In that case, a similar paper transfer would be issued on the circulator.

1-Day and 7-Day Combined Metro/Circulator Passes – All of the 1-day and 7-day Metrobus and Metrorail passes would have Circulator options. For 1-day passes, \$1 would be added to the

pass price. For 7-day passes, \$3 (\$1.50 for senior/disabled) would be added. This would only be available for holders of SmarTrip cards.

Circulator-Only Passes – Passes allowing unlimited use of only the circulator would be available as follows: 1-day (\$2), 3-day (\$4), 7-day (\$8), monthly (\$12), and annual (\$120). They would be valid only on the Circulator and could not be used on Metrobus or Metrorail services. All, except the annual pass, would be sold as paper or plastic “flash passes”. The monthly passes would also be available on SmarTrip cards and the annual pass would only be available on SmarTrip. The flash passes could be made available at Metro sales outlets, but the more significant distribution channels would be through various tourist oriented outlets. Annual and monthly passes would appeal to those using the circulator on a regular basis who may not be regular Metro riders. The 7-day and 3-day passes would appeal most to visitors. The 1-day passes could be used by visitors or by residents who are not regular Circulator riders but may be traveling about the downtown for the day.

Each of the above fare products would be available using one or more of the three fare media that would be accepted on the Circulator, as follows:

- **SmarTrip Cards** – single ride, all transfers, Metro pass combos, monthly/annual passes
- **Flash Passes** – 1-Day, 3-Day, 7-Day, monthly passes
- **Cash** – single ride

It should be noted that it would be possible to use magnetic media in place of the flash passes and as stored value cards if that option is selected when procuring fareboxes. However, as noted above, the magnetic media accepted by bus fareboxes would not be compatible with that used on Metrorail.

5.3 Fare Media Sales and Distribution

The fare media accepted on the Circulator would include SmarTrip, flash passes, and cash.

A SmarTrip card can be used both as a stored-value card or as a pass, depending on the rider’s choice. As Metro moves to an entirely SmarTrip-based pass program, mechanisms for pass sales will be in place and will be accessible to most users. The Circulator will be able to take advantage of this system. Cooperation from Metro will be required to make Circulator passes and combination passes available, but no additional sales and distribution mechanisms will be necessary. SmarTrip holders will be able to add value and purchase passes with cash or credit card at vending machines in Metrorail stations and possibly at other locations. As will be the case with all Metro passes, combo and Circulator passes on SmarTrip cards will be valid for the specified time period from the date of first use, not the date of purchase.

The flash passes (the 1-Day, 3-Day, 7-Day and monthly) will likely be popular with visitors. These could be sold through Metro outlets but, with Metro’s elimination of non-SmarTrip media, mechanisms may eventually not be available to distribute paper media. These passes will need to primarily be available to visitors, so distribution and sales through tourist-oriented outlets would be most effective. They could be made available at hotels, museums, and other popular visitor sites. They could be sold on the vehicles, but this would require that drivers carry a large quantity of valuable fare media, a practice that many public transit agencies have tried to avoid. The number sold on the vehicle should also be minimized to avoid delays resulting from time taken to sell passes. It will be important to make passes available at locations encountered by

users before their first need for the circulator, and preferably before they make a decision regarding travel mode in the core area. This would point to hotels, tour companies, and tourist-oriented web sites as important distribution outlets.

Circulator flash passes should also be made available with the Metro Passports that are available to groups of 50 or more by mail, in advance. Passports are magnetic media accepted only on Metrorail and therefore cannot be used on Metrobus or the Circulator. They are sold as 2-Day, 3-Day, and 4-Day passes that become effective on first use. For an additional four dollars, a 3-Day Circulator pass could be added to each package (as long as a mechanism for activating the passes other than at point-of-sale is provided). This would be an effective distribution method for conventions and other large groups.

Passes sold on SmarTrip cards have one significant administrative advantage over flash passes. SmarTrip passes can automatically become effective on first use, making it possible to purchase them ahead of time and use them as needed. Flash passes either need a pre-set date printed on them or need a mechanism for adding the active dates when first used. With short duration flash passes (such as 1-Day and 3-Day passes), pre-printed dates are impractical. Circulator flash passes will need a mechanism for the active dates to be added, either at the point of sale, upon first use on the vehicle, or by the passenger before the first use. Adding the active date at the point of sale will avoid the delay caused by on-vehicle activation, but does not allow for advanced purchase (or at least requires that the usage dates be known at the time of purchase). On-vehicle activation would be most like SmarTrip passes, but could delay the boarding process and require equipment on the bus to stamp dates on the passes. Another option adopted for visitor passes at some transit properties involves creating passes that are “scratch cards” where riders would scratch off the dates or dates that they would like the pass to be used before their first use. This method requires more expensive cards but avoids the problems associated with other methods.

Using magnetic media in place of flash passes would also solve the problem of how to activate the passes, and would provide better control over fare evasion. Magnetic media could also be sold on the buses directly through the fareboxes, without drivers handing the cards, but exact change would be required and sales could significantly delay the buses. If magnetic cards are pre-loaded as specific passes or with a specified number of single ride fares, they could be distributed in much the same way as flash passes. Otherwise, expensive ticket vending machines would be required to distribute magnetic media. The major disadvantage is that the readers on the farebox are expensive and require high levels of maintenance. As noted above, the magnetic media would not be easily compatible with that used by Metrorail and would not be accepted on Metrobus, so there would be no benefit resulting from a common fare media. The fare structure presented here is compatible with both flash passes and magnetic media and the choice of either method over the other would not provide significant additional benefits or provide fare structure opportunities that would otherwise not be available.

5.4 Projected Utilization of Fare Options

5.4.1 Visitors

Visitors to the core area are expected to use the Circulator both to reach the attractions that are not easily accessible by Metrorail and to move between attractions during the course of their visit. (Expected use of the circulator by visitors is discussed in detail in the Operations Plan.) Because visitors' stays vary in length and visitors may make any number of short trips during the

day, any of several different fare options may be the most appropriate for visitors. The fare option chosen by each visitor will depend on the number of days during which they may use the circulator and the number of trips they may make during they stay. In most cases, visitors will choose between an unlimited use pass valid for a specified period of time (one, three, or seven days), and paying cash for each circulator trip.

For most visitors, the choice is between paying the 50 cent cash fare for every trip, and purchasing an unlimited use pass. If visitors choose the most cost-effective option, one-day visitors making four or more trips will choose the two dollar 1-Day pass. Two- or three-day visitors making eight or more trips will choose the four dollar 3-Day pass. Visitors staying four to seven days making 16 or more trips will choose the eight dollar 7-Day pass. Visitors making fewer trips would find paying with cash to be more cost-effective. Many visitors may, however, choose a less cost-effective option for convenience, since the cost of the passes is still quite low and may be seen as much more convenient than carrying a significant amount of change. Pass purchase among visitors should be encouraged since having a pass will encourage visitors to make more trips and explore secondary sites, such as the downtown area, more thoroughly.

Other fare options, such as Metro combo passes, transfers, and annual passes would not be available to visitors since SmarTrip cards would be required for these fare products. Metro passes available to visitors would be limited to the Metrorail Visitor Passports. These could be sold in conjunction with Circulator passes but could not be combined into a single pass since the two products use different media and must have different activation mechanisms.

5.4.2 Downtown Workers and Shoppers

Downtown workers and shoppers are expected to use the circulator to move around within the downtown. The Downtown Circulator is not primarily intended to be used as part of the commute into downtown (although some may use it to make a short trip at the end of their commute). It is rather designed as a way to make short trips within downtown during the course of the day. As a result, the majority of circulator trips made by downtown workers and shoppers will be between offices, shopping areas, restaurants and entertainment venues, with only a small portion (mostly trips by Georgetown residents) being home-based trips. Other than trips that complete the commute, these trips would generally not involve transferring between the Circulator and any Metro services.

Like visitors, downtown workers and shoppers will make a choice between one of the pass options, and paying the cash fare on the circulator. (Because the vast majority of circulator trips are expected to be short trips within downtown, use of a transfer is unlikely to be an option in most cases.)

For regular Metrobus and Metrorail users who hold a Metro pass on their SmarTrip card, the weekly pass add-on, at three dollars, would be a cost-effective option for those who would make as few as three round trips per week on the Circulator. Those purchasing a 1-Day Metro pass could choose to add the Circulator for one dollar. Those Metro pass holders who do not choose the Metro/Circulator combo would pay a single ride fare using the value stored in their SmarTrip card.

For riders using a SmarTrip card as only a stored-value card on Metro, monthly and annual Circulator passes would still be available for the SmarTrip card. At \$12, the monthly pass would be attractive for frequent Circulator riders, those making 24 trips (12 round trips) per month. The annual pass, at \$120, would also be an option for frequent users, especially those who do not

use Metrorail on a regular basis. Less frequent riders could still pay a single ride fare using their SmarTrip card.

For downtown workers and shoppers without SmartTrip cards, the flash passes would be available. For frequent riders, the \$12 monthly pass would be attractive to those making 24 trips (12 round trips) per month. For those just in the downtown for the day, the two dollar 1-Day pass may be attractive if the rider plans four or more trips, or would just like the convenience. The 3-Day (\$4) and 7-Day (\$8) passes are unlikely to be attractive to downtown workers and shoppers, unless they are planning a week of high circulator use with little to no circulator use the rest of the month.

5.5 Revenue

5.5.1 Revenue Allocation and Impacts on Metro Revenue

The proposed fare structure allows for a clear determination of who receives the revenue from the various fare products. There is no need for any allocation formulas to estimate how revenue should be divided among multiple agencies. The 1-Day, 3-Day, 7-Day, monthly and annual passes are valid only on the circulator, so all revenue from their sales will go to the circulator. Similarly, all cash fares collected will go to the circulator. For the Metro combination passes (in which the circulator may be added to the weekly Metro passes for three dollars and to a daily pass for one dollar) the increment in cost should go to the circulator.

While transfers are not expected to be a major share of Circulator ridership, riders transferring using a SmarTrip card (as a stored value card) will receive a discount. Riders transferring from Metrorail to the Circulator will be able to board for \$0.10 (a \$0.40 discount). Riders transferring from Metrobus to the Circulator will be able to board for free (a \$0.50 discount). This is identical to the discount riders will receive transferring to a Metrobus from Metrorail or another Metrobus using a stored-value SmarTrip card. The discount is a benefit for the occasional rider who is an area resident (and therefore has a SmarTrip card), but doesn't need a pass. The number of such riders on the Circulator is expected to be small.

Similarly, as a result of the Metro "balanced transfer" policy, Riders transferring to Metrorail from the Circulator will be able to board for a \$0.40 discount. Riders transferring to Metrobus from the Circulator will be able to board for \$0.70 (a \$0.50 discount). Again, since the number of such riders is expected to be small, minimal impact is expected on Metro revenues.

5.5.2 Revenue under Base Level Scenario

Circulator revenue was estimated assuming all riders make rational choices based purely on the relative cost of the various fare options. This does not take into account the convenience of each option, nor does it consider any other incentives or bulk sales and distribution options.

Each of the two major markets was examined separately. The estimated annual revenue from downtown workers and shoppers is shown in Table 5-1. Estimated ridership was further divided by trip purpose, based on the regional travel data used to develop the ridership estimates. Most trips would be non-home-based trips, although some home-based trips, mostly from Georgetown, are included. The key factor to determine was the number of trips that would be made by users who would make more than 6 trips per week (or 24 trips each month) since these riders would likely buy passes, either a three dollar weekly add-on to a Metro pass, or a twelve dollar monthly Circulator-only pass. Since no estimates of frequency of circulator use have been made, a distribution was assumed with the average user making 5 trips per month. This resulted in an

Table 5-1: Estimated Annual Revenue from Downtown Workers and Shoppers

	Total	Non-Home-Based	Home-Based-Work	Home-Based-Other
Annual Circulator Trips	3,634,864	2,520,815	601,586	512,463
Est. % circulator trips made by riders making at least 24 trips/month		33%	90%	33%
Est. % circulator trips made by 1-Day Metro Combo Pass holders		2%		
Est. % circulator trips made by 1-Day Circulator-only Pass holders		3%		
Annual Circulator Trips	1,531,880	823,118	541,428	167,334
weekly combo/monthly/annual	42%	33%	90%	33%
Combo 1-Day pass	50,416	50,416	-	-
Circ. 1-Day pass	75,624	75,624	-	-
single ride	1,976,944	1,571,656	60,159	345,129
weekly combo/monthly/annual	\$0.37	\$0.41 ¹	\$0.31 ²	\$0.41 ¹
Combo 1-Day pass ³	\$0.33	\$0.33	\$0.33	\$0.33
Circ. 1-Day pass ⁴	\$0.40	\$0.40	\$0.40	\$0.40
single ride	\$0.50	\$0.50	\$0.50	\$0.50
all fare products	\$0.44	\$0.46	\$0.33	\$0.47
Annual Revenue	\$572,229	\$338,066	\$165,436	\$68,726
weekly combo/monthly/annual	36%	29%	85%	28%
Combo 1-Day pass	\$16,805	\$16,805	\$0	\$0
Circ. 1-Day pass	\$30,250	\$30,250	\$0	\$0
single ride	\$988,472	\$785,828	\$30,079	\$172,564
all fare products	\$1,607,756	\$1,170,950	\$195,516	\$241,291

1. assumes 28 circulator trips/month and 25% annual passes

3. assumes 3 trips/pass

2. assumes 36 circulator trips/month and 50% annual passes

4. assumes 5 trips/pass

estimate of 33% of circulator trips being made by the 25% of users who would make at least 24 trips per month. This figure was used for Non-Home-Based and Home-Based-Other trips. A higher figure of 90% was used for Home-Based-Work trips because such trips tend to be much more regular. These figures were used to estimate the number of trips that would be made using weekly, monthly, or annual passes.

For Non-Home-Based trips, some infrequent Metrobus riders traveling into downtown may purchase a 1-Day Circulator pass or a 1-Day Metro/Circulator combo pass. These figures were estimated to be about 3% and 2% of non-home-based trips, respectively.

All remaining trips were assumed to be paid at the single ride 50 cent fare, whether paid using cash or a SmarTrip card. For weekly, monthly and annual pass users, the average fare per trip was estimated assuming pass users would use the circulator for 36 trips per month for work trips and 28 trips per month for other purposes. It was estimated that half of the work trips made with passes would be made with annual passes. For other purposes, it was estimated that 25% of pass trips would be made with annual passes. For 1-Day Circulator pass users, five circulator trips were assumed, while for 1-Day Combo pass users, three circulator trips were assumed. The resulting revenue per passenger and annual revenue is shown in Table 5-1. Overall, for downtown workers and shoppers, an average revenue per passenger of \$0.44 is the result, with pass use accounting for 46% of all trips.

The estimated annual revenue from visitors is shown in Table 5-2. The first step was to develop a profile of the number of circulator trips per day that visitors might make that was consistent with the ridership estimates developed for the circulator Operations Plan. In developing the ridership estimates, most visitors were assumed to arrive and leave the core area on Metrorail or other means and use the circulator only to access the attractions not on Metrorail (such as the monuments) and to move between attraction areas. Visitors were assumed to move between two attraction areas no more than once in a day and that, with the exception of the Monuments area, most trips within an area would be made by walking. The resulting profile shows 75% of visitors making one or two circulator trips in a day and 90% making no more than three trips in a day. In this profile, no riders would make more than five circulator trips in a day. It should be noted that the ridership estimates considered only trips to and between visitor attractions and did not consider trips “induced” by the circulator and by new downtown development, such as additional shopping and entertainment trips.

The profile of the number of daily trips by circulator users was combined with a estimate of the length of stay of area visitors.³⁴ This was used to estimate the number of trips made by visitors staying four to seven days and making 16 or more trips (who would purchase an eight dollar 7-Day pass), the number of trips made by visitors staying two or three days and making eight or more trips (who would purchase a four dollar 3-Day pass), and the number of trips made by one-day visitors making four or more trips (who would purchase a two dollar 1-Day pass). Visitors staying longer than a week may not use the circulator every day, however for the analysis in Table 5-2, these visitors were assumed to purchase an average of three 3-Day passes.³⁵

³⁴ Tourism statistics indicate that 30% of visitors stay only one day and that average length of stay is 3.6 days. A profile of number of days of circulator use was developed assuming an average of 3.0 days of circulator use and 30% one-day visits.

³⁵ This is equivalent in revenue to a monthly pass, or to a weekly pass and two additional 1-Day passes.

Table 5-2: Estimated Annual Revenue from Visitors

		Visitors	
Annual Circulator Trips	7-Day pass	2,585,453	20.3%
	3-Day pass	2,369,878	18.6%
	1-Day pass	285,962	2.2%
	cash	7,471,501	58.8%
	all fare media	12,712,794	
Revenue per Passenger	7-Day pass	\$0.44	¹
	3-Day pass	\$0.45	²
	1-Day pass	\$0.49	³
	cash	\$0.50	
	all fare media	\$0.48	
Annual Revenue	7-Day pass	\$1,142,742	19%
	3-Day pass	\$1,065,114	18%
	1-Day pass	\$139,494	2%
	cash	\$3,735,751	61%
	all fare media	\$6,083,100	

1. assumes 18.1 circulator trips/pass

2. assumes 8.9 circulator trips/pass

3. assumes 4.1 circulator trips/pass

Table 5-3: Summary of Estimated Annual Revenue

	Ridership	Revenue	Revenue per Passenger
Workers and Shoppers	3,634,864	\$1,607,756	\$0.44
Visitors	12,712,794	\$6,083,100	\$0.48
Total	16,347,658	\$7,690,856	\$0.47

All remaining visitor trips were assumed to be paid with cash at the 50 cent fare. For 7-Day passes, the analysis assumed an average of 18.1 trips per pass, with a resulting average fare per trip of 44 cents. For 3-Day passes, the analysis assumed an average of 8.9 trips per pass, and for 1-Day passes, an average of 4.1 trips per pass. The resulting revenue per passenger and annual revenue is shown in Table 5-2. Overall, the result is an average revenue per passenger of 48 cents, with passes accounting for 41% of all trips.

Table 5-3 summarizes the projected annual ridership, revenue, and average fare for the circulator. The overall average fare is projected at 47 cents.

5.6 *Alternative Fare Scenarios*

Several alternative fare structure and fare media distribution scenarios were examined. While a detailed fare model and analysis that could capture the impacts on ridership of changes in prices of individual fare products was not within the scope of the implementation planning effort, the likely shift between products was estimated for three modified scenarios. In these scenarios, only the shift between fare products and the resulting impact on revenue was estimated. The effects on total system ridership are not calculated and ridership is assumed constant in all scenarios. The sensitivity of ridership to overall fare levels is discussed in a later section.

The first scenario examines the impact of a higher single ride fare on pass usage, given no change in pass prices. The second examines the effect of restricting the Monuments route to multi-day passes only. The third considers a broader use of passes by visitors resulting from advanced sales of passes. Each of the three are discussed below and are compared to the base scenario above considering changes in pass usage, average revenue per passenger, and total revenue.

It should be noted that the ridership estimates on which the revenue projections are based do not include visitor trips made solely for shopping, dining, or purely entertainment purposes. Ensuring that more visitors have passes allowing unlimited circulator ridership during their stay will encourage such trips. Thus, while the revenue estimates contained herein would not be affected by such additional travel, ridership could actually be higher due to these additional trips, especially for scenarios in which there is greater pass usage.

5.6.1 Higher Single Ride Fare Scenario

Under this scenario, all fares would be the same as the base scenario, except that the single ride fare would be \$0.75. Among downtown workers and shoppers this would change the breakeven point for pass purchase from six trips per week to four trips per week (and from 24 trips per month to 16). The share of Non-Home-Based and Home-Based-Other trips that would be made using passes is estimated to jump from 33% to 62%. While pass prices would not change, the average number of trips per pass would go down as less frequent users switched to passes. This would raise the average revenue per pass trip as well as the revenue from single ride fares. The average revenue per passenger would increase from 44 cents to 55 cents, while pass use would increase from 46% to 72% among downtown workers and shoppers. For visitors, there would also be a significant increase in pass use from 41% to 70%, while average revenue per passenger would increase from 48 cents to 64 cents. Total revenue would increase by \$2.5 million.

It should be noted that higher fares, including higher average fares for pass users, will have a negative effect on ridership that is not quantified here. Nevertheless, a change in the relative pricing of the single ride fare versus pass prices will cause a significant shift to pass use.

5.6.2 Higher Monument Fares Scenario

The Monuments Route is unique among the proposed Circulator routes in that it is purely a visitor-oriented service. It is also unique in that riders are expected to board and alight many times in the course of a day in order to visit the many monuments and memorials along the route. The \$0.50 single ride fare is very inexpensive compared to most expenses faced by visitors, yet the need to produce \$0.50 exact change at every stop is an inconvenience to visitors and will slow operations on the route. It is likely that visitors using this route will tend toward pass

purchase more than other visitors, however, it may be beneficial to require pass use in order to speed operations and obtain increased revenues.

In this scenario, visitors would be required to purchase at least a three day pass if they wish to use the Monuments Route. This would not only increase revenue, but would also provide all visitors with a pass that could be used to explore the downtown area on subsequent days. To accomplish this, the 1-Day Circulator pass, in addition to the single ride cash fare, would not be accepted on the Monuments route. The 1-Day Circulator pass would be renamed the “Downtown Pass” and would provide for one day of unlimited ridership on the three downtown routes only. The 3-Day and 7-Day passes would be “Visitor Passes” and would be valid on all Circulator routes for the specified time period. Marketing to visitors would focus on the visitor passes, although the downtown pass would still be available. All SmarTrip-based fare products (including single ride fares) could still be accepted on the Monuments Route, or SmarTrip users could be restricted to only Circulator pass holders.

The effect of this scenario would be to require all visitors who intend to visit the monuments to purchase at least a 3-Day pass for four dollars. This will have no impact on downtown workers and shoppers but will increase pass use by visitors substantially. It is estimated that nearly half the visitors who would use the Circulator on a given day would use the Monuments Route. While no estimate has been made as to how many might use the route at *any* time during their visit, a figure of 75% was used for purposes of analyzing this scenario.

Under this scenario, the number of visitor trips made with a pass would increase from 46% to 87%. The average revenue per passenger for visitors would increase from 48 cents to 75 cents and total annual revenue would increase by \$3.5 million.

It should be noted that this policy could have a negative effect on ridership that is not quantified here. Nevertheless, the increase in revenue in the scenario is associated entirely with visitors and relates to the relatively “essential” visitor activity of visiting the national monuments. Other choices for visiting the monuments would be much more costly or would involve seeking very limited parking. Therefore, it is likely that the impacts of this policy on ridership would be quite small.

5.6.3 Advanced Sales Scenario

In the base revenue scenario, each visitor would choose the lowest cost fare payment method for their travel patterns throughout their visit. This assumes that visitors can predict their travel pattern accurately and will choose the lowest cost method even if the savings is only a dollar or two. The Advanced Sales Scenario considers a case which a majority (75%) of visitors purchase a pass in advance consistent with the number of days they would stay. Single day visitors are assumed to purchase a 1-Day pass. Two and three day visitors would purchase a 3-Day pass, and other visitors would purchase a weekly pass.

Under this scenario, the number of visitor trips made with a pass would increase from 46% to 87%. The average revenue per passenger for visitors would increase from 48 cents to 68 cents and total annual revenue would increase by \$2.5 million. Note that the average fare for visitors would be higher than the cash fare indicating that many visitors would be paying an extra dollar or two for the convenience of the pass. *This scenario is only likely to occur if there is a highly successful marketing effort that results in pre-purchase of passes for 75% of visitors to the area.*

5.6.4 Summary of Fare Alternative Scenarios

The impacts on revenue and pass usage for the base level and the alternative scenarios is shown in Table 5-4 for downtown workers and shoppers and in Table 5-5 for visitors. Table 5-5 also shows the total revenue for each alternative. As noted above, the analysis of these alternatives did not include an assessment of the impacts of these scenarios on ridership, only the impact on relative usage of each fare product.

Of the alternatives to the base scenario, the higher single ride scenario is most likely to have adverse impacts on ridership since it imposes higher fares on downtown workers and shoppers who may be more sensitive to fare increases than visitors, and it increases fares for trips that visitors might consider optional, such as trips from the Mall into downtown. It does increase the share of visitor trips made with passes, putting more passes into visitors’ hands so that they might be more likely to make extra trips to shop or dine, but it does not increase visitor pass use as much as other alternatives.

The advanced sales scenario would greatly increase pass use by visitors and would increase revenue substantially. It is not likely to decrease ridership since such sales would be optional. It would, however, require significant marketing efforts and partnership arrangements to bring this about. The higher monuments fare scenario would bring about similar increases in pass use and revenue with much less effort. There could be a slight disincentive to use the Circulator but, as noted above, the higher fares would be imposed for a service that visitors would likely consider essential and worth the price. Visitors would then have a pass giving them unlimited rides for at least three days to explore the Mall and the downtown.

Table 5-4: Revenue from Downtown Workers and Shoppers for Alternative Scenarios

		Base		Higher Single Ride	
Annual Circulator Trips	weekly combo/monthly/annual	1,531,880	42%	2,428,916	67%
	Combo 1-Day pass	50,416	1%	75,624	2%
	Circ. 1-Day pass	75,624	2%	100,833	3%
	single ride	1,976,944	54%	1,029,491	28%
	all fare products	3,634,864		3,634,864	
Revenue per Passenger	weekly combo/monthly/annual	\$0.37		\$0.47	
	Combo 1-Day pass	\$0.33		\$0.50	
	Circ. 1-Day pass	\$0.40		\$0.50	
	single ride	\$0.50		\$0.75	
	all fare products	\$0.44		\$0.55	
Annual Revenue	weekly combo/monthly/annual	\$572,229	36%	\$1,152,078	57%
	Combo 1-Day pass	\$16,805	1%	\$37,812	2%
	Circ. 1-Day pass	\$30,250	2%	\$50,416	3%
	single ride	\$988,472	61%	\$772,118	38%
	all fare products	\$1,607,756		\$2,012,425	

Table 5-5: Revenue from Visitors for Alternative Scenarios

	Base	Higher Single Ride	Higher Monuments	Advanced Sales
7-Day pass	2,585,453 20.3%	4,323,560 34.0%	6,549,385 51.5%	6,549,385 51.5%
3-Day pass	2,369,878 18.6%	3,930,059 30.9%	4,488,904 35.3%	3,385,075 26.6%
1-Day pass	285,962 2.2%	696,595 5.5%	- 0.0%	1,103,829 8.7%
cash	7,471,501 58.8%	3,762,580 29.6%	1,674,505 13.2%	1,674,505 13.2%
all fare media	12,712,794	12,712,794	12,712,794	12,712,794
7-Day pass	\$0.44	\$0.58	\$0.65	\$0.65
3-Day pass	\$0.45	\$0.60	\$1.00	\$0.74
1-Day pass	\$0.49	\$0.67		\$0.91
cash	\$0.50	\$0.75	\$0.50	\$0.50
all fare media	\$0.48	\$0.64	\$0.75	\$0.68
7-Day pass	\$1,142,742 19%	\$2,524,706 31%	\$4,259,763 44%	\$4,259,763 49%
3-Day pass	\$1,065,114 18%	\$2,346,304 29%	\$4,488,904 47%	\$2,507,463 29%
1-Day pass	\$139,494 2%	\$464,397 6%	\$0 0%	\$1,003,481 12%
cash	\$3,735,751 61%	\$2,821,935 35%	\$837,252 9%	\$837,252 10%
all fare media	\$6,083,100	\$8,157,342	\$9,585,919	\$8,607,959
Revenue from Downtown Workers and Shoppers	\$1,607,756	\$2,012,425	\$1,607,756	\$1,607,756
Total Revenue	\$7,690,856	\$10,169,767	\$11,193,675	\$10,215,715

Thus, while the base scenario would be an appropriate fare structure for the Circulator, the higher monuments fares could increase revenue and entice more visitors to explore downtown without affecting local riders.

5.7 Sensitivity of Ridership to Higher/Lower Fares

While the previous scenarios considered riders’ changes in choice of fare products in response to changes in relative cost, the analysis did not consider the impacts on total system ridership. This section briefly examines the impact on ridership of changes in overall fare levels. All fares and passes are assumed to retain the same relative cost, while fares are increased or decreased. Table 5-6 shows how ridership and revenue could be expected to change as the single ride fare is varied between \$0.25 and \$1.00 and prices of other fare products are varied proportionally. The analysis shown in the table uses common transit industry practice for projecting ridership changes as a result of fare increases.³⁶ Projected ridership and revenue is shown separately for downtown workers and shoppers and for visitors. For downtown workers and shoppers, the common transit industry factors used should yield fairly reliable estimates since these riders are likely to behave somewhat similarly to transit riders elsewhere. For visitors, the results may be less reliable as visitors are likely to be less sensitive to price. Higher fares, however, may deter visitors from making the additional shopping or dining trips not included in the ridership estimates.

The table shows that higher fares will raise higher revenues, but with decreased ridership. Lower fares will increase ridership but revenues will be substantially lower. However, throughout the range of fares in Table 5-6, revenues would range between 28% and 74% of operating costs, within or above generally accepted levels for public transit services.

Table 5-6: Sensitivity of Ridership and Revenue to Fares

Single Ride Fare	Fare Change	Riders Change	Annual Ridership			Annual Revenue		
			Workers & Shoppers	Visitors	Total	Workers & Shoppers	Visitors	Total
\$0.25	-50%	22.2%	4,442,612	15,537,859	19,980,471	\$982,518	\$3,717,450	\$4,699,968
\$0.40	-20%	6.9%	3,885,544	13,589,538	17,475,083	\$1,374,909	\$5,202,099	\$6,577,008
\$0.45	-10%	3.2%	3,751,491	13,120,691	16,872,182	\$1,493,408	\$5,650,452	\$7,143,859
\$0.50	0%	0.0%	3,634,864	12,712,794	16,347,658	\$1,607,756	\$6,083,100	\$7,690,856
\$0.55	10%	-2.8%	3,532,473	12,354,687	15,887,161	\$1,718,714	\$6,502,920	\$8,221,633
\$0.60	20%	-5.3%	3,441,862	12,037,778	15,479,641	\$1,826,866	\$6,912,124	\$8,738,990
\$0.75	50%	-11.3%	3,223,370	11,273,610	14,496,980	\$2,138,619	\$8,091,671	\$10,230,290
\$1.00	100%	-18.2%	2,973,980	10,401,377	13,375,357	\$2,630,873	\$9,954,164	\$12,585,037

³⁶ The analysis uses a mid-point arc elasticity formula and the industry accepted fare elasticity of -0.3.

6 Capital Plan

This Capital Plan for the Downtown Circulator discusses the three primary capital expenditures that will be required. These are expenditures for the vehicle fleet, stops and stop amenities, and a storage and maintenance facility for the circulator vehicle fleet. It should be noted that the cost of providing a maintenance facility for Circulator Vehicles will be the responsibility of the selected service operator. Therefore, while presented here, the cost of such a facility will not be borne as a capital expense of the Circulator project. Similarly, bus shelters will be provided by the current bus shelter contractor in the District and will not be a direct expense of the project. As a result, vehicle costs will be the only capital expense of the Circulator project.

6.1 Vehicles

6.1.1 Vehicle Configuration Requirements

The configuration of a transit vehicle can vary depending on the type of market it is serving. The variations in configuration will include vehicle length, seat configuration, number and width of doors, and the level of the floor and the resultant type of boarding operations. The vehicle to be utilized on the circulator routes will be serving a market that is characterized by relatively short trips and potentially large volumes of boardings and alightings at individual stops (this will especially be true on the Monuments Route, which will predominantly serve visitors making short trips between the large number of tourist attractions along the route). Key elements of the vehicle configuration that will effectively serve this type of market include:

- **Low Floor** – One of the most important elements of the vehicle configuration impacting the speed of boardings and alightings is the vehicle floor level. The DCPG determined early in the planning process that the vehicles used on the circulator would be low floor. Because the level of the floor on a low floor vehicle is at curb height, there are no steps to climb to get into or out of the vehicle. This speeds the ingress and egress of both able bodied passengers as well as passengers who are physically handicapped. All vehicles identified in this analysis are low floor.
- **Door Width** – The width of both the front and back doors on the vehicle will be an important determinant of the speed with which boardings and alightings can occur. Standard door widths on vehicles identified as candidates for the circulator service range from approximately 29” to 46”. Three candidate vehicles identified³⁷ have three doors. Among the vehicles identified as potential candidates for the circulator service, those with the widest doors are manufactured by Neoplan (between 36” and 45”) and Thomas Built (both the front and rear doors are 42” wide).
- **Vehicle Length** – The operations plan assumed vehicles that can handle loadings of 50 to 55 passengers. Based on this loading requirement the length of the vehicles will have to

³⁷ The Neoplan AN440 TLF and the Volvo B10LE and B10L

be at least 35' long. Vehicles of between 35' and 45' were identified as potential candidates for the circulator service.³⁸

- **Seat Configuration** - The number and configuration of the seats on the bus will impact the vehicle capacity as well as the speed of loading and off-loading passengers. The final seat configuration is variable and therefore can be adjusted to the specific market served by the bus. Given the ridership estimates, especially on the Monuments Route, a seat configuration that maximizes capacity will likely be required.
- **Identity** – Because many of the passengers utilizing the circulator system will be visitors who do not have a great deal of familiarity with the District of Columbia, a special system identity that is quickly recognizable is essential. This identity will be incorporated into the system signage as well as the shelters, but the place where it will be most important is in the look of the vehicles. Two options exist for developing an identity. In the first instance, the identity can come from fitting a standard coach with a unique paint scheme. The second option is to utilize a special design vehicle that has a unique and recognizable body type. Figure 6-1 shows examples of both approaches. These special design buses are described in greater detail later in the report. The advantage of the unique body type of a special design bus is that it can be extremely recognizable and unique relative to other buses on downtown streets. The disadvantage is that each of the special design buses is in limited use and therefore there are additional issues associated with them such as parts availability and inventory, retrofitting maintenance facilities, and potentially unproven technologies. The advantage of using any of the standard coaches identified here is that it is a proven technology in wide use in North America and Europe, while the risk is that the paint scheme may not be unique enough on crowded downtown streets.

Figure 6-1: Unique Paint Scheme, Baltimore, MD - Unique Body Type, Irisbus Civis



³⁸ It should be noted that some of the special design vehicles identified herein do not meet this criterion. All special design vehicles were included in this analysis despite some not meeting this criterion because of the strong interest by the Partner Group in unique special vehicles.

In addition to these parameters, direction from the DCPG identified a number of additional vehicle characteristics that were considered essential. These include large windows to allow for maximum passenger viewing of passing sites and the fact that the vehicle should use clean fuel such as natural gas, electric-hybrid propulsion (a hybrid system comprised of both an internal combustion engine and an electric motor), or purely electric propulsion. Therefore, vehicles were identified that met the following criteria:

- Low floor
- Large windows
- Clean fuels
- Adequate capacity (55 passengers)

Each of these elements was considered as part of the process for identifying candidate vehicles for the circulator service. A summary of each vehicle type is outlined below, grouped by type (standard natural gas, double deck, and special design bus). A summary Table showing relevant data on each vehicle is included as Appendix F. Color photos of vehicle candidates are contained in Appendix G.

6.1.2 Standard Natural Gas Vehicles

The largest number of vehicles available that match the requirements set by the DCPG are standard-vehicles that have the option of utilizing natural gas engines rather than diesel engines.

Manufacturers of standard vehicles with natural gas options include:

- El Dorado National
- New Flyer
- Neoplan
- North American Bus Industries
- Orion Bus
- Volvo
- Nova Bus
- MAN

Standard vehicles with a natural gas option are outlined in Appendix F. These types of vehicles have both advantages and disadvantages. The primary advantage of these standard vehicles is that they are in wide use throughout the country, and therefore have been tested in operation. Further, because maintenance practices do not differ greatly from those used on diesel buses, there could be a wider range of potential operators available to bid on the contract, thus increasing competition and potentially lowering costs. This wider range of potential contractors can also provide the DCPG more flexibility in selecting the circulator operator. The primary disadvantage of a natural gas vehicle fleet is that the fleet will require a maintenance facility with natural gas fueling capabilities. WMATA has one natural gas facility that is at capacity and though there are other potential contractors that run natural gas vehicles, a new or retrofitted facility to handle the addition of the large fleet of natural gas vehicles will likely be required.

The body types of the vehicles vary, with some having fairly unique looks while others are quite standard. Most of the body types have large windows, as required by the DCPG. A unique identity can be further enhanced through a unique paint scheme. Figure 6-1 contained a picture

of the Hampden Shuttle Bug in Baltimore, which utilizes a standard Thomas 30' vehicle but has a unique paint scheme that provides identity. This is one approach the DCPG may wish to take.

6.1.3 Double Deck Buses

Some interest was expressed in the use of double deck buses on the circulator system for both system identity and capacity purposes. Two low floor double deck manufacturers were identified; TransBus and Volvo. Both buses utilize diesel engines that are currently equipped with clean diesel technology. Research was conducted into alternative fuel options for double deck buses. In discussions with Transbus staff, they indicated that the use of natural gas fuels on double deck buses appeared infeasible because the typical location for natural gas fuel storage is on the roof of the vehicle, which would exacerbate existing issues related to double deck bus heights. However, Transbus is currently completing formal engineering investigation to assess the feasibility of utilizing a hybrid electric drive system being developed by the Allison Transmission Division of General Motors. If feasible, a vehicle utilizing this hybrid-electric drive would produce lower emissions than a vehicle fueled by natural gas.

The potential disadvantage in utilizing double deck buses is that maintenance facilities would have to be retrofitted to handle them, thus potentially increasing costs as well as potentially limiting the number of contract operators who would be willing to operate the service (retrofits would be required because of the bus height, and would also be required if the vehicle is equipped with an electric/hybrid drive). One additional potential disadvantage is interference from overhanging trees. Many sidewalk trees in the city overhang the street and these trees can brush against even regular buses running in the curb lane. This issue will be exacerbated for double deck buses, especially where trees overhang the street at bus stops (overhanging trees would be present on each of the planned routes). Despite the issues associated with overhanging trees, these double-deck buses are about 1 foot shorter than a typical tractor trailer, and there does not appear that there are any truck restrictions on any of the proposed circulator routes.

Examples of the double deck buses manufactured by TransBus and Volvo are outlined in Appendix F.

6.1.4 Special Design Buses

Special design buses that have both unique body types as well as alternative fuel applications were also considered. Manufacturers represented include Designline, TransTeq, North American Bus Industries, Advanced Vehicle Systems, and Civis, each of which produces hybrid-electric or fully electric vehicles. The advantage of these vehicles is that they have very unique body types and thus provide a distinct identity. The primary disadvantage in using these vehicles is that they are in limited operation and therefore the technologies may not be fully proven. Second, required maintenance practices that are different than standard diesel bus maintenance may limit the number of contractors that would be willing to run the service, thus potentially increasing operating costs. In addition, a new or retrofitted maintenance facility would be required to handle this new technology. A short description of each vehicle is outlined below.

The **Designline** vehicle is a low emission electric hybrid that is manufactured and utilized in New Zealand. The vehicle has a capacity of 37 passengers (21 seated, 16 standing). The vehicles are currently used for a downtown circulator system in Christchurch New Zealand. This vehicle is included in this analysis despite not meeting the capacity requirements of 55 passengers outlined above because of the DCPG's strong interest in unique and alternative vehicles.

The **North American Bus Industries 30C-LF CNG Hybrid-Electric Composite Concept Bus** has a capacity of 26 seated passengers and approximately 18 standees. Its length is 30'. The vehicle is not currently in use in operations. As with the Designline vehicle, this vehicle is included in this document despite not meeting the capacity requirements outlined above because of the DCPG's strong interest in alternative vehicles.

The **TransTeq EcoMark CNG/Electric Hybrid** is utilized to provide service on Denver's 16th Street Mall. This vehicle carries 116 passengers so it will not be appropriate for circulator service unless the vehicle can be modified as a smaller bus. The vehicle is now also being put into service at Los Angeles International Airport. Research indicates that these are the only two operational applications.

The **Advanced Vehicle Systems AVS38** is an 38' electric hybrid vehicle that can accommodate 39 seated passengers and 22 standing passengers in its maximum capacity configuration. The buses are being used in operations in New York City, Chattanooga Tennessee, and Tampa Florida.

The **Irisbus Tramway Civis** is a 61' heavy haul fully electric or electric/hybrid vehicle in service in Europe but nowhere in the United States as of yet. This vehicle has been designed for Bus Rapid Transit service, which is meant to replicate rail service utilizing a rubber tired vehicle, and therefore has significant passenger carrying capacity (over 100 when filled to capacity). This vehicle may be too large for a circulator application on busy downtown streets.

The **Irisbus Trolleybus Cristalis** is a 39' fully electric/hybrid electric vehicle manufactured by the same firm as the Irisbus Tramway Civis. This vehicle has the same look as the Irisbus Tramway Civis but has a smaller passenger carrying capacity. Based on its shorter length, this vehicle may be more suited to a circulator service on busy city streets.

The potential feasibility of utilizing some of the special design vehicles noted above is impacted by the Federal Transit Administration's (FTA) Buy America requirements for rolling stock purchases funded by the FTA. This Buy America stipulation requires that manufactured products such as rolling stock must be manufactured in the United States and have a 60% domestic content. In response to this requirement, many European bus manufacturers have set up factories in the United States to build vehicles for U.S. properties. However, it should be noted that these factories produce standard vehicles utilized throughout the U.S. while the special design vehicles identified above would not be produced in large quantities and therefore setting up a U.S. manufacturing operation for these vehicles may not be feasible or cost-effective.

The alternative to a U.S. manufacturing operation is to receive a waiver to the Buy America requirements. The two primary factors that will allow for a waiver is that if there is no equivalent U.S. product, which might apply to some of the special design vehicles identified above, or if there is a 25% cost differential between the U.S. product and the foreign product. If the DCPG chooses to apply for a waiver, they would be required to present their argument for the waiver to the Federal Transit Administration and the FTA would deliberate on whether a waiver is appropriate given the circumstances. This application process and FTA review would likely take between 6 months to a year.

6.1.5 Vehicle Summaries/Advantages and Disadvantages

Table 6-1 shows a summary of the vehicles grouped by fuel type and vehicle size. Table 6-2, summarizes the data outlined in the previous paragraphs regarding the advantages and

disadvantages of the different vehicle types. Table 6-3 shows a ranking of vehicles by nine criteria noted in the previous sections. For each criterion, each vehicle is given a rating of one through four, with four being the most desirable.³⁹

Based on the above assessment and considering the specific fuel and capacity requirements outlined by the DCPG, it is suggested that the Circulator move forward with a vehicle that is: 1) at least 35' long, 2) uses clean fuels, and 3) has a proven track record of use in North America. Using these criteria, two of the special design vehicles, the Designline City Bus, and North American Bus Industries Concept Bus, fall out of contention because they do not meet the circulator capacity requirements. A Natural Gas vehicle, the El Dorado National E-Z Rider II barely meets the passenger capacity requirements but is less than 35' and thus provides little flexibility on heavy travel days or routes.

Neither of the double deck buses identified in the process currently have a Natural Gas fuel option. TransBus is considering an electric hybrid drive system but this is an unproven technology.

Many of the other Electric/Electric hybrid vehicles identified meet these basic criteria but are in limited use in North America. These vehicles include the TransTeq EcoMark, which is in use only in Denver, the Advanced Vehicle Systems vehicle, which is in limited use in Nashville Tennessee, Tampa Florida, and New York City, the Irisbus Trolleybus Cristalis, and the Irisbus Tramway Civis neither of which are in use in North America. The latter two vehicles, along with the Designline City Bus, have the further disadvantage of not being manufactured in North America, which would require a Buy America waiver from the Federal Transit Administration. Procuring this waiver will add time to the process and there is no guarantee that the waiver can in fact be procured.

The remaining vehicles are standard buses already in wide use that have natural gas fuel options and meet the minimum length requirements. The use of one of these standard vehicles with an eye catching and unique paint scheme and graphics will address Buy America requirements, will meet the requirements for capacity and clean fuel technology, and will provide buses with a proven track record with North American Transit Systems.

If the DCPG wishes to use vehicles with a unique body type, there are several vehicles that meet the capacity and clean fuel requirements. Most of these do not meet the Buy America requirement. None have a long proven track record in North America, although some are in limited use. All are unique enough to require retrofitting of facilities and non-standard maintenance procedures which may limit the flexibility in finding a contractor who can provide the service.

³⁹ Note that a total rating is given. This is an unweighted total shown for convenience. This does not reflect a recommendation as to the most appropriate vehicle.

Table 6-1: Summary of Vehicles by Size and Fuel Type

Vehicle Size	Natural Gas	Electric/Electric Hybrid	Clean Diesel*
<35'	1. El Dorado National E-Z Rider II (30')	1. Designline City Bus (30') 2. North American Bus Industries Composite Concept Bus (30')	
35'–45'	1. New Flyer Model D40LF (40') 2. New Flyer Model D35LF (35') 3. Neoplan AN 440 TLF (40' or 45') 4. Neoplan AN 435 TLF (35') 5. North American Bus Industries 40LFW (40') 6. Orion Bus Orion VII Low Floor (40') 7. Volvo B10BLE (45') 8. Volvo B10L(40') 9. Nova Bus LFS (40') 10. MAN NM Low Floor MidiBus (35')	1. Advanced Vehicle Systems (38') 2. Irisbus Trolleybus Cristalis (39')	
>45'		1. TransTeq EcoMark (60') 2. Irisbus Tramway Civis (61')	
Double Deck			1. TransBus Trident (39') 2. Volvo Super Olympian (40')

* The double deck buses are currently only available with the clean diesel fuel option. However, TransBus is currently working with the Allison Drives Division of General Motors to examine the feasibility of equipping TransBus double deck buses with an electric/hybrid drive system.

Table 6-2: Summary of Advantages and Disadvantages

Vehicle Type	Advantages	Disadvantages
Standard Vehicles with Natural Gas Engines	<ul style="list-style-type: none"> • Wide use, proven design • Standard maintenance practices, no changes required to existing maintenance practices of potential operator • Can potentially utilize existing or future maintenance facilities equipped for Natural Gas vehicles • Sufficient passenger capacity to meet estimated demand. • Greater number of potential operating contractors based on wider familiarity with standard vehicles – greater flexibility in selecting contractor 	<ul style="list-style-type: none"> • May have insufficient uniqueness in body type for identity purposes. • New or retrofitted facility to handle natural gas will likely be required.
Double Deck Buses	<ul style="list-style-type: none"> • Unique identity • Passenger carrying capacity 	<ul style="list-style-type: none"> • Fewer model choices available • Operations and Maintenance facility retrofits will likely be required • O&M facility limitations may limit number of contractors willing to bid to run the system • Unlikely to be available in natural gas fuel option – electric hybrid propulsion system untested. Contractor unfamiliarity with electric/hybrid system may limit number of contractors willing to bid. • Potential interference from street trees and other clearance problems.
Special Design Buses	<ul style="list-style-type: none"> • Unique identity 	<ul style="list-style-type: none"> • Some vehicles are in limited use and therefore are an unproven technology • Off shore manufacturing requires FTA Buy America waiver • O&M facilities will require special retrofits to handle new technology. • Some potential contractors may not be willing to compete on contract because they do not have the capability to maintain vehicles, therefore constraining the DCPG’s flexibility in selecting a contractor. • Some vehicles do not have required capacity to meet estimated demand.

Table 6-3: Ranking of Vehicles

Type	Model	Facility Retrofits Required	Buy America	Proven Track Record	Meets Capacity Requirements	Unique Body	Standard Maintenance Practices	Flexibility in Contractor	Vehicle Retrofit	Availability of Clean Fuel Technology	Total Score
Standard Bus - Natural Gas	El Dorado E-Z Rider II	3	4	4	2	1	4	4	4	4	30
	New Flyer Model D40LF	3	4	4	4	1	4	4	4	4	32
	New Flyer Model D35LF	3	4	4	4	1	4	4	4	4	32
	Neoplan AN 440 TLF	3	4	4	4	1	4	4	4	4	32
	Neoplan AN 435 TLF	3	4	4	4	1	4	4	4	4	32
	NABI 40LFW	3	4	4	4	1	4	4	4	4	32
	Orion Bus Orion VII Low Floor	3	4	4	4	1	4	4	4	4	32
	Volvo B10BLE	3	4	4	4	1	4	4	4	4	32
	Volvo B10BL	3	4	4	4	1	4	4	4	4	32
	Nova Bus LFS	3	4	4	4	1	4	4	4	4	32
MAN NM Low Floor MidiBus	3	4	4	4	1	4	4	4	4	32	
Special Design - Electric/Hybrid Electric	Designline City Bus	1	1	1	1	4	1	1	4	4	18
	NABI Composite Concept Bus	1	4	1	1	4	1	1	4	4	21
	Advanced Vehicle Systems	1	4	2	4	2	1	1	4	4	23
	Irisbus Trolleybus Cristalis	1	1	1	4	4	1	1	4	4	21
	TransTeq Ecomark	1	4	2	4	3	1	1	4	4	24
	Irisbus Tramway Civis	1	1	1	4	4	1	1	4	4	21
Double Deck	TransBus Trident	1	2	3	4	3	3	2	1	1	20
	Volvo Super Olympian	1	2	3	4	3	3	2	1	1	20

6.1.6 Estimated Vehicle Costs

Based on the range of candidate vehicles, the associated range of vehicle capital costs are summarized in Table 6-4 below.

Table 6-4: Vehicle Capital Costs

Vehicle Type	Required # of Vehicles*	Cost Per Vehicle**	Total Vehicle Cost
35' Standard Natural Gas	90	\$260,000	\$23,400,000
40' Standard Natural Gas	90	\$280,000	\$25,200,000
Double Deck	90	\$270,000	\$24,300,000
Electric/Electric Hybrid	90	\$285,000	\$25,650,000

* The assumption for the required number of vehicles is based on the project operating plan. Different vehicles will have different capacities and therefore some modifications of the operating plan to reduce the number of vehicles may be possible. These potential savings are not incorporated into the capital cost calculations included in this table or in the operating cost elsewhere in this plan.

** Costs per vehicle were estimated utilizing the Federal Transit Administration’s “Statistics on Appropriations for Vehicle Purchases for FY 2001.

6.2 Stops and Stop Amenities

Bus stops and stop amenities will be installed and maintained via a contract with a bus shelter advertiser. Under this arrangement, the advertiser recoups the cost of installation and the maintenance program through the sale of advertising on the shelters. This arrangement is quite common and in place in a number of jurisdictions. The contract with the advertiser in Washington D.C. will be written such that the advertiser will be responsible for installing unique shelters and stop amenities at circulator-only stops as part of its larger city-wide contract. Further, the contract will stipulate that certain Circulator stops will have no advertising (the costs of installing the circulator shelters will be recouped by increasing advertising on other shelters in the city). Because the responsibility for stop amenity installation will rest with the advertising firm, the project will bear no capital cost for this project element.

6.3 Storage and Maintenance Facility

The large vehicle fleet (90 vehicles) necessary for the circulator service may very well require an entirely new maintenance and storage facility. Capital costs and acreage requirements were estimated for the new fleet based on work completed as part of the Washington Metropolitan Regional Bus Study. Based on this work the estimated facility acreage requirement will be **5.9 acres**.⁴⁰ The estimated capital cost of the storage and maintenance facility is **\$56,398,593** (see Table 6-5 below for greater detail), including the cost of land purchase. This estimate is based on the estimated cost of a 100-vehicle urban facility from the Regional Bus Study. Land costs are

⁴⁰ The garage plan portion of the Regional Bus Study calculated acreage requirements for both urban and suburban facility types, for a range of the number of buses to be handled at the facility (acreage requirements were developed for a 50, 100, 150, 200, and 250 bus facility). The acreage estimate identified for the circulator facility is based on the acreage required for an urban facility supporting 100 vehicles.

based on the average cost of land in the District of Columbia based on data received from WMATA and the real estate industry.

Table 6-5: Garage Capital Costs

Program Element	Unit	Cost	20% Contingency	Total
Site Work	SF	\$2,058,358	\$411,672	\$2,470,029
Operations and Maintenance Building	SF	\$14,215,563	\$2,843,113	\$17,058,675
Bus Parking	SF	\$5,410,000	\$1,082,000	\$6,492,000
Employee Parking	SF	\$1,080,000	\$216,000	\$1,296,000
Furniture/Equipment	SF	\$1,421,556	\$284,311	\$1,705,868
Soft Costs*	LS	\$12,092,738	\$2,418,548	\$14,511,286
Land	LS			\$12,864,735
Total				\$56,398,593

*Soft Costs include design fees and expenses, construction management fees, testing/monitoring, permits, and communication systems.

7 Financing Plan

This Financing Plan for the Downtown Circulator includes a description of funding sources used for other downtown circulators throughout the United States, conclusions that can be applied in Washington, and a description of the financing strategy for the Downtown Circulator.

7.1 Funding for Other Downtown Circulators

As part of the process of developing a Downtown Circulator Implementation Plan for the DCPG, Multisystems, Inc. contacted the agencies that operate downtown circulator systems in nine U.S. cities. This effort was undertaken in order to gain insights into the potential markets for downtown circulators and to develop an understanding of the operations of other circulator systems. One of the key issues discussed with the nine agencies was the source of funding used for both acquiring the downtown circulator and for ongoing operation of the services. This section summarizes the funding sources used by the agencies.

7.1.1 Capital Funding Sources

Table 7-1 shows a detailed break-down of the capital funding sources used by the nine downtown circulator operators. Seven of the nine agencies leveraged federal funding for purchasing their Downtown Circulator vehicles. Six of these agencies used a standard 80-20 federal-local funding split for vehicle acquisition. While most of the federal funding was Federal Transit Administration (FTA) Section 5307 or 5309, one of the agencies (*Milwaukee*) used a Congestion, Mitigation, and Air Quality (CMAQ) grant to purchase their vehicles. As will be described in a subsequent section, Milwaukee County Transit has also used CMAQ money to fund operation of their downtown trolley system. Vehicles for the LYMMO service in Orlando were funded with only a 50% Federal share. 25% of the vehicle cost in Orlando was covered by the Florida Department of Transportation, while the remainder was paid with local funds (a combination of general city funds and community redevelopment funds).

Additionally, two of the agencies have used different funding sources to pay for specific vehicles. In Denver, the original 16th Street Mall Shuttle vehicles were purchased with 80% federal funding; however, the agency is in the process of replacing these vehicles, and the new vehicles are only 50% funded by the FTA. In Miami Beach, the four original Electrowave vehicles were purchased with 80% federal funds. The remaining seven vehicles were funded by variety of sources. 13% of the capital cost was covered by the Clean Cities Coalition, 33% was covered by the City of Miami Beach, and the remainder was paid by a variety of state sources, including the DOT, EPA, and the Pollution Recovery Trust Fund. The Miami Beach TMA is currently in the process of purchasing three additional vehicles for the Electrowave service, and these vehicles are being 80% funded by the FTA.

Two of the cities (*Austin and Los Angeles*) did not use any Federal funds for purchasing their vehicles. In Austin, the vehicles were purchased with general transit agency funds, which are derived from sales tax, investment income, and other revenue sources. In Los Angeles, vehicles

Table 7-1: Sources of Capital Funds for Downtown Circulator Vehicles

	Funding Mechanism			
	Federal	State	Local	Transit Agency Funds
Austin	-	-	-	100% ⁵
Chattanooga²	80%	10%	10% ⁸	-
DART	80%	-	-	20% ⁷
Denver (original vehicles)	80%	-	-	20%
Denver (new fleet)	50%	-	-	50%
Los Angeles	-	-	100% ⁶	-
Miami (remaining 7 original vehicles)¹⁰	13%	54%	33%	-
Miami (4 original and 3 new vehicles)	80%	20% ¹		-
Milwaukee⁴	80%	-	20%	-
Oklahoma City	80%	-	20% ³	-
Orlando (LYNX)⁹	50%	25%	25%	-

¹ Funded through state toll revenues

²Federal funds were Section 5309; State funds were from the TN Department of Transportation;
Local funds were from the City of Chattanooga

³Funded through MAPS project, which was a 5-year sales tax that funded downtown improvements

⁴Federal funds were CMAQ; Local funds were provided by the County

⁵Sales tax, investment income, other revenue sources - exact breakdown unknown

⁶Proposition A local return funds - based on a one-half percent sales tax levied in Los Angeles County

⁷Source of transit agency funds is a 1 percent sales tax levied within 13 member cities

⁸General city funds - source is tax revenue.

⁹State funds from the Florida Department of Transportation. Local funds were a combination of general city funds and funds from the community redevelopment agency (tax increment financing)

¹⁰Federal funding for these 7 vehicles was from the Clean Cities Coalition;

were purchased with Proposition A local transit funds. These funds are based on a one-percent sales tax that is levied within 13 cities in the Los Angeles metropolitan area.

The local match required for federally funded vehicles has been provided by a variety of sources at the different agencies. Three of the seven agencies that used federal capital funding had additional funding from their State Departments of Transportation (*Chattanooga, Miami Beach, and Orlando*); all of these agencies also used local funds for their match. In Miami Beach, the state funds were in the form of toll revenue credits. Two of the cities (*Dallas and Denver*) used general transit agency funds for their local match. The remaining two cities (*Milwaukee and Oklahoma City*) used only local funds for their 20% match. In Oklahoma City, this local match was covered by their MAPS project, a 5-year project in which a sales tax was levied to fund downtown improvements.

7.1.2 Operating Funding Sources

The nine agencies have used a variety of sources to fund everyday operation of their downtown circulator services. In general, these funding sources can be broken down into the following categories: transit agency (farebox revenue and general operating funds), federal, state, local, and private funds. The following sections provide more detail on these funding sources. Table 7-2 shows a breakdown of the sources used by each of the nine downtown circulator systems.

Farebox Revenue

Four of the cities (*Austin, Chattanooga, Denver, and Orlando*) do not charge a fare on their services; thus they do not receive any farebox revenue. The remaining systems have farebox recovery ratios ranging from 4% - 24%. It should be noted that the 24% recovery ratio is on Oklahoma City's green route, which is primarily geared towards tourists⁴¹. The remaining routes have a recovery ratio of only 4%. Table 7-3 shows the fare charged by each of the cities that charge a fare, and their respective fare recovery ratios⁴².

Regular Transit Agency Operating Funds

Six of the cities (*Austin, Dallas, Denver, Los Angeles, Milwaukee, and Oklahoma City*) receive general transit agency operating funds for their downtown circulator systems. The contribution by the transit agency ranges from 1% in Milwaukee, to 100% in Austin. In Oklahoma City, the operating cost for the trolley service was originally covered by the MAPS project (referenced earlier); however, once this project was completed, the transit agency took over responsibility for funding the service.

Federal Funds

Only two of the cities (*Milwaukee and Oklahoma City*) use federal funds to operate their downtown circulator services. Milwaukee uses a CMAQ grant to fund this service, while Oklahoma City uses FTA funds. In Milwaukee, the CMAQ grant covers 80% of their operating cost. Currently, the agency is having trouble obtaining the local match for funding the service (even though they have private sponsorship as well), and may consider discontinuing it as of September 2003.

⁴¹ This route has a fare of \$0.50. The remaining routes have fares ranging from \$0.25 to \$0.50.

⁴² It should be noted that the fare recovery ratio is not dependent solely on the fare charged - there are a number of other factors that also contribute to this ratio, such as the cost of operating the service and ridership.

Table 7-2: Sources of Operating Funds for Downtown Circulator Systems

	Funding Mechanism											
	Agency Funds		Federal Funds		State Funds	Local Funds					Private Funds	
	Farebox Revenue	Agency Operating Funds	CMAQ	Other Federal Funds	State DOT	Sales Tax	Parking Revenue	Downtown Property Tax	Impact Fees on Developers	Local Funds	Private Sponsorships	Downtown BID
Austin	-	100% ⁶	-	-	-	-	-	-	-	-	-	-
Chattanooga	-	-	-	-	-	-	58%	-	-	42%	-	-
DART	10%	50% ⁵	-	-	-	-	-	-	-	-	-	40% ⁷
Denver	-	100% ⁵	-	-	-	-	-	-	-	-	-	-
Los Angeles (A, B, and E)⁸	12%	✓	-	-	-	✓	-	-	-	-	-	-
Los Angeles (remaining)	12%	-	-	-	-	78%	-	-	-	-	-	-
Miami	5% ¹	-	-	-	20%	-	60%	-	15%	-	-	-
Milwaukee	15%	1%	80%			-	-	-	-	-	2% ²	2%
Oklahoma City (Green)	24%	29% ³	-	21%	-	-	-	-	-	-	26% ⁴	-
Oklahoma City (Other)	4%	78% ³	-	18%	-	-	-	-	-	-	-	-
Orlando (LYNX)	-	-	-	-	-	-	✓	✓	-	-	-	-

¹Includes advertising revenues and grants

²Private sponsorship is from a local casino

³Originally, local share of operating cost was covered by the MAPS project

⁴Private sponsorship includes local museums and the Convention & Visitors Bureau

⁵Primarily sales tax revenue

⁶Sales tax, investment income, other revenue sources - exact breakdown unknown

⁷McKinney Ave. Transit Authority, which is partially funded by BID

⁸These routes receive regional transit funding because they are the result of the

LADOT taking over the Southern California Rapid Transit District's Minibus route

✓ Exact breakdown not specified by agency

Table 7-3: Comparison of Fares Charged to Fare Recovery Ratios⁴³

City	Fare Charged	Fare Recovery Ratio
Dallas	\$0.50	10%
Los Angeles	\$0.25	12%
Miami Beach	\$0.25	5%
Milwaukee	\$0.50	15%
Oklahoma City	\$0.25 - \$0.50	4% - 24%

State Funds

Miami Beach is the only city that receives state funding to cover their downtown circulator operating cost. The Florida Department of Transportation covers 20% of the operating cost for the Electrowave service.

Local Funds

Five of the cities (*Chattanooga, Los Angeles, Miami Beach, Oklahoma City, Orlando*) use local funds to cover at least a portion of their downtown circulator operating cost. The three agencies that do not receive general transit agency funding for operating their services (*Chattanooga, Miami Beach, and Orlando*) cover a significant portion of the operating cost with parking revenue, downtown property owner tax revenue, impact fees for developers, or city funds. Miami Beach has levied an impact fee on developers, which covers 15% of their operating cost. In Los Angeles, most of the DASH routes are operated with Proposition A funding, although three of the routes (Routes A, B, and E) also receive regional transit funding because they are the result of the LADOT taking over the Southern California Rapid Transit District's Minibus route.

Private Partnerships/Sponsorships

Three of the cities have developed partnerships with private organizations to help in funding their downtown circulator systems. In Dallas, the McKinney Avenue Transit Authority, which is partially funded by the Downtown Business Improvement District (DBID), covers 40% of the operating cost for the M-Line Shuttle. The Milwaukee Transit Authority has formed partnerships with the DBID and a local casino to help fund their trolley service - each of these organizations provide approximately 2% of the total operating cost for the service. In Oklahoma City, the green route (which is largely tourist oriented) has 26% of its operating cost covered by private sources, including local museums and the Convention & Visitors Bureau.

7.2 Conclusions for the Downtown Circulator

The examination of funding sources used by other cities highlights a few observations that might be useful in the implementation of a Downtown Circulator for Washington D.C. For vehicle purchase, many of the example systems leveraged federal funding when acquiring their vehicles. The FTA can cover up to 80% of the purchase cost of vehicles. Some cities found that obtaining the remaining 20% could be a challenge. Additionally, some of the agencies had to be creative in finding funding for their vehicles. The Miami Beach TMA had at least five funding sources for the Electrowave vehicles, including the Florida EPA and the Clean Cities Coalition. The Florida Power and Light Company donated approximately \$350,000 worth of supporting

⁴³ Fares shown are for full-fare riders. Some systems charge reduced fares for the elderly and people with disabilities.

equipment for the service. A representative from the TMA noted the importance of developing partnerships (as they have), and of thinking about the various grants that may be pursued in the start-up of a circulator service.

While the FTA may prove to be a good starting point for capital funding, the federal government does not typically provide funds for operating bus services. Although the Milwaukee Transit System was successful in obtaining CMAQ funds for operations, these grants typically span only a few years, and the transit agency must then think about how to continue operating the service that has been established.

Farebox revenues, for the services examined, do not cover a significant portion of the operating cost of service. The projected farebox recovery ratio for the DC Downtown Circulator is much higher than has been achieved in these other cities. The higher expectations are reasonable given the characteristics of the intended market, however, expectations concerning farebox revenues should be allowed to become unrealistic. It will be important to identify other sources of operating funding to cover the majority of the operating costs. The example cities, in most cases, have relied heavily on local or private funding sources for operations. Sales taxes, parking revenues, and taxes on downtown property owners can be good sources of operating funds, since the people who are paying these taxes and fees tend to benefit from the transit service. It is also important to develop partnerships with other organizations when trying to obtain funds for continuing operation of the downtown circulator service. A varied mix of funding sources appears to be the most effective way to assemble a financing plan for the DC Downtown Circulator.

7.3 Funding Sources for Downtown Circulator Operations

The Downtown Circulator is expected to be able to cover about 45% of operating costs through farebox revenues. While this percentage is quite high relative to other public transit services and to downtown circulators in other cities, it still leaves just over half of all operating costs to be paid through other sources. Several possible sources of additional operating funding have been identified for the Downtown Circulator. The DCPG is working to establish a financing plan to establish a stable set of funding sources for the service. For the initial phase of implementation, three members of the DCPG (DBID, DDOT, and NCPC) have committed to each securing \$2 million in annual operating funding (a total of \$6 million) to support the operation of the Circulator.

8 Marketing Plan

This Marketing Plan for the Downtown Circulator identifies design and promotion efforts that will be needed to ensure the success of the proposed downtown transportation system.

8.1 *Marketing Plan Overview*

The Marketing Plan is based on an understanding of:

- Target markets – Whom are we trying to serve?
- Service design – How are people expected to make use of the service?
- Operating context – How do circulator routes fit with other transportation modes?
- Marketing context – How can the project best use vehicle graphics, displays, and printed materials to reach visitors and local workers?

The plan includes sections on the following topics:

- **Target Markets** - This examines the context within which proposed bus services will operate. It describes the market groups for whom the service has been designed so that marketing messages can be formulated to reach these target groups. It identifies three principal user groups – tourists, business travelers/conventioners, and downtown workers/shoppers. It also describes how identified groups are expected to utilize the proposed service.
- **Project Name and Identity** - This presents recommendations for a working name and corporate identity for the proposed circulator transportation program. A properly selected name and a well-designed logo can be decisive in determining how people will react to the service. This section includes a matrix of issues and choices designed to help determine the best market position and system name. It includes a choice of logotype and paint scheme applications.
- **Marketing Strategy** - Marketing efforts need to be based on a clearly stated and clearly understood strategy. This section presents a two-page marketing strategy for the circulator project. This concisely written document is designed to keep marketing efforts focused and on track. Its purpose is to remind project partners, bus operators, and marketing staff what the project is doing with its marketing program and why.
- **Individual Marketing Efforts** - This presents a more detailed discussion of the individual marketing efforts identified in the Marketing Strategy. It describes the purpose of each component effort, suggests criteria for measuring success of the effort, and identifies implementation steps, costs, and related issues.

8.2 *Target Markets*

A successful marketing program will show potential users how they will benefit from the service. Therefore, the first task is to identify those users and their transportation needs. This will ensure that marketing messages are formulated to reach the target groups.

The Operations Plan identified two primary potential user groups – visitors and downtown workers/shoppers. For marketing purposes, the visitors group really consists of two distinct sub-groups – tourists and conventioners/business travelers. This section describes the three groups and how they are expected to utilize the proposed services, highlights the relevance of other transportation modes, and discusses possible expectations of the potential partners and reasons to address their concerns in a circulator marketing program.

8.2.1 User Markets

Downtown circulator services can be discussed in terms of three different market groups:

- Tourists
- Conventioneers/business travelers
- Downtown workers and shoppers

Tourists

Tourists travel to the nation’s capital to visit monuments, museums, exhibits, government buildings, and other national landmarks. Tourists need access to the capital’s attractions – whether from their hotels, from parking areas, or from public transportation terminals. And because many of the distances involved are too far to walk, visitors need a convenient way to travel between various capital attractions.

Tourists also need access to local restaurants and shopping opportunities, both in the downtown and in historic Georgetown. In addition, visitors can be expected to show increasing interest in Washington, D.C.’s downtown, in part because of ongoing restoration and revitalization efforts in the downtown core.

Conventioneers/Business Travelers

A wide assortment of business travelers visit the nation’s capital for meetings with elected officials, government agencies, interest groups, and private businesses. Added to this daily flow of business travel are larger groups attending conferences and conventions. This last group is expected to become increasingly significant with the opening of the new Convention Center.

Business travelers need easy access to office locations downtown and on Capitol Hill. They also need convenient transportation to conference sites, to restaurants, and to in-town retail stores. At the same time, business travelers can benefit from quick and direct transportation to and from individual tourist destinations.

Downtown Workers and Shoppers

Downtown workers travel within the downtown core for a wide variety of business purposes. This includes participation in downtown meetings, travel between agency offices, attendance at congressional hearings, and visits to congressional offices. Downtown workers can also benefit from easier access during midday and early evening hours to downtown restaurants and shopping opportunities.

8.2.2 Anticipated Travel Patterns

The downtown circulator transportation includes four routes:

- **White House-Capitol Route** – serves the White House, Foggy Bottom, the State Department area, Federal Triangle, the National Mall, the Capitol, Union Station, and downtown

- **Monuments Route** – serves the Washington Monument, Jefferson, Roosevelt, Korean War, Lincoln, Vietnam Veterans, and World War II Memorials and connects them to Metrorail and the White-House Capitol Route.
- **North-South Route** – serves the new convention center, the downtown area, the National Mall, the L’Enfant Plaza area, and the Southwest Waterfront.
- **K Street Route** – serves Union Station, the new convention center, K Street, and Georgetown.

Anticipated Tourist Travel Patterns

Visitors can be expected to use these bus routes for trips that originate at their hotels, at downtown Metrorail stations, at Union Station, and various parking locations.

Some visitors will be likely to assemble a list of travel destinations. For example, a group of visitors might travel from their hotel in the morning to Capitol Hill to visit the Capitol building, the Library of Congress, and the Supreme Court. They might continue from there to the Smithsonian on the Mall to visit the Air and Space Museum and the National Gallery of Art. After a trip into the downtown or to Union Station for lunch, they might return to the Mall to visit the Museum of Natural History.

The same group might return to the Mall on their second day and transfer to the route that will take them to the Jefferson, Roosevelt, Lincoln, Vietnam Veterans and World War II Memorials.

Other visitors might wish to focus their time and attention on one or two museums or monument sites. These individuals will look for opportunities to travel directly from their starting point to their desired destination. For example, someone with a particular interest in the National Gallery of Art might travel from a downtown hotel to the art museum in the morning, and from the museum to Union Station for lunch. They could go back to the art museum for the afternoon, or into the historic downtown for a walking tour and shopping. This same person might use the circulator service in the evening to travel between their hotel and Georgetown for dinner.

Anticipated Conventioneers/Business Travel Patterns

Business travelers could use the circulator service for travel between their hotels and the Convention Center. They may also use it to travel to Capitol Hill for an appointment with their Congressional representative. Convention participants can be expected to travel to different in-town locations for evening dining. And business travelers may also want to visit one or more destinations on the Mall. Some will have time for a more leisurely visit. Others may have limited time available and may wish to travel directly to and from a destination such as the Vietnam Veterans Memorial.

Anticipated Downtown Worker and Shopper Travel Patterns

An individual who works in an office west of the White House might use the circulator service to travel to a Congressional hearing or to a staff meeting on Capitol Hill. Similarly, Congressional staffers might use it to attend meetings downtown.

Federal employees might use circulator routes to travel between agency locations, avoiding a need to wait for less frequent employee van service.

An employee of the Department of Transportation in southeast Washington might use the 7th Street bus to travel to Chinatown for lunch. Or they could use this route to reach the downtown

center for late afternoon shopping before boarding Metrorail downtown for their afternoon commute.

8.2.3 Other Transportation Modes

While some potential users will have hotel accommodations on the circulator routes, and some area workers may live within walking distance of the service, a significant percentage of visitors and downtown workers will travel to and from the downtown using some other mode of transportation.

A key function of new circulator services will be to provide visitors and workers with frequent and easy access to in-town destinations after they have arrived in the downtown by Metrorail, Metrobus, commuter train, or private automobile.

Each travel mode can be seen as a different sub-market for the circulator program. And each mode can be addressed separately for visitors and resident workers. The different subgroups are likely to differ to some degree in (1) their need for alternate transportation, (2) their awareness of the service, and (3) their willingness to utilize the new service.

Metrorail and commuter rail users, both visitors and commuting workers, are probably the prime market for circulator routes. These people have demonstrated a willingness to use an alternative to the automobile, yet they may be unfamiliar with regular city Metrobuses and reluctant to try them. Much of the circulator marketing program should probably be aimed at these Metrorail and passenger train riders.

The importance of the Metrorail market for tourists can be seen by the treatment of Metrorail in visitor guide books and tourist maps. Most of these publications include Metro's graphic presentation of the Metrorail route map. Guide books include suggested itineraries that rely on the Metrorail system for touring capital attractions.

This suggests that links to Metrorail and Amtrak stations should be prominently featured in maps presenting circulator bus routes. Graphics should be designed for utilization in private guides and maps. Metrorail cars and stations may be a prime location for promotional display advertising.

While some individuals who commute by private auto may be persuaded to use the new service, these people currently demonstrate either limited awareness of the benefits of the existing alternatives or a reluctance to give up the privacy of their cars. Individuals who place a high priority on their privacy are likely to continue relying on private taxis for cross-town travel. If they can be persuaded to try the new service, this is most likely to be for rides that are short and quick and that involve little or no waiting.

Current Metrobus riders are likely to switch to the new service for trips that are faster than existing alternatives, or because less waiting time is involved. Experienced bus users are probably the most likely group to understand the benefits of the new service and the most willing to take advantage of it. Advertisements in Metrobuses may play an important role in informing current bus riders.

8.2.4 Needs and Expectations of Project Partners

This section identifies issues that may be of concern to potential project partners. To ensure participation by partners, and a positive response from potential users, a circulator marketing program should attempt to address as many of these issues as possible.

Possible partners addressed briefly in this section include:

- United States Congress
- National Park Service
- Other Federal Agencies/GSA
- Metro
- DC Convention Center
- Downtown Businesses
- Georgetown Businesses
- NCPC and other planners

United States Congress and National Hospitality

Visitor facilities serve as a welcome center for U.S. citizens who travel to their nation's capital. The quality of visitors' experiences reflects upon their sense of the quality of their government. Members of Congress pay attention to the hospitality provided to constituents who visit their offices. This should also hold true for their constituents' overall experience with national landmarks, monuments, and facilities in the capital.

The name, identity, and image of the new transportation program should suggest that it is an integral part of a high-quality visitor experience.

National Park Service

The mission of the National Park Service is (1) to protect natural and cultural resources and (2) to ensure a quality visitor experience. Traffic congestion, tour bus parking, and automobile overcrowding threaten the Park's resources. Traffic congestion and related obstacles that interfere with easy public access diminish the quality of the visitor experience.

While the National Park Service is working separately to address these problems in the nation's capital, there is considerable overlap with concerns expressed by the city, the business community, the transit authority, and federal agencies. Circulator bus routes are likely to meet many of the needs that have been identified by the National Park Service.

Federal Agencies/GSA

Shuttle routes have been designed in part to meet the needs of federal employees who must travel regularly between Washington, D.C, office locations. The Circulator is likely to provide a more cost effective, more frequent, and more convenient alternative than existing private shuttle programs to federal agencies and individual workers.

Metro

New circulator routes may be able to play a role in decreasing the heavy demand on key Metrorail transfer points. Peak hour transfer demands at Metro Center and Gallery Place often result in delays as crowds wait for access to escalators between rail platforms. Circulator routes may be able to lesson overcrowding, particularly by providing a direct route for commuters traveling between Union Station and the Smithsonian and L'Enfant Plaza Metrorail stations.

DC Convention Center

As described above, circulator shuttles can play an important role in accommodating the needs of convention participants – for access to the Convention Center itself, as well as tourist destinations, restaurants, shopping, and visits to Capitol Hill offices.

Downtown Businesses

The capital's restored and revitalized historic downtown is strategically located between the Convention Center and the Mall, and between the White House and the Capitol Building. Frequent and convenient transportation between these locations will result in improved access to the downtown center, and increased awareness of the dining, shopping, and cultural opportunities it has to offer.

Georgetown Businesses

A circulator program that includes the downtown, Capitol Hill, the Convention Center, national monuments, and the Mall can serve as an expansion to the successful Georgetown Metro Connection. This should result in increased use of Georgetown routes, especially by visitors and federal workers.

Regional Planning Agencies

Circulator bus routes can help reduce traffic congestion, particularly in the Mall area. They may also be able to play a role in reducing the visual impact of school bus, charter bus, and automobile parking along the roadways bordering the Mall.

8.3 Project Name and Identity

In many respects, selecting an identity is one of the most important decisions to be made in marketing the new service. The project name will help determine the circulator's "place" in the market. A properly selected name and a well-designed logo can be decisive in determining how people will react to the service. It will also play a role in determining how all other marketing efforts will be received.

The first part of this section presents a matrix of issues and choices designed to help determine the best market position and system name. The second part presents and explains an example project name. The third discusses the possible use of a supporting subtext or slogan. The fourth part presents a choice of logotype and paint scheme applications. And the last proposes names for individual bus routes.

8.3.1 Market Positioning

A danger for the proposed bus service is that it will be invisible, that it will blend into the city's existing traffic, making little or no impression on visitors or downtown workers.

The circulator program needs distinctive and highly visible graphics. The service needs to appeal to tourists, without being mistaken for just one more guided tour or trolley bus service. And it needs to appeal to downtown workers as an important addition to the city's transportation infrastructure, without being mistaken for a minor expansion of the regular Metrobus system.

Three fundamental decisions need to be made in positioning the service in the marketplace:

- Should the name and identity be aimed at visitors or downtown workers?
- Should one name be selected, or are four separate identifies needed?
- How closely should the new service be associated with Metro?

These are difficult questions because arguments can be made for opposing positions.

Marketing for Visitors or Workers?

The transient nature of the visitor market presents a major marketing challenge for the project. The project needs an affordable way to reach a constantly changing public.

Most visitors will spend only a handful of days in the region. Tourists need to understand at a glance that the service is designed for visitors. The project is unlikely to be able to afford to pay for the level of TV, radio, or newspaper exposure that would be required to reach this transient market through traditional advertising media.

Visitors need to understand that the service is relevant for them as soon as they see it. Immediate comprehension is less important for residents because they will see the service at work in their community and they will come to understand its relevance for them over time.

On the other hand, the program needs to be positioned as more than a tourist service. Circulator routes are designed to accomplish much more than accommodating tourists. Circulator service is an integral part of a revitalized downtown. It is designed to offer new ways to experience the capital core – by local workers as well as transient guests. An important sub-message is that the capital core includes the historic downtown – along with national landmarks and government buildings.

The ideal name and identity will accomplish both missions at the same time: It will present a fast, frequent, and direct travel mode that offers easy transportation access within a capital core that includes the historic downtown. And it will show tourists and other visitors that this service is easy to use, visitor-friendly, and designed for tourists.

One Name or Four Names?

The circulator program is designed to serve widely divergent target markets. And the four proposed routes are very different from each other.

- The White House-Capitol Route will benefit visitors, but it will also provide important benefits for District workers.
- The Monuments Route is clearly intended for visitors.
- The North-South Route will serve dual visitor and District worker functions.
- The K Street route will be used primarily, at least during the daytime, by local workers.

The need to present a clear understanding of the benefits of each service component supports an argument for four different route-specific identities. Route specific names can help visitors and residents understand where each route goes and what it has to offer.

On the other hand, four names will greatly complicate the task of establishing public awareness and public acceptance of this new approach to in-town mobility. A rule of thumb in marketing is that it takes seventeen impressions before a potential customer gains full recognition of a new product. With four routes, this outreach task could grow to 68 impressions. And the situation will become even more complicated if additional routes are added in the future.

The best approach appears to be to establish one shared identity that captures the key features of the service and to choose names for individual routes that will be presented as components of a unified capital core transportation system.

How Closely Aligned with Metro?

Arguments can be made for clearly separating circulator services from existing Metrobus operations. Visitors may be fearful that they will become lost in a big and complex urban transit system. They may also fear that regular transit drivers and other passengers will be impatient and unsympathetic to visitors who do not know their way.

Some downtown workers may have already decided that regular Metrobuses are not their preferred travel mode. Some may feel that city buses are too slow, or that the route structure is too complicated. Others may perceive the service as too expensive or too infrequent. Some suburban commuters simply may not be used to riding buses.

The goal of enhancing the image of the historic downtown provides another reason for creating a new and separate identity for the circulator program. It will be more difficult to use the circulator network to alter the vision of downtown if it uses a name that is too closely linked with the existing public transit system.

On the other hand, there are important reasons for associating the new service with the Metrorail network. Many visitors already utilize the Metrorail system. Tour guides and visitor maps highlight the Metrorail system as the best way to travel to and from key capital destinations. Probably the best way to inform visitors about circulator bus routes will be to include a circulator route map and related information in Metrorail publications.

Close association with the Metro system can suggest a number of other important messages for visitors. It will help them understand that the service provides direct and fast transportation, not a rambling circuitous tour. It will suggest that this is an affordable transportation alternative, not a high-priced packaged tour. And it can reassure visitors that the program is part of the official infrastructure of the nation's capital.

Close association with Metrorail may also be important for regional commuters. Metrorail riders may be more inclined to utilize a downtown bus service if it is presented as a downtown enhancement of their high-speed rail network.

8.3.2 Suggested System Name

A wide assortment of possible names were considered for the Circulator. Although the project during its design phase has become known as the *Downtown Circulator*, this name may not be the most appropriate system identity, in part because it is too long, and in part because it may suggest to some potential users a slow and circuitous transportation mode.

- *MetroLink*, *Metro Express*, *Metro XP*, and *Metro Explorer* were rejected because they position the service too closely with existing transit operations.
- *MonuMetro* was recognized as providing a strong dual message: (1) visitor transportation and (2) fast and direct service. However, this was rejected as an overall system name because it gives only a partial picture of what the four proposed bus routes have to offer. Neither the K Street nor the 7th Street routes serve "monuments."
- *Capital Explorer* was given serious consideration, but was ultimately rejected because it is too visitor oriented and because it fails



to show that the new service is part of a revitalized and fast-paced downtown center.

- *Capital Connection* was rejected because it is too generic and because it lacks the spark of excitement needed to attract visitors and residents to the new service.

The name DC ZIP was suggested as a possible identity for the service as is used in the examples in this section. While ongoing efforts are underway to develop a final identity for the service, the DC ZIP name illustrates many of the characteristics that an identity for the circulator should possess. This name has a number of significant strengths:

- The name itself is short and quick, with a suggested spark of excitement.
- It suggests rides that are short and quick, not long commuter trips or circuitous tour bus excursions.
- Combining DC and ZIP reinforces the idea that the District of Columbia and its historic downtown are experiencing an exciting transformation.
- Future riders will be likely to use the service name as both a noun (“The easiest way to get there is to just take the ZIP.”) and a verb (“I don’t need you to pick me up, I’ll just ZIP it from downtown.”)

It is interesting to contrast DC ZIP with the name used for similar west coast transit services – *The Dash*. *The Dash* is a comparatively empty name. It includes no sense of geographic place. It suggests a fast movement, but includes no inference about arriving anywhere. Moreover, a dash is a punctuation mark used when a speaker runs out of things to say.

In contrast, DC ZIP suggests energy, electrical spark, connection, and success (“I can zip that off in a matter of minutes.”) It tells a story unique to the nation’s capital, while stressing that the city is alive, and not just a collection of national landmarks and monuments.

Certainly other factors, such as the use of the term in the past by the US Postal Service, may require further consideration and refinement of the name and identity. However, DC ZIP is an working title that illustrates the desired characteristics in an identity for the circulator.

8.3.3 Possible Subheadings or Slogans

It would be possible to include subheadings or slogans to accompany a DC ZIP logotype. An extra phrase or message could be included in the vehicle paint scheme and in all other logo applications to highlight or explain additional features of the new transportation service.

Since the name DC ZIP is somewhat weighted toward the downtown worker market, a supporting phrase or slogan could highlight tourist-friendly aspects of the service. A slogan could emphasize connections with Metrorail, or supporting text could focus attention to the historic downtown.

A broad selection of possible candidates was considered. Possible subheadings and their strengths and weaknesses are presented in the Table 8-1.

As discussed in the following sub-section, pictures might do a better job of providing the desired subtext. This may be especially true for the task of underscoring the relevance of the service for tourists. None of the slogans considered above do a particularly good job of conveying this important message.

8.3.4 Logotype and Vehicle Paint Scheme Applications

The Downtown Circulator Partner Group wants Circulator buses to be highly visible and easily recognizable. Vehicles need to be readily distinguished from regular Metrobuses and other charter and shuttle services. Partners suggested using bright bold colors such as red or purple, or possibly an environmentally friendly use of the color green.

The partner group indicated a willingness to consider vinyl graphics on a limited amount of window space, while cautioning that full vehicle wraps were unacceptable to city officials and bus riders in the District. The partners felt that vinyl applications on windows should not interfere with people’s ability to see into buses from the sidewalk. It was suggested that buses might be effective with a single solid color. It was also suggested that exterior advertising on buses be reserved as a possible future option.

Three sets of paint scheme alternatives were prepared using the DC ZIP identity. These are shown in Figure 8-1. The proposed logotype, shown in each set, highlights the word ZIP in gold, with DC presented in a light shade of gray. Within each set are examples that use different colors and, in some cases, different supporting phrases.

- One set of alternatives includes pictures of the Lincoln and Jefferson Memorials at the front and back off the bus, with DC ZIP under the windows between the two monuments. These alternatives include a small amount of vinyl on windows in the front and back, with all of the middle windows left vinyl free.
- A second set of options leaves the windows completely free of any vinyl covering.

Figure 8-1: Paint Scheme Alternatives

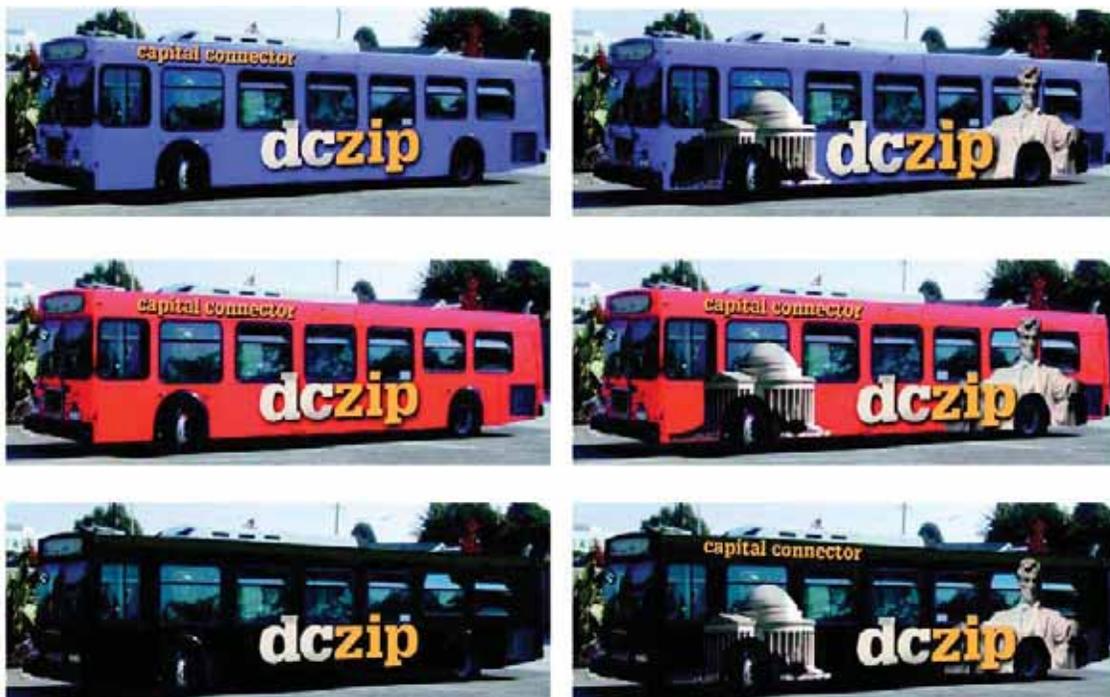


Table 8-1: Possible Circulator Name Subheadings

Subheading	Strengths	Weaknesses
Capital Connector	This suggests links with Metrorail and other transportation modes, as well as cross-town connections for meetings and other purposes.	It is very generic and provides limited new information about the nature or quality of the links involved.
Capital Connections	This slogan suggests multiple type of links.	It remains generic and may be seen as a cliché.
In-town Connector	This helps explain where the service operates and how it differs from other transit services.	It is flat and lacks excitement. Both words are too generic. This slogan could be used in any city.
Downtown Connector	This places the spotlight directly on the downtown center. It suggests that all trips lead eventually to downtown.	While this is an important role for the service, it presents only a partial picture. This slogan may not be appropriate for visitor markets.
Capital Core Express	This provides a better description of where the service operates. It also reinforces the suggestion that the service is fast and direct.	Some visitors may not understand the reference to “capital core.” And “Express” tends to imply limited-stop service on lengthy travel routes.
Metro Link Service or Metro Link Express	These candidates highlight the idea that the DC ZIP provides transportation for Metrorail users.	This may be too close an association with Metro. “Service” is too flat. “Express” may not be appropriate.
Single ride \$.50 All day \$2	If this fare information is included in the vehicle paint scheme, it will greatly increase visitor and worker understanding of the nature of the service. The low all-day pass price will reinforce the message to visiting families that this service is meant for them.	This requires displaying only some of the available fares. (Passes would be marketed separately.) Highlighting prices may degrade the overall sophistication of vehicle graphics.

With all of the paint scheme variations, it is recommend that the sides of project buses be kept free of outside advertising signs. If advertising revenue is needed, it is suggested that one of two strategies be pursued:

- 1) Exterior advertising can be limited to vinyl wraps on the backs of project buses only. Examples of “fullback” and “supertail” vinyl applications can be seen at http://www.obie.com/prod_gallery/pg-trans.html. These vinyl applications are typically sold for periods of at least six months. Experience elsewhere in the country suggests that when this type of artwork appears on the backs of buses, the advertising

market can become energized fairly quickly. The project is likely to be able to generate more revenue from these applications than from sign frames on the sides of vehicles.

- 2) An alternative approach is to look for a single corporate sponsor and to apply that company's logo to project vehicles for a full year or longer. This strategy was followed at Acadia National Park where Island Explorer buses included a logo for L.L. Bean with the slogan "Helping to Protect Our National Parks." L.L. Bean has pledged a total of \$1 million over four years to help fund the Island Explorer shuttle bus project.

8.3.5 Names for Individual Bus Routes

Names for individual bus routes can be displayed in a number of key locations, including:

- Electronic destination signs on the front, side, and back of project buses
- Route-specific bus stop signs
- Schematic diagrams of system routes
- Full system route map

A variety of different approaches can be taken to naming routes. For example, names could be accompanied by route numbers or color designations, or both to avoid any confusion with color-coded Metrorail lines or numbered Metrobus routes.

8.4 Marketing Strategy

Marketing efforts need to be based on a clearly stated and clearly understood strategy. This is necessary so that focus and purpose of marketing efforts do not become lost among other day-to-day management issues and decisions.

A successful marketing program requires consistent effort over an extended period of time. A concisely written marketing strategy will help keep marketing efforts focused and on track. It will remind project partners, bus operators, and paid marketing staff what the project is doing with its marketing program and why.

Figure 8-2 presents a marketing strategy for the circulator project. This marketing strategy is designed to include:

- 1) A clear statement of the purpose of the marketing program
- 2) A statement summarizing how this purpose will be accomplished
- 3) A brief description of target audiences
- 4) A list of individual marketing efforts to be employed
- 5) A statement of the transit program's market position
- 6) A description of the resources that will be devoted to the marketing effort

The marketing strategy provides an outline for more detailed discussions of individual marketing efforts in the following section.

8.5 Individual Marketing Efforts

This section presents a more detailed discussion of individual marketing efforts included in the Marketing Strategy. It describes the purpose of each component effort, suggests criteria for

Figure 8-2 - Marketing Strategy

Marketing Strategy For Downtown Circulator Services

The purpose of the circulator marketing program will be to inform visitors, workers, and residents about the new Downtown Circulator services, to ensure that people understand where buses operate and how they can benefit from the service, and to generate acceptance and usage by tourists, business travelers, downtown workers.

This will be accomplished by

- Developing an identity that suggests benefits for tourists, business travelers, and downtown workers, while also calling attention to the capital's revitalized historic downtown center
- Developing an identity and supporting graphic materials that differentiate the service from regular transit alternatives, while suggesting that it provides important links within the existing transportation network
- Designing a vehicle paint scheme that is highly visible and that provides visitors and other downtown pedestrians with a clear picture of why the service is special
- Developing distinctive route maps in both a schematic and a full street-map format
- Developing route-specific bus stop signs
- Designing an internet web site for the new service, plus graphic elements that can be incorporated in the web sites of neighboring businesses and agencies
- Encouraging the National Park Service, Smithsonian, the downtown BID, and others to include the routes on maps displayed on the Mall and on downtown streets
- Developing graphic concepts that can be incorporated in Metrorail maps and brochures and in privately published DC maps and tour guides
- Producing a full color visitor guide and map in a single-sheet tabloid format for distribution in hotels, at Metrorail stations, and on the Mall

Target audiences include

- (1) Workers who commute to downtown Washington via Metrorail but who do not use Metrobuses for travel to cross-town meetings or for access to lunch or shopping downtown
- (2) Workers who commute to downtown Washington via private automobile and who are unfamiliar with cross-town travel options
- (3) Workers who commute to downtown via Metrobus who can benefit from faster, more frequent, and more direct bus links
- (4) Visitors staying in hotels within the immediate downtown
- (5) Visitors who use Metrorail to reach Capital tourist destinations
- (6) Visitors who attempt to reach Capital tourist destinations with their private automobiles

- (7) Convention Center attendees and other business travelers who need transportation to and from hotels, restaurants, Capitol Hill offices, Smithsonian museums, and national monuments
- (8) Information center staff, hotel clerks, and others who answer visitors' questions about capital attractions
- (9) Authors and publishers of Washington, DC travel guides
- (10) Federal agencies and private employers who can save money by encouraging their workers to use low-cost shuttles instead of taxis and private shuttles
- (11) Residents who conduct personal business and shop downtown

Marketing vehicles to be employed will include:

- A name and logo for the new service
- Vehicle graphics and paint schemes
- A schematic route map designed for use in Metrorail promotions, in Smithsonian and National Park Service publications, and elsewhere
- Route-specific bus stop signs
- Web site promotions, with graphic elements that can be used by neighboring agencies and businesses in their own web sites
- Promotional posters for display in Metrorail stations and in rail cars
- A single-sheet tabloid "Visitor Guide" that will include maps and related visitor information about how to take advantage of the Circulator service
- Counter-top displays and outdoor newspaper vending machines for distribution of the tabloid visitor guide
- Ticket, multiple-day, and monthly pass sales to individuals, groups, government agencies, and private employers.

The market position will be a convenient, easy-to use, and inexpensive transportation service utilizing clean-fuel vehicles to offer tourists, business travelers, and downtown workers direct, frequent, and easy-to-understand access to key Washington, DC destinations, including dining and shopping opportunities in Georgetown and a revitalized historic downtown.

measuring the level of success, and identifies implementation steps and related issues that will need to be addressed. A rough estimate of project expenses is also included.

The marketing strategy includes nine component efforts. Name and logo for the new service and vehicle graphics and paint schemes were addressed above. This section covers the remaining seven items:

- Route Map Schematic
- Route-specific Bus Stop Signs
- Web Site Promotions
- Posters for Metrorail Stations and Metrorail Cars
- Design of Tabloid *Visitor Guide*
- *Visitor Guide* Distribution
- Ticket and Pass Sales

8.5.1 Route Map Schematic

The Problem and the Solution

The project needs an easy, obvious, and affordable way to educate potential riders about the benefits of circulator bus services. One of the most basic tasks is to publicize the routes involved. Potential users need to understand where buses operate and what locations they serve before they can decide to take advantage of the service.

It is important to come up with a low-cost method for very wide exposure of basic route structure information. This is especially true for visitors who will spend only a handful of days in the region. The project is unlikely to be able to afford to pay for the level of TV, radio, or newspaper exposure that would be required to reach this transient market.

The solution is to develop a schematic route map that can be displayed in a wide variety of locations. This map should be designed to accompany and complement the widely-recognized schematic presentation of Metrorail routes. A key objective will be to have the circulator map displayed along with the Metrorail map – in Metro posters and printed materials as well as in guidebooks, maps, web sites, and other media that include the Metrorail map.

This map must be clear, instantly recognized, and easily understood. And the graphic elements must be simple enough to allow it to be included in other publications without interfering with the design of those pieces. An example is shown as Figure 8-3.

Criteria for Measuring the Success of the Effort

The success of this effort can be measured by identifying the locations, web sites, and publications where the circulator graphic is displayed. A key measure will be whether this route map begins to appear in Metrorail posters and brochures. Other locations that should be assessed include:

- Visitor displays at train stations and airports
- Smithsonian and National Park Service displays and brochures
- Privately published tourist maps and guidebooks
- Web sites for hotels and other regional businesses

Figure 8-3: Example Route Map Schematic



Implementation Strategies

A key implementation step will be to work with Metrorail’s marketing department to develop a design that will fit with a full range of Metrorail promotions. Once this objective has been met, efforts will be needed to make this graphic available to public and private agencies, businesses, guide book authors, and map publishers.

Estimated Cost

Finalizing the graphic design in Figure 8-3 may cost around \$3,000. A completely different design may cost more. Ongoing efforts to distribute this graphic element to agencies and publications throughout the region should involve roughly one-quarter of the time of a full-time marketing staff member.

Implementation Calendar

The route map graphic should be completed eight to twelve months prior to implementation of the service. This will allow lead-time for WMATA, the Smithsonian, the National Park Service, and private groups to make adjustments to posters, information displays, brochures, web sites, and visitor publications.

Since the project may be implemented in stages, it will be important to develop a route schematic that shows additional routes as they are added or planned.

8.5.2 Route-specific Bus Stop Signs

The Problem and the Solution

Tourists and business travelers need to feel comfortable and secure when they use the service. Downtown workers need to be able to board and disembark effortlessly, with no uncertainty about how the service works. There should be no unanswered questions for these user groups about where they need to stand to board, where they can get off, the direction in which buses are headed, or what key destinations are served.

One way to create and reinforce an understanding of the service will be to design graphically interesting bus stop signs that include essential route information. Different levels of information can be displayed, depending on the size and complexity of the sign.

At a minimum, bus stop signs should display the system logo, along with a route number. These signs will be more informative if they include route names.

It may be possible to employ larger signs that include one or more of the following:

- End point destinations to indicate direction of travel
- A list of key intermediate locations served
- A map of the individual route
- A schematic map of all four routes

More complex displays may need to be limited to a select number of locations.

Criteria for Measuring the Success of the Effort

The effectiveness of the signs and the information presented should be evaluated through passenger surveys. Overall awareness and effectiveness could be assessed through general visitor surveys and surveys of downtown employees.

Implementation Strategies

It will be important to work with city officials and regional planning agencies to develop bus stop designs that are appropriate for a variety of landscapes – the downtown, Georgetown, the Mall, Capitol Hill, and national monuments.

It may be necessary to limit the size and information content of bus stop signs. To fit with existing signage, it may be necessary to incorporate more detailed information in existing signage implemented by the Business Improvement District, the Smithsonian, and the National Park Service.

Once design issues have been resolved, implementation steps include

- Identifying bus stop locations
- Purchasing and installing basic bus stop signs
- Changing existing displays to include Circulator information

Estimated Cost

The design of a basic bus stop sign should cost under \$2,000. Adjustments to BID, Smithsonian, and National Park Service information displays will be more expensive, but these changes are likely to be handled directly by the agencies involved. The design of graphic elements might cost another \$2,500.

The estimated cost to purchase and install 120 bus stop signs and posts is \$20,000.

Implementation Calendar

Bus stop signs and posts should be acquired at least 3 or 4 months prior to implementation. These signs should be installed roughly one month prior to the start of service.

More lead time will be needed for more complex informational displays. Graphic elements should be provided to participating partners at least 8-12 months prior to the expected implementation date.

8.5.3 Web Site Promotions

The Problem and the Solution

A large percentage of vacationers and business travelers use the Internet to help plan their trips. Visitors should be aware of their in-town travel options before they begin their journeys. Two Internet web site design tasks are needed:

- Develop a web site that presents detailed information about routes and services, along with suggestions about how visitors can utilize the service to enhance their stay in the capital
- Design and distribute graphic elements and links that can be included in the web sites of hotels, businesses, agencies, and other project partners.

Information for other web sites should be made available in two formats: (1) minimal information and graphics for those who wish to offer a direct link to the web site and (2) a concise yet complete picture of shuttle services for businesses who prefer not to include outside links on their web pages.

Criteria for Measuring the Success of the Effort

To some extent, the success of this effort can be measured by evaluating traffic levels at the system's web site. Another important measure will be to identify a list of important District of Columbia and tourist industry web sites, and to show which of these sites include links to the site or information about the bus service.

Implementation Strategies

Four basic implementation steps should be included in this effort:

- Design a web site with maps and basic information about circulator services.
- Add supporting information, including sample itineraries and feature stories that explain how to take advantage of the service. (These web pages can draw upon stories and graphics prepared for the tabloid publication discussed below)
- Design individual graphic elements for use in other web sites.
- Meet with project partners and neighboring businesses to distribute web materials and to encourage them to use these graphic elements in their sites.

Estimated Cost

Design of a web site and supporting graphic elements should cost an estimated \$10,000. Web site hosting should cost roughly \$1,000 per year. Meetings with partners and neighboring businesses might involve roughly one-quarter of the time of a full-time marketing staff person.

Implementation Calendar

New and refined plans should continue to be added to the existing BID web site as they are developed. Design of a new web site may take three to six months. This should be completed at least eight to ten months in advance of service implementation. This will allow time for a marketing staff person to show this site to partners and other interested businesses. These parties should be contacted at least three months prior to the start of service.

8.5.4 Posters for Metrorail Stations and Rail Cars

The Problem and the Solution

Areas residents and visitors need to be made aware of circulator routes and services. They need to understand the various fare alternatives and the benefits offered by the new service.

Current Metrorail users represent a key target market for the new service. Local commuters who arrive by rail can benefit from better access to cross-town meetings, as well as in-town travel to lunch sites and shopping. Many Metrorail riders recognize the benefits of well-designed transit alternatives, while remaining unsure about or reluctant to try regular city Metrobuses.

Visitors who use Metrorail to travel to downtown or the Mall can benefit from information about Circulator opportunities.

Posters on Metro trains and in Metrorail stations provide a key opportunity to reach current Metrorail riders. Commuters and tourists can read information in Metrorail cars as they travel into the city center. Probably the best strategy for in-station posters would be to feature this information at primary tourist destinations and transfer points. The best candidates are probably Union Station, the Smithsonian, L'Enfant Plaza, Metro Center, and Gallery Place.

Criteria for Measuring the Success of the Effort

A simple measure of the success of implementing this task is the number of posters placed in rail cars and in stations. Evaluating the effectiveness of the messages displayed is a more difficult task. This can be done through onboard surveys, focus group discussions, visitor surveys, or interviews with individual tourist groups. An alternate approach to reaching commuters would be through employee surveys distributed at individual businesses or federal agencies.

Implementation Strategies

The key task for this effort is the design of appropriate posters for rail cars and stations. It may be appropriate to develop two different sets of designs. One design could provide basic map, fare, and service information. A separate set of designs could offer promotional messages highlighting special advantages of the new service for particular user groups.

A poster could feature downtown lunch opportunities: "When it's time for lunch, ZIP it downtown." Another could highlight access to Capitol Hill from downtown and the Mall. A third could feature easy access to popular tourist destinations.

A variation of this approach would be to develop partnership promotions. For example, a Metrorail poster for a special Smithsonian exhibit could include a message and graphic elements for the Circulator.

Estimated Cost

Design of display posters should cost between \$3,000 and \$10,000, depending on the number of different messages involved. Costs for sign placements will depend on the scope of the advertising effort.

Implementation Calendar

Poster designs should be developed roughly 10-12 months prior to the start of the service. Placement schedules should be developed with Metrorail at least six months prior to service implementation, with posters appearing in Metrorail cars and stations one or two months before the service begins.

It may be appropriate to begin with basic route and fare information, phasing in promotional messages over a one or two year period.

8.5.5 Design of Tabloid Visitor Guide

The Problem and the Solution

Visitors can benefit from more detailed information about Circulator routes and services. A printed Visitor Guide can help tourists and business travelers gain a better understanding of where vehicles operate and how they can utilize and benefit from the service.

One of the best ways to display information about visitor transportation services is through the use of a single-sheet full-color tabloid publication. A key advantage is the ability to produce high-quality color graphics in large quantities for a very low unit cost. The low unit cost is made possible by the use of a newspaper Web press.

A single sheet yields four pages measuring 11.5 by 16.5 inches, with a final document that folds in half to 8.25 by 11.5 inches. The centerfold provides ample space for a detailed full-color map of the service area. A recent innovation is to a design centerfold transit map using hand-colored satellite photography as a base.

The front and back covers of the tabloid publication can then be used to provide supporting articles about the bus service. This can include feature articles about developments in the downtown, information about Smithsonian and National Park Service programs, and suggested itineraries for combining Metrorail and the DC ZIP to visit capital landmarks and attractions.

A tabloid format can also provide space for display advertising for project underwriters. This type of publication also allows space to be set aside to provide educational information about guided-tours operated by National Park Service concessionaires.

Criteria for Measuring the Success of the Effort

One measure of the effectiveness of this type of publication is the willingness of project partners to distribute it to their customers and guests. For example, if the Visitor Guide is well designed and helpful to guests, hotels are more likely to display it in their lobbies or to hand it out to guests. Key partners in this effort are likely to be hotels, shops, restaurants, the Smithsonian Institution, and the National Park Service. Distribution efforts are discussed in more detail below.

The overall effectiveness of the printed piece can be evaluated through passenger surveys, general visitor surveys, focus groups, or interviews with individual tourists. A less scientific approach is to watch visitors as they use outdoor displays of centerfold information. The Island Explorer project at Acadia National Park has used observations and passenger surveys to improve the presentation of bus routes and schedules in its tabloid publication.

Implementation Strategies

The biggest implementation step is the design of a tabloid newspaper. Particular attention needs to be paid to the presentation of full-color maps and schedule information. This information needs to be readily understandable by visitors who are not necessarily experienced transit users.

Cover design and supporting stories can be equally important. A tabloid format gives project partners a unique ability to determine the market position for the service. Supporting stories can help determine how visitors and local businesses respond to the service. And it can call their attention to related developments in the core area.

Estimated Cost

Design of an initial tabloid publication might cost roughly \$10,000. Once key design elements have been established, editions for subsequent years or seasons should cost between \$3,000 and \$5,000.

By using a Web press and high quality newsprint, unit costs should be roughly \$.05 per item. This means that a press run of 100,000 would cost roughly \$5,000. With a \$.05 unit cost, a run of 1.5 million would cost \$75,000. Some savings are likely to result with a press run of this size.

Implementation Calendar

If circulator routes are implemented in phases, the best approach may be to delay production of a tabloid Visitor Guide until the White House Capitol Route is introduced. Design of a tabloid publication will likely take roughly three months. More time may be needed if display advertising is going to be included. Since numerous partners and agencies may have input to the draft publication, it would probably be best to add another three months to consider comments from stakeholders.

8.5.6 Visitor Guide Distribution

The Problem and the Solution

Brochures that sit in a storeroom in opened boxes accomplish nothing for a transit project. It is important to have a plan for effective distribution before going to the trouble and expense of designing and printing a *Visitor Guide*.

There are a variety of approaches to distributing tabloid transit guides. Most of these strategies can be combined to help promote the Downtown Circulator.

- The project can purchase clear plastic easels for display and distribution of a tabloid Visitor Guide in hotel lobbies. Easels can be printed with the system logo.
- Some hotels may be interested in displaying Circulator Visitor Guides in individual guest rooms. This approach was followed by the Sunday River Ski resort to distribute tabloid shuttle guides to hotel and condominium guests.
- Outdoor newspaper vending machines can be used for tabloid distribution in various downtown and Mall locations. This technique is used effectively to distribute Island Explorer visitor guides on the Bar Harbor Village Green.
- Centerfold information can be printed in an enlarged weatherproof format for mounting in outdoor metal sign frames.
- The National Park Service may want to incorporate a Circulator guide into other visitor publications. At Acadia National Park, the Island Explorer guide is inserted into the Park's tabloid "Beaver Log" publication as an additional sheet in the press run. In fact,

the Island Explorer visitor guide was designed from the start to match the layout and print specifications for the National Park Service tabloid publication.

Criteria for Measuring the Success of the Effort

The success of distribution efforts can be measured by developing a list of likely distribution locations and documenting the level of success at each site. Quantities disbursed by different distribution techniques can also be monitored.

Estimated Cost

The cost for clear plastic display easels is likely to be roughly \$5,000 for 1,000 easels.

“Honor rack” tabloid vending machines (for free distribution) cost approximately \$150 per unit.

Outdoor sign frames cost an estimated \$5,000 each.

Additional labor or contract costs will be incurred because someone must regularly check distribution points to ensure that ample supplies are on hand.

Implementation Calendar

Once a decision has been made to print a tabloid *Visitor Guide*, efforts to set up a distribution program should begin. This process is likely to take between 3 and 4 months. More lead time will likely be needed to determine appropriate locations for outdoor sign displays.

8.5.7 Ticket and Pass Sales

The Problem and the Solution

Advanced sale of fare media is not only critical to efficient vehicle operations, it is also critical to establishing awareness of the service in the minds of both visitors and local users, and is therefore critical to the success of the service. Negotiations with government agencies, private employers, and businesses and organizations dealing with visitors should be undertaken for bulk sales of passes.

For downtown employees using the circulator, circulator-only and circulator/Metro passes could be covered by the regular SmartBenefits program for non-federal workers, allowing existing employer transit benefits to be used for the circulator. Otherwise, bulk sales will need to be handled on a face-to-face basis. This will require direct and ongoing involvement of project marketing staff.

For visitors, single- and multi-day passes could be distributed through tour companies, hotels, the Convention Center, National Park Service, Smithsonian, and other tourist venues. Negotiations with each of these entities will be required. This will require direct and ongoing involvement of project marketing staff.

Criteria for Measuring the Success of the Effort

The success of advanced sales of fare media will be measured by the number and percentage of the various fare media that are sold off the vehicles.

Estimated Cost

The marketing cost for fare media sales will consist largely of staff time devoted to negotiating with businesses, government agencies, tour companies, hotels, the Park Service, museums, and other tourist venues.

Implementation Calendar

Negotiations with partners should take place between three and nine months prior to service implementation.

8.5.8 Summary of Marketing Cost Estimates

A summary of the initial costs for each of the individual marketing efforts is shown in Table 8-2. This does not include ongoing marketing costs, since much of the ongoing effort will be staff time for what is likely to be a full-time marketing person. This also does not include the cost of the effort to select and develop a final system name and identity.

Table 8-2: Summary of Initial Marketing Costs

Element	Initial Costs
Route Map Schematic	\$3,000 or more for design
Route-Specific Bus Stop Signs	\$4,500 for design \$20,000 for 120 signs
Web Site Promotions	\$10,000 for design
Posters for Metrorail Stations and Cars	\$3,000 - \$10,000 for design
Design of Tabloid <i>Visitor Guide</i>	\$10,000 for design \$5,000 for 100,000 copies
<i>Visitor Guide</i> Distribution	\$5,000 per frame for permanent displays Staff time for distribution
Ticket and Pass Sales	Staff time

Appendix A

Estimation of Market for Access/Egress Trips to Attraction Areas

Appendix A

Mall Area			
All Visits to Area Attractions			
Total Visits to Area Attractions			26,703,691
In Tour Group	10%	(2) 2 x WCTC Travel Trends	2,670,369
Not in Tour Group	90%		24,033,322
Non-Group Visits to Area Attractions			
Not in Tour Group			24,033,322
Primary Access Trips	92%		22,082,463
Trips from Other Areas	8%		1,950,859
Primary Trips to Area Attractions			
Primary Access Trips			22,082,463
from Metro Area	20.7%	(3) Smithsonian Institution	4,571,070
Visitors to Metro Area	79%		17,511,393
Visitors Staying at Core Area Hotels			
Trips by Visitors			17,511,393
Trips by Visitors in Hotels	40.3%	(4) WCTC Travel Trends	7,061,046
by Visitors in Core Hotels	27.9%	(5) estimated from Hotel Association Data	1,969,611
by Conventioneers	7.4%	% of all visitors	1,293,455
from Convention Center	50.0%	half of conventioneers trips from CC	646,728
from Core Area Hotels			1,322,884
Union Station	10%	(6) Hotel Association of Washington DC	126,351
Mt. Vernon Square	6%	(6)	79,827
Downtown	21%	(6)	279,870
Capitol South	1%	(6)	11,101
TOTAL Circulator Area			497,150
L'Enfant Plaza	5%	(6)	65,805
TOTAL within Walking Distance			65,805
Massachusetts Ave.	19%	(6)	250,145
K Street	12%	(6)	154,688
Pennsylvania Ave.	6%	(6)	77,052
Georgetown	4%	(6)	47,400
West End	17%	(6)	230,645
TOTAL Other Core Area			759,930
Visitors and Residents not in Core hotels			
All Visitors and Residents except those in Core hotels and Convention Center			20,112,852
Auto	0%	(7) assume all are potential transit users	0
Metrorail			20,112,852
Virginia - Blue Orange	45%	(8) WMATA Ridership Data	9,060,732
East - Blue Orange	15%	(8)	2,997,596
Yellow-Green	7%	(8)	1,413,869
Red East	8%	(8)	1,664,612
Green North	5%	(8)	1,011,062
Red West	20%	(8)	3,964,980
Summary of Non-Group Visits to Area Attractions by Access			
West - Blue Orange		(9) includes 2/3 of non circulator core hotels	9,567,352
East - Blue Orange			2,997,596
Yellow-Green			1,413,869
Red East			1,664,612
Green North			1,011,062
Red West		(9) includes 1/3 of non circulator core hotels	4,218,290
Convention Center			646,728
Circulator Area Hotels			497,150
Walk			65,805
Auto			0
TOTAL			22,082,463

Appendix A

Georgetown Area			
All Visits to Area Attractions			
Total Visits to Area Attractions			10,200,000
In Tour Group	10%	(2) 2 x WCTC Travel Trends	1,020,000
Not in Tour Group	90%		9,180,000
Non-Group Visits to Area Attractions			
Not in Tour Group			9,180,000
Primary Access Trips	91%		8,388,852
Trips from Other Areas	9%		791,148
Primary Trips to Area Attractions			
Primary Access Trips			8,388,852
from Metro Area	20.7%	(3) same as Smithsonian Institution	1,736,492
Visitors to Metro Area	79%		6,652,360
Visitors Staying at Core Area Hotels			
Trips by Visitors			6,652,360
Trips by Visitors in Hotels	40.3%	(4) WCTC Travel Trends	2,682,403
by Visitors in Core Hotels	27.9%	(5) estimated from Hotel Association Data	748,231
by Conventioneers	7.4%	% of all visitors	491,367
from Convention Center	50.0%	half of conventioneers trips from CC	245,684
from Core Area Hotels			502,547
Union Station	10%	(6) Hotel Association of Washington DC	47,999
Mt. Vernon Square	6%	(6)	30,325
Massachusetts Ave.	19%	(6)	95,027
K Street	12%	(6)	58,764
Pennsylvania Ave.	6%	(6)	29,271
West End (1/2)	9%	(6)	43,810
TOTAL Circulator Area			305,196
Georgetown	4%	(6)	18,007
TOTAL within Walking Distance			18,007
Downtown	21%	(6)	106,319
Capitol South	1%	(6)	4,217
L'Enfant Plaza	5%	(6)	24,998
West End (1/2)	9%	(6)	43,810
TOTAL Other Core Area			179,344
Visitors and Residents not in Core hotels			
All Visitors and Residents except those in Core hotels and Convention Center			7,640,621
Auto	0%	(7) assume all are potential transit users	0
Metrorail			7,640,621
Virginia - Blue Orange	45%	(8) WMATA Ridership Data	3,442,059
East - Blue Orange	15%	(8)	1,138,749
Yellow-Green	7%	(8)	537,111
Red East	8%	(8)	632,365
Green North	5%	(8)	384,090
Red West	20%	(8)	1,506,247
Summary of Non-Group Visits to Area Attractions by Access			
West - Blue Orange			3,442,059
East - Blue Orange		(9) includes 1/2 of non circulator core hotels	1,228,422
Yellow-Green			537,111
Red East		(9) includes 1/4 of non circulator core hotels	677,202
Green North			384,090
Red West		(9) includes 1/4 of non circulator core hotels	1,551,083
Convention Center			245,684
Circulator Area Hotels			305,196
Walk			18,007
Auto			0
TOTAL			8,388,852

Appendix A

Capitol/Union Station Area			
All Visits to Area Attractions			
Total Visits to Area Attractions			8,404,100
In Tour Group	10%	(2) 2 x WCTC Travel Trends	840,410
Not in Tour Group	90%		7,563,690
Non-Group Visits to Area Attractions			
Not in Tour Group			7,563,690
Primary Access Trips	83%		6,308,963
Trips from Other Areas	17%		1,254,727
Primary Trips to Area Attractions			
Primary Access Trips			6,308,963
from Metro Area	10%	(3) estimate 1/2 of Smithsonian	652,978
Visitors to Metro Area	90%		5,655,985
Visitors Staying at Core Area Hotels			
Trips by Visitors			5,655,985
Trips by Visitors in Hotels	40.3%	(4) WCTC Travel Trends	2,280,639
by Visitors in Core Hotels	27.9%	(5) estimated from Hotel Association Data	636,163
by Conventioneers	7.4%	% of all visitors	417,772
from Convention Center	50.0%	half of conventioneers trips from CC	208,886
from Core Area Hotels			427,277
Mt. Vernon Square	6%	(6) Hotel Association of Washington DC	25,783
Downtown	21%	(6)	90,395
Massachusetts Ave.	19%	(6)	80,794
K Street	12%	(6)	49,963
Pennsylvania Ave.	6%	(6)	24,887
Georgetown	4%	(6)	15,310
West End (1/2)	9%	(6)	37,248
L'Enfant Plaza	5%	(6)	21,254
TOTAL Circulator Area			345,633
Union Station	10%	(6)	40,810
Capitol South	1%	(6)	3,586
TOTAL within Walking Distance			44,395
West End (1/2)	9%	(6)	37,248
TOTAL Other Core Area			37,248
Visitors and Residents not in Core hotels			
All Visitors and Residents except those in Core hotels and Convention Center			5,672,800
Auto	0%	(7) assume all are potential transit users	0
Metrorail			5,672,800
Virginia - Blue Orange	45%	(8) WMATA Ridership Data	2,555,566
East - Blue Orange	15%	(8)	845,468
Yellow-Green	7%	(8)	398,780
Red East	8%	(8)	469,501
Green North	5%	(8)	285,169
Red West	20%	(8)	1,118,317
Summary of Non-Group Visits to Area Attractions by Access			
West - Blue Orange		(9) includes 2/3 of non circulator core hotels	2,580,398
East - Blue Orange			845,468
Yellow-Green			398,780
Red East			469,501
Green North			285,169
Red West		(9) includes 1/3 of non circulator core hotels	1,130,733
Convention Center			208,886
Circulator Area Hotels			345,633
Walk			44,395
Auto			0
TOTAL			6,308,963

Appendix A

Monuments Area			
All Visits to Area Attractions			
Total Visits to Area Attractions			5,744,356
In Tour Group	10%	(2) 2 x WCTC Travel Trends	574,436
Not in Tour Group	90%		5,169,920
Non-Group Visits to Area Attractions			
Not in Tour Group			5,169,920
Primary Access Trips	78%		4,053,969
Trips from Other Areas	22%		1,115,951
Primary Trips to Area Attractions			
Primary Access Trips			4,053,969
from Metro Area	10%	(3) estimate 1/2 of Smithsonian	419,586
Visitors to Metro Area	90%		3,634,383
Visitors Staying at Core Area Hotels			
Trips by Visitors			3,634,383
Trips by Visitors in Hotels	40.3%	(4) WCTC Travel Trends	1,465,477
by Visitors in Core Hotels	27.9%	(5) estimated from Hotel Association Data	408,781
by Conventioneers	7.4%	% of all visitors	268,449
from Convention Center	50.0%	half of conventioneers trips from CC	134,224
from Core Area Hotels			274,557
Union Station	10%	(6) Hotel Association of Washington DC	26,223
Mt. Vernon Square	6%	(6)	16,568
Downtown	21%	(6)	58,085
Capitol South	1%	(6)	2,304
TOTAL Circulator Area			103,180
TOTAL within Walking Distance			0
Massachusetts Ave.	19%	(6)	51,916
K Street	12%	(6)	32,105
Pennsylvania Ave.	6%	(6)	15,992
Georgetown	4%	(6)	9,838
West End	17%	(6)	47,869
L'Enfant Plaza	5%	(6)	13,657
TOTAL Other Core Area			171,376
Visitors and Residents not in Core hotels			
All Visitors and Residents except those in Core hotels and Convention Center			3,645,188
Auto	0%	(7) assume all are potential transit users	0
Metrorail			3,645,188
Virginia - Blue Orange	45%	(8) WMATA Ridership Data	1,642,138
East - Blue Orange	15%	(8)	543,275
Yellow-Green	7%	(8)	256,245
Red East	8%	(8)	301,689
Green North	5%	(8)	183,242
Red West	20%	(8)	718,600
Summary of Non-Group Visits to Area Attractions by Access			
West - Blue Orange		(9) includes 2/3 of non circulator core hotels	1,756,389
East - Blue Orange			543,275
Yellow-Green			256,245
Red East			301,689
Green North			183,242
Red West		(9) includes 1/3 of non circulator core hotels	775,726
Convention Center			134,224
Circulator Area Hotels			103,180
Walk			0
Auto			0
TOTAL			4,053,969

Appendix A

Downtown Area			
All Visits to Area Attractions			
Total Visits to Area Attractions			2,983,445
In Tour Group	10%	(2) 2 x WCTC Travel Trends	298,345
Not in Tour Group	90%		2,685,101
Non-Group Visits to Area Attractions			
Not in Tour Group			2,685,101
Primary Access Trips	72%		1,936,865
Trips from Other Areas	28%		748,235
Primary Trips to Area Attractions			
Primary Access Trips			1,936,865
from Metro Area	21%	(3) Smithsonian Institution	400,931
Visitors to Metro Area	79%		1,535,934
Visitors Staying at Core Area Hotels			
Trips by Visitors			1,535,934
Trips by Visitors in Hotels	40.3%	(4) WCTC Travel Trends	619,328
by Visitors in Core Hotels	27.9%	(5) estimated from Hotel Association Data	172,756
by Conventioneers	7.4%	% of all visitors	113,450
from Convention Center	50.0%	half of conventioneers trips from CC	56,725
from Core Area Hotels			116,031
Union Station	10%	(6) Hotel Association of Washington DC	11,082
K Street	12%	(6)	13,568
Pennsylvania Ave.	6%	(6)	6,758
Georgetown	4%	(6)	4,157
L'Enfant Plaza	5%	(6)	5,772
Capitol South	1%	(6)	974
TOTAL Circulator Area			42,311
Downtown	21%	(6)	24,548
Mt. Vernon Square	6%	(6)	7,002
TOTAL within Walking Distance			31,549
Massachusetts Ave.	19%	(6)	21,940
West End	17%	(6)	20,230
TOTAL Other Core Area			42,170
Visitors and Residents not in Core hotels			
All Visitors and Residents except those in Core hotels and Convention Center			1,764,110
Auto	0%	(7) assume all are potential transit users	0
Metrorail			1,764,110
Virginia - Blue Orange	45%	(8) WMATA Ridership Data	794,722
East - Blue Orange	15%	(8)	262,921
Yellow-Green	7%	(8)	124,011
Red East	8%	(8)	146,004
Green North	5%	(8)	88,681
Red West	20%	(8)	347,771
Summary of Non-Group Visits to Area Attractions by Access			
West - Blue Orange			794,722
East - Blue Orange			262,921
Yellow-Green			124,011
Red East			146,004
Green North			88,681
Red West		(9) includes 1/3 of non circulator core hotels	361,827
Convention Center			56,725
Circulator Area Hotels		(9) includes 2/3 of non circulator core hotels	70,425
Walk			31,549
Auto			0
TOTAL			1,936,865

Appendix A

White House Area			
All Visits to Area Attractions			
Total Visits to Area Attractions			1,710,220
In Tour Group	10%	(2) 2 x WCTC Travel Trends	171,022
Not in Tour Group	90%		1,539,198
Non-Group Visits to Area Attractions			
Not in Tour Group			1,539,198
Primary Access Trips	70%		1,077,439
Trips from Other Areas	30%		461,759
Primary Trips to Area Attractions			
Primary Access Trips			1,077,439
from Metro Area	10%	(3) estimate 1/2 of Smithsonian	111,515
Visitors to Metro Area	90%		965,924
Visitors Staying at Core Area Hotels			
Trips by Visitors			965,924
Trips by Visitors in Hotels	40.3%	(4) WCTC Travel Trends	389,485
by Visitors in Core Hotels	27.9%	(5) estimated from Hotel Association Data	108,643
by Conventioneers	7.4%	% of all visitors	71,347
from Convention Center	50.0%	half of conventioneers trips from CC	35,673
from Core Area Hotels			72,970
Union Station	10%	(6) Hotel Association of Washington DC	6,969
Mt. Vernon Square	6%	(6)	4,403
Pennsylvania Ave.	6%	(6)	4,250
Capitol South	1%	(6)	612
TOTAL Circulator Area			16,235
Downtown	21%	(6)	15,438
K Street	12%	(6)	8,533
Massachusetts Ave.	19%	(6)	13,798
TOTAL within Walking Distance			37,768
West End	17%	(6)	12,722
Georgetown	4%	(6)	2,615
L'Enfant Plaza	5%	(6)	3,630
TOTAL Other Core Area			18,967
Visitors and Residents not in Core hotels			
All Visitors and Residents except those in Core hotels and Convention Center			968,795
Auto	0%	(7) assume all are potential transit users	0
Metrorail			968,795
Virginia - Blue Orange	45%	(8) WMATA Ridership Data	436,437
East - Blue Orange	15%	(8)	144,388
Yellow-Green	7%	(8)	68,103
Red East	8%	(8)	80,181
Green North	5%	(8)	48,701
Red West	20%	(8)	190,985
Summary of Non-Group Visits to Area Attractions by Access			
West - Blue Orange		(9) includes 2/3 of non circulator core hotels	449,082
East - Blue Orange			144,388
Yellow-Green			68,103
Red East			80,181
Green North			48,701
Red West		(9) includes 1/3 of non circulator core hotels	197,307
Convention Center			35,673
Circulator Area Hotels			16,235
Walk			37,768
Auto			0
TOTAL			1,077,439

Appendix B

Adjustment Factors Used in Estimation of Market
for Circulation Trips by Workers and Shoppers

Adjustment Factors Applied to Account for Walk Trips or No Circulator Service

		Destination																
		Downtown	Union Sta.	NoMa	Capitol	Mall	White House	Mt. Vernon	L'Enfant	Waterfront	Southwest	Constitution West	GWU	Penn. Ave.	K Street	DuPont Circle	West End	Georgetown
Origin	Downtown	local	adj.	OK	OK	adj.	OK	adj.	OK	OK	none	OK	OK	OK	adj.	none	none	OK
	Union Sta.	adj.	none	adj.	adj.	OK	OK	OK	OK	OK	none	OK	OK	OK	OK	none	none	OK
	NoMa	OK	adj.	none	OK	OK	OK	adj.	OK	OK	none	OK	OK	OK	OK	none	none	OK
	Capitol	OK	adj.	OK	local	adj.	OK	OK	adj.	OK	none	OK	OK	OK	OK	none	none	OK
	Mall	adj.	OK	OK	adj.	local	adj.	OK	adj.	OK	none	OK	OK	OK	OK	none	none	OK
	White House	OK	OK	OK	OK	adj.	local	OK	OK	OK	none	adj.	adj.	adj.	adj.	none	none	OK
	Mt. Vernon	adj.	OK	adj.	OK	OK	OK	none	OK	OK	none	OK	OK	OK	adj.	none	none	OK
	L'Enfant	OK	OK	OK	adj.	adj.	OK	OK	none	adj.	none	OK	OK	OK	OK	none	none	OK
	Waterfront	OK	OK	OK	OK	OK	OK	OK	adj.	none	none	OK	OK	OK	OK	none	none	OK
	Southwest	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	Constitution West	OK	OK	OK	OK	OK	adj.	OK	OK	OK	none	local	adj.	OK	none	none	none	none
	GWU	OK	OK	OK	OK	OK	adj.	OK	OK	OK	none	adj.	none	none	none	none	none	none
	Penn. Ave.	OK	OK	OK	OK	OK	adj.	OK	OK	OK	none	OK	none	local	OK	none	none	adj.
	K Street	adj.	OK	OK	OK	OK	adj.	adj.	OK	OK	none	none	none	OK	local	none	none	OK
	DuPont Circle	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
	West End	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none	none
Georgetown	OK	OK	OK	OK	OK	OK	OK	OK	OK	none	none	none	adj.	OK	none	none	local	

none = no trips that are likely to use the circulator
 local = 50% reduction in estimated market since most may walk
 adj. (adjacent) = 15% reduction in estimated market since some may walk
 OK = no reduction in estimated market - all could use circulator

Adjustment Factors Applied to Account for Competing Metrorail Service

		Destination																
		Downtown	Union Sta.	NoMa	Capitol	Mall	White House	Mt. Vernon	L'Enfant	Waterfront	Southwest	Constitution West	GWU	Penn. Ave.	K Street	DuPont Circle	West End	Georgetown
Origin	Downtown	poor	good	poor	fair	fair	poor	poor	good	fair	fair	poor	fair	fair	good	poor	poor	poor
	Union Sta.	good	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	good	poor	poor	poor
	NoMa	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor
	Capitol	fair	poor	poor	poor	fair	poor	poor	good	poor	fair	poor	good	good	good	poor	poor	poor
	Mall	fair	poor	poor	fair	poor	poor	poor	fair	poor	poor	poor	fair	fair	fair	poor	poor	poor
	White House	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor
	Mt. Vernon	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor
	L'Enfant	good	poor	poor	good	fair	poor	poor	poor	fair	fair	poor	good	good	good	poor	poor	poor
	Waterfront	fair	poor	poor	poor	poor	poor	poor	fair	poor	poor	poor	poor	poor	poor	poor	poor	poor
	Southwest	fair	poor	poor	fair	poor	poor	poor	fair	poor	poor	poor	fair	fair	fair	poor	poor	poor
	Constitution West	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor
	GWU	fair	poor	poor	good	fair	poor	poor	good	poor	fair	poor	poor	poor	good	poor	poor	poor
	Penn. Ave.	fair	poor	poor	good	fair	poor	poor	good	poor	fair	poor	poor	poor	good	poor	poor	poor
	K Street	good	good	poor	good	fair	poor	poor	good	poor	fair	poor	good	good	fair	poor	poor	poor
	DuPont Circle	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor
	West End	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor
Georgetown	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	poor	good	

poor = No direct Metrorail service - no reduction in estimated market
 fair = Direct Metrorail service for a few - 25% reduction in estimated market
 good = Direct Metrorail service for many - 50% reduction in estimated market

Appendix C

Proposed Circulator Bus Stop Locations

White House-Capitol Route – Alternative A – Clockwise

Route	Seq	Street	Dir.	Cross Street	Stop Loc. *	Description	Existing Curb Lane Usage
WH-Cap-C	1	F	EB	7th	NS	National Museum of American Art, National Portrait Gallery, MCI Center, Spy Museum, <i>transfer to other routes</i>	parking
WH-Cap-C	2	F	EB	6th	FS	MCI Center, Law Enforcement Memorial Visitors' Center	parking
WH-Cap-C	3	F	EB	5th-4th	MB	National Law Enforcement Officers Memorial, National Building Museum, Judiciary Square Metrorail	parking
WH-Cap-C	4	3rd	SB	E-F	MB	Judicial Center, EPA	parking
WH-Cap-C	5	E	EB	2nd	FS		Metrobus
WH-Cap-C	6	E	EB	New Jersey	NS	Hyatt Hotel	Metrobus
WH-Cap-C	7	Union Station				Union Station, National Postal Museum, Union Station Metrorail	Buses
WH-Cap-C	8	1st	SB	C-Constitution	MB	Senate Office Buildings	Metrobus
WH-Cap-C	9	1st	SB	East Capitol	FS	US Capitol, Supreme Court, Library of Congress	Tourmobile
WH-Cap-C	10	Independence	WB	New Jersey	FS	House Office Buildings, Capitol South Metrorail (2 blocks)	traffic
WH-Cap-C	11	Independence	WB	1st	FS	Botanic Gardens	traffic
WH-Cap-C	12	3rd	NB	Maryland	FS	National Museum of the American Indian	parking
WH-Cap-C	13	Madison	WB	4th-7th	MB	National Gallery of Art, Air and Space Museum	Tourmobile
WH-Cap-C	14	Madison	WB	7th	FS	National Sculpture Garden, National Archives, Hirshorn Museum, Arts and Industries Building, <i>transfer to 7th Street Route</i>	parking
WH-Cap-C	15	Madison	WB	7th-12th	MB	National Museum of Natural History, Smithsonian Castle, Museum of African Art	Tourmobile
WH-Cap-C	16	Madison	WB	12th-14th	MB	National Museum of American History, Washington Monument	Tourmobile
WH-Cap-C	17	Constitution	WB	14th-15th	MB	Department of Commerce	Metrobus
WH-Cap-C	18	Constitution	WB	17th	NS	WWII Memorial, Constitution Hall	Metrobus
WH-Cap-C	19	Constitution	WB	19th	NS	Department of the Interior, Constitutions Gardens	Metrobus
WH-Cap-C	20	Constitution	WB	21st	FS	Lincoln memorial, Vietnam memorial, Federal reserve Board, National Academy of Science and Engineering	Metrobus
WH-Cap-C	21	23rd	NB	C	NS	State Department	parking
WH-Cap-C	22	23rd	NB	Virginia	NS	State Department	Metrobus
WH-Cap-C	23	23rd	NB	G	FS		Metrobus
WH-Cap-C	24	23rd	NB	Eye	NS	George Washington University, Foggy Bottom Metrorail	parking
WH-Cap-C	25	Eye	EB	21st	NS		parking
WH-Cap-C	26	Pennsylvania	EB	H	NS		parking
WH-Cap-C	27	Pennsylvania	EB	17th	FS	White House	closed
WH-Cap-C	28	Pennsylvania	EB	15th	NS	White House	closed
WH-Cap-C	29	F	EB	15th	FS	White House Visitor Center (2 blocks), Hotel Washington	hotel parking
WH-Cap-C	30	F	EB	14th-13th	MB	National Place	Metrobus
WH-Cap-C	31	F	EB	11th	NS	Ford's Theatre, Petersen House, Metro Center Metrorail	Metrobus

* NS = near side
 FS = far side
 MB = mid-block

White House-Capitol Route – Alternative A – Counter-Clockwise

Route	Seq	Street	Dir.	Cross Street	Stop Loc.	Description	Existing Curb Lane Usage
WH-Cap-CC	1	F	WB	7th	FS	National Museum of American Art, National Portrait Gallery, MCI Center, Spy Museum, <i>transfer to other routes</i>	parking
WH-Cap-CC	2	F	WB	11th	NS	Ford's Theatre, Petersen House, Metro Center Metrorail	Metrobus
WH-Cap-CC	3	F	WB	13th-14th	MB	National Place	Metrobus
WH-Cap-CC	4	15th	NB	F-G	MB	White House Visitor Center (2 blocks), Hotel Washington	Metrobus
WH-Cap-CC	5	Pennsylvania	WB	15th	FS	White House	closed
WH-Cap-CC	6	Pennsylvania	WB	17th	NS	White House	closed
WH-Cap-CC	7	Pennsylvania	WB	H	NS		parking
WH-Cap-CC	8	Eye	WB	21st-22nd	MB		parking
WH-Cap-CC	9	23rd	SB	Eye	FS	George Washington University, Foggy Bottom Metrorail	Metrobus
WH-Cap-CC	10	23rd	SB	G	NS		Metrobus
WH-Cap-CC	11	23rd	SB	Virginia	FS	State Department	Metrobus
WH-Cap-CC	12	23rd	SB	C	FS	State Department	parking
WH-Cap-CC	13	Constitution	EB	21st	NS	Lincoln memorial, Vietnam memorial, Federal reserve Board, National Academy of Science and Engineering	Metrobus
WH-Cap-CC	14	Constitution	EB	19th	NS	Department of the Interior, Constitutions Gardens	Metrobus
WH-Cap-CC	15	Constitution	EB	17th	FS	WWII Memorial	Metrobus
WH-Cap-CC	16	Constitution	EB	17th-15th	MB	Washington Monument	parking
WH-Cap-CC	17	15th	SB	Const-Madison	MB	National Museum of American History	Metrobus
WH-Cap-CC	18	Jefferson	EB	12th	NS	Freer Gallery, Sackler Gallery, Smithsonian Metrorail, <i>transfer to Monument Loop</i>	parking
WH-Cap-CC	19	Jefferson	EB	12th-7th	MB	National Museum of Natural History, Smithsonian Castle, Museum of African Art, Arts and Industries Building, National Sculpture Garden, Hirshorn Museum	Tourmobile
WH-Cap-CC	20	7th	SB	Jefferson	FS	National Gallery of Art, <i>transfer to 7th Street Route</i>	Metrobus
WH-Cap-CC	21	Independence	EB	6th	FS	Air and Space Museum, Department of Education	Metrobus
WH-Cap-CC	22	Independence	EB	3rd	NS	National Museum of the American Indian, Department of Health and Human Services, Food and Drug Administration	Metrobus
WH-Cap-CC	23	Independence	EB	1st	NS	Botanic Gardens	traffic
WH-Cap-CC	24	Independence	EB	New Jersey	NS	House Office Buildings, Capitol South Metrorail (2 blocks)	traffic
WH-Cap-CC	25	1st	NB	East Capitol	FS	US Capitol, Supreme Court, Library of Congress	traffic
WH-Cap-CC	26	1st	NB	C-Constitution	MB	Senate Office Buildings	Metrobus
WH-Cap-CC	27	Union Station				Union Station, National Postal Museum, Union Station Metrorail	Buses
WH-Cap-CC	28	E	WB	New Jersey	NS	Hyatt Hotel	Metrobus
WH-Cap-CC	29	E	WB	1st-2nd	MB		Metrobus
WH-Cap-CC	30	3rd	NB	E-F	MB	Judicial Center, EPA	parking
WH-Cap-CC	31	F	WB	4th-5th	MB	National Law Enforcement Officers Memorial, National Building Museum, Judiciary Square Metrorail	parking
WH-Cap-CC	32	F	WB	6th	NS	MCI Center, Law Enforcement Memorial Visitors' Center	parking

* NS = near side
 FS = far side
 MB = mid-block

White House-Capitol Route – Alternative B – Clockwise

Route	Seq	Street	Dir.	Cross Street	Stop Loc.	Description	Existing Curb Lane Usage
WH-Cap-C	1	F	EB	7th	NS	National Museum of American Art, National Portrait Gallery, MCI Center, Spy Museum, <i>transfer to other routes</i>	parking
WH-Cap-C	2	F	EB	6th	FS	MCI Center, Law Enforcement Memorial Visitors' Center	parking
WH-Cap-C	3	F	EB	5th-4th	MB	National Law Enforcement Officers Memorial, National Building Museum, Judiciary Square Metrorail	parking
WH-Cap-C	4	3rd	SB	E-F	MB	Judicial Center, EPA	parking
WH-Cap-C	5	E	EB	2nd	FS		Metrobus
WH-Cap-C	6	E	EB	New Jersey	NS	Hyatt Hotel	Metrobus
WH-Cap-C	7	Union Station				Union Station, National Postal Museum, Union Station Metrorail	Buses
WH-Cap-C	8	1st	SB	C-Constitution	MB	Senate Office Buildings	Metrobus
WH-Cap-C	9	1st	SB	East Capitol	FS	US Capitol, Supreme Court, Library of Congress	Tourmobile
WH-Cap-C	10	Independence	WB	New Jersey	FS	House Office Buildings, Capitol South Metrorail (2 blocks)	traffic
WH-Cap-C	11	Independence	WB	1st	FS	Botanic Gardens	traffic
WH-Cap-C	12	3rd	NB	Maryland	FS	National Museum of the American Indian	parking
WH-Cap-C	13	Madison	WB	4th-7th	MB	National Gallery of Art, Air and Space Museum	Tourmobile
WH-Cap-C	14	Madison	WB	7th	FS	National Sculpture Garden, National Archives, Hirshorn Museum, Arts and Industries Building, <i>transfer to 7th Street Route</i>	parking
WH-Cap-C	15	Madison	WB	7th-12th	MB	National Museum of Natural History, Smithsonian Castle, Museum of African Art	Tourmobile
WH-Cap-C	16	Madison	WB	12th-14th	MB	National Museum of American History, Washington Monument	Tourmobile
WH-Cap-C	17	Constitution	WB	14th-15th	MB	Department of Commerce	Metrobus
WH-Cap-C	18	Constitution	WB	17th	NS	WWII Memorial	Metrobus
WH-Cap-C	19	Constitution	WB	19th	NS	Department of the Interior, Constitutions Gardens	Metrobus
WH-Cap-C	20	Constitution	WB	21st	FS	Lincoln memorial, Vietnam memorial, Federal reserve Board, National Academy of Science and Engineering	Metrobus
WH-Cap-C	21	23rd	NB	C	NS	State Department	parking
WH-Cap-C	22	E	EB	20th-19th	MB	Office of Personell Management	Metrobus
WH-Cap-C	23	E	EB	18th	FS	Department of the Interior, General Services Administration, Constitution Hall	parking
WH-Cap-C	24	E	EB	17th	FS	White House, Corcoran Gallery	closed
WH-Cap-C	25	E	EB	15th	NS	White House	closed
WH-Cap-C	26	Pennsylvania	EB	14th	NS	White House Visitor Center, Department of Commerce, Federal Triangle	Tourmobile
WH-Cap-C	27	F	EB	11th	NS	Ford's Theatre, Petersen House, Metro Center Metrorail	Metrobus

- * NS = near side
 FS = far side
 MB = mid-block

White House-Capitol Route – Alternative B – Counter-Clockwise

Route	Seq	Street	Dir.	Cross Street	Stop Loc.	Description	Existing Curb Lane Usage
WH-Cap-CC	1	F	WB	7th	FS	National Museum of American Art, National Portrait Gallery, MCI Center, Spy Museum, <i>transfer to other routes</i>	parking
WH-Cap-CC	2	F	WB	11th	NS	Ford's Theatre, Petersen House, Metro Center Metrorail	Metrobus
WH-Cap-CC	3	Pennsylvania	WB	14th	NS	White House Visitor Center, Department of Commerce, Federal Triangle	Metrobus
WH-Cap-CC	4	E	WB	15th	FS	White House	closed
WH-Cap-CC	5	E	WB	17th	NS	White House, Corcoran Gallery	closed
WH-Cap-CC	6	E	WB	18th	NS	Department of the Interior, General Services Administration, Constitution Hall	parking
WH-Cap-CC	7	E	WB	19th	FS	Office of Personell Management	parking
WH-Cap-CC	8	23rd	SB	C	FS	State Department	parking
WH-Cap-CC	9	Constitution	EB	21st	NS	Lincoln memorial, Vietnam memorial, Federal reserve Board, National Academy of Science and Engineering	Metrobus
WH-Cap-CC	10	Constitution	EB	19th	NS	Department of the Interior, Constitutions Gardens	Metrobus
WH-Cap-CC	11	Constitution	EB	17th	FS	WWII Memorial	Metrobus
WH-Cap-CC	12	Constitution	EB	17th-15th	MB	Washington Monument	parking
WH-Cap-CC	13	15th	SB	Const-Madison	MB	National Museum of American History, Federal Triangle	Metrobus
WH-Cap-CC	14	Jefferson	EB	12th	NS	Freer Gallery, Sackler Gallery, Smithsonian Metrorail, <i>transfer to Monument Loop</i>	parking
WH-Cap-CC	15	Jefferson	EB	12th-7th	MB	National Museum of Natural History, Smithsonian Castle, Museum of African Art, Arts and Industries Building, National Sculpture Garden, Hirshorn Museum	Tourmobile
WH-Cap-CC	16	7th	SB	Jefferson	FS	National Gallery of Art, <i>transfer to 7th Street Route</i>	Metrobus
WH-Cap-CC	17	Independence	EB	6th	NS	Air and Space Museum, Department of Education	Metrobus
WH-Cap-CC	18	Independence	EB	3rd-4th	MB	National Museum of the American Indian, Department of Health and Human Services, Food and Drug Administration	Metrobus
WH-Cap-CC	19	Independence	EB	1st	NS	Botanic Gardens	traffic
WH-Cap-CC	20	Independence	EB	New Jersey	NS	House Office Buildings, Capitol South Metrorail (2 blocks)	traffic
WH-Cap-CC	21	1st	NB	East Capitol	FS	US Capitol, Supreme Court, Library of Congress	traffic
WH-Cap-CC	22	1st	NB	C-Constitution	MB	Senate Office Buildings	Metrobus
WH-Cap-CC	23	Union Station				Union Station, National Postal Museum, Union Station Metrorail	Buses
WH-Cap-CC	24	E	WB	New Jersey	NS	Hyatt Hotel	Metrobus
WH-Cap-CC	25	E	WB	1st-2nd	MB		Metrobus
WH-Cap-CC	26	3rd	NB	E-F	MB	Judicial Center, EPA	parking
WH-Cap-CC	27	F	WB	4th-5th	MB	National Law Enforcement Officers Memorial, National Building Museum, Judiciary Square Metrorail	parking
WH-Cap-CC	28	F	WB	6th	NS	MCI Center, Law Enforcement Memorial Visitors' Center	parking

- * NS = near side
 FS = far side
 MB = mid-block

Monuments Route

Route	Seq	Street	Dir.	Cross Street	Stop Loc.	Description	Existing Curb Lane Usage
Monument	1	Jefferson	EB	12th	NS	Freer Gallery, Sackler Gallery, National Museum of American History, Smithsonian Metrorail, <i>transfer to Capitol Loop</i>	parking
Monument	2	Raoul Wallenberg	SB	Ind.-Maine	MB	US Holocaust Memorial, Bureau of Engraving and Printing	Tourmobile
Monument	3	East Basin Drive	WB		MB	Jefferson Memorial	Tourmobile
Monument	4	Ohio Drive	NB	West Basin Drive	FS	Roosevelt Memorial	Tourmobile
Monument	5	23rd	NB	Lincoln Circle	NS	Lincoln Memorial, Korean War Memorial	traffic
Monument	6	Const. SR	EB	21st	NS	Lincoln Memorial, Vietnam War Memorial	Tourmobile Lane
Monument	7	Const. SR	EB	19th-18th	MB	Constitution Gardens	Tourmobile Lane
Monument	8	17th	SB	Independence-Constitution	MB	WWII Memorial	traffic
Monument	9	Jefferson	EB	15th-14th	MB	Washington Monument	Tourmobile

- * NS = near side
 FS = far side
 MB = mid-block

Monuments Route – Presidential Routing

Route	Seq	Street	Dir.	Cross Street	Stop Loc.	Description	Existing Curb Lane Usage
Presidential	1	Jefferson	EB	12th	NS	Freer Gallery, Sackler Gallery, National Museum of American History, Smithsonian Metrorail, <i>transfer to Capitol Loop</i>	parking
Presidential	2	Raoul Wallenberg SB		Ind.-Maine	MB	US Holocaust Memorial, Bureau of Engraving and Printing	Tourmobile
Presidential	3	East Basin Drive	WB		MB	Jefferson Memorial	Tourmobile
Presidential	4	Ohio Drive	NB	West Basin Drive	FS	Roosevelt Memorial	Tourmobile
Presidential	5	23rd	NB	Lincoln Circle	NS	Lincoln Memorial, Korean War Memorial	traffic
Presidential	6	Constitution	EB	21st	NS	Lincoln memorial, Vietnam memorial, Federal reserve Board, National Academy of Science and Engineering	Metrobus
Presidential	7	Constitution	EB	19th	NS	Department of the Interior, Constitutions Gardens	Metrobus
Presidential	8	17th	NB	C	NS	Constitution Hall	parking
Presidential	9	17th	NB	New York	NS	Corcoran Gallery	traffic
Presidential	10	Pennsylvania	EB	17th	FS	White House, Renwick Gallery	closed
Presidential	11	Pennsylvania	EB	15th	NS	White House	closed
Presidential	12	15th	SB	E	NS	White House Visitor Center	traffic
Presidential	13	Jefferson	EB	15th-14th	MB	Washington Monument	Tourmobile

- * NS = near side
 FS = far side
 MB = mid-block

North-South Route

Route	Seq	Street	Dir.	Cross Street	Stop Loc.	Description	Existing Curb Lane Usage
7th-SB	1	L	WB	7th-9th	MB	Convention Center	Construction
7th-SB	2	9th	SB	K	FS	Convention Center	parking
7th-SB	3	9th	SB	H	FS		parking
7th-SB	4	9th	SB	F	FS	National Museum of American Art, National Portrait Gallery, MCI Center, Spy Museum, <i>transfer to other routes</i>	parking
7th-SB	5	9th	SB	E	FS		parking
7th-SB	6	Pennsylvania	EB	7th	NS	US Navy Memorial, National Archives, Newseum	traffic
7th-SB	7	7th	SB	Madison	NS	National Gallery of Art, National Sculpture Garden, National Museum of Natural History, <i>transfer to Loop Route to Washington Monument</i>	parking/traffic
7th-SB	8	7th	SB	Jefferson	FS	Air and Space Museum, Hirshorn Museum, Arts and Industries Building, Smithsonian Castle, Museum of African Art, <i>transfer to Loop Route to Capitol</i>	Metrobus
7th-SB	9	7th	SB	C	NS	FAA, DOE	Metrobus
7th-SB	10	7th	SB	D-E	MB	L'Enfant Plaza, DOT, HUD, L'Enfant Plaza Metrorail	Metrobus
7th-SB	11	7th	SB	G	NS		Metrobus
7th-NB	1	7th	SB	Maine	NS	Waterfront	Metrobus
7th-NB	2	L'Enfant Prom.	NB	L'Enfant Pl.	MB	L'Enfant Plaza, US Postal Service	parking
7th-NB	3	Independence	EB	9th	NS	Freer Gallery, Sackler Gallery, Smithsonian Castle, Museum of African Art, Department of Energy	Metrobus
7th-NB	4	7th	NB	Jefferson	NS	Air and Space Museum, Hirshorn Museum, Arts and Industries Building, <i>transfer to Loop Route to Capitol</i>	parking/traffic
7th-NB	5	7th	NB	Madison	FS	National Gallery of Art, National Sculpture Garden, National Museum of Natural History, <i>transfer to Loop Route to Washington Monument</i>	parking/traffic
7th-NB	6	7th	NB	Pennsylvania	FS	US Navy Memorial, National Archives, Newseum	Metrobus
7th-NB	7	7th	NB	E	NS		Metrobus
7th-NB	8	7th	NB	F	FS	National Museum of American Art, National Portrait Gallery, MCI Center, Spy Museum, <i>transfer to other routes</i>	Metrobus
7th-NB	9	7th	NB	H	FS	Chinatown	Metrobus
7th-NB	10	7th	NB	Massachusetts	NS	Convention Center	Metrobus

* NS = near side
 FS = far side
 MB = mid-block

K Street Route

Route	Seq	Street	Dir.	Cross Street	Stop Loc.	Description	Existing Curb Lane Usage
K-WB	1	Union Station			*	Union Station, National Postal Museum, Union Station Metrorail	Buses
K-WB	2	Massachusetts	WB	New Jersey	*		Metrobus
K-WB	3	Massachusetts	WB	H	*		parking
K-WB	4	Massachusetts	WB	7th	*	Chinatown	parking
K-WB	5	L	WB	7th-9th	*	Convention Center	Construction
K-WB	6	K	WB	12th	*		parking
K-WB	7	K	WB	14th	*	Franklin Square	Metrobus
K-WB	8	K	WB	15th	*	MacPherson Square	Metrobus
K-WB	9	K	WB	Connecticut	*	Farragut Square	Metrobus
K-WB	10	K	WB	19th	*		Metrobus
K-WB	11	K	WB	21st	*		Metrobus
K-WB	12	K	WB	24th	*	Washington Circle, Foggy Bottom	parking
K-WB	13	K	WB	Thomas Jefferson	*	Park Service Georgetown Visitor Center, Washington Harbour	G Metro Conn.
K-WB	14	K	WB	Wisconsin	*	Georgetown Waterfront	G Metro Conn.
K-WB	15	M	WB	Wisconsin	*		G Metro Conn.
K-WB	16	M	WB	33rd	*		G Metro Conn.
K-WB	17	M	WB	34th	*		parking
K-EB	1	M	EB	Canal Road	*		
K-EB	2	M	EB	34th	*		G Metro Conn.
K-EB	3	M	EB	33rd	*		G Metro Conn.
K-EB	4	M	EB	Wisconsin	*		G Metro Conn.
K-EB	5	K	EB	Wisconsin	*	Georgetown Waterfront	G Metro Conn.
K-EB	6	K	EB	Thomas Jefferson	*	Park Service Georgetown Visitor Center, Washington Harbour	G Metro Conn.
K-EB	7	K	EB	24th	*	Washington Circle, Foggy Bottom	parking
K-EB	8	K	EB	21st	*		Metrobus
K-EB	9	K	EB	19th	*		Metrobus
K-EB	10	K	EB	Connecticut	*	Farragut Square	Metrobus
K-EB	11	K	EB	15th	*	MacPherson Square	Metrobus
K-EB	12	K	EB	14th	*	Franklin Square	Metrobus
K-EB	13	K	EB	12th	*		parking
K-EB	14	K	EB	9th	*	Convention Center	parking
K-EB	15	Massachusetts	EB	7th	*	Chinatown	parking
K-EB	16	Massachusetts	EB	H	*		parking
K-EB	17	Massachusetts	EB	New Jersey	*		Metrobus

* Note: Precise stop locations have not been determined due to the pending K Street Busway Project.

Appendix D

Headways and Vehicle Requirements – Alternative B

Alternative B Circulator Headways and Vehicle Requirements – Off-Peak Season

	<i>Off-Peak Season (7 months)</i>								
	Headway			Cycle Time			Buses		
	Sat.	Sun.	M-F	Sat.	Sun.	M-F	Sat.	Sun.	M-F
<i>White House/Capitol Route - Clockwise</i>									
8-10a	10	10	5	70	60	65	7	6	13
10a-1p	5	5	5	70	65	70	14	13	14
1p-5p	5	5	5	70	65	75	14	13	15
5p-7p	5	5	5	70	65	75	14	13	15
7p-9p	10	10	10	60	60	60	6	6	6
<i>White House/Capitol Route-Counter Clockwise</i>									
8-10a	10	10	5	60	50	60	6	5	12
10a-1p	5	5	5	65	60	70	13	12	14
1p-5p	5	5	5	65	60	70	13	12	14
5p-7p	5	5	5	65	60	70	13	12	14
7p-9p	10	10	10	50	50	60	5	5	6
<i>Monuments Route</i>									
8-10a	10	10	10	30	30	30	3	3	3
10a-2p	5	5	5	30	30	30	6	6	6
2p-8p	5	5	5	30	30	30	6	6	6
8p-9p	10	10	10	30	30	30	3	3	3
<i>Monuments Route - Presidential Routing</i>									
8a-9p	30	30	30	60	60	60	2	2	2
<i>North-South Route</i>									
8-10a	10	10	5	40	40	35	4	4	7
10a-4p	10	10	5	40	40	40	4	4	8
4-7p	10	10	5	40	40	45	4	4	9
7p-9p	10	10	10	40	40	40	4	4	4
<i>K Street Route</i>									
8-10a	10	10	5	60	60	75	6	6	15
10a-4p	10	10	5	70	70	75	7	7	15
4-7p	10	10	5	70	70	80	7	7	16
7p-9p	10	10	10	70	60	70	7	6	7
Total							46	44	62

Alternative B Circulator Headways and Vehicle Requirements – Peak Season

	Peak Season (5 months)											
	Headway				Cycle Time				Buses			
	Sat.	Sun.	M/T	W/Th/F	Sat.	Sun.	M/T	W/Th/F	Sat.	Sun.	M/T	W/Th/F
White House/Capitol Route - Clockwise												
8-10a	10	10	5	5	70	60	65	65	7	6	13	13
10a-1p	3.5	4.5	4.5	4	70	68	72	68	20	15	16	17
1p-5p	3.5	4.5	4.5	4	70	68	77	76	20	15	17	19
5p-7p	5	5	5	5	70	65	75	75	14	13	15	15
7p-9p	10	10	10	10	60	60	60	60	6	6	6	6
White House/Capitol Route-Counter Clockwise												
8-10a	10	10	5	5	60	50	60	60	6	5	12	12
10a-1p	4	5	5	4	64	60	70	68	16	12	14	17
1p-5p	3	3.5	4	3.5	63	60	68	70	21	17	17	20
5p-7p	3	4	4	4	63	60	68	68	21	15	17	17
7p-9p	10	10	10	10	50	50	60	60	5	5	6	6
Monuments Route												
8-10a	10	10	10	10	30	30	30	30	3	3	3	3
10a-2p	4	5	5	5	32	30	30	30	8	6	6	6
2p-8p	3	5	5	4	30	30	30	32	10	6	6	8
8p-9p	4	5	5	5	28	25	30	30	7	5	6	6
9p-11p	5	5	5	5	25	25	30	30	5	5	6	6
Monuments Route - Presidential Routing												
8a-11p	30	30	30	30	60	60	60	60	2	2	2	2
North-South Route												
8-10a	10	10	5	5	40	40	35	35	4	4	7	7
10a-4p	10	10	5	5	40	40	40	40	4	4	8	8
4-7p	10	10	5	5	40	40	45	45	4	4	9	9
7p-9p	10	10	10	10	40	40	40	40	4	4	4	4
K Street Route												
8-10a	10	10	5	5	60	60	75	75	6	6	15	15
10a-4p	10	10	5	5	70	70	75	75	7	7	15	15
4-7p	10	10	5	5	70	70	80	80	7	7	16	16
7p-9p	10	10	10	10	70	60	70	70	7	6	7	7
Total									63	51	67	74

Appendix E

Estimated Market Shares for Circulator

Estimated Market Shares for Visitor Circulation Trips between Attraction Areas

Trips Between Attraction Areas

Assumed Market Share							
Origin	Destination						
	Mall	George- town	Capitol Area	Monuments	Downtown	White House Area	
Mall	25%	0%	25%	50%	33%	25%	
Georgetown	0%	10%	33%	0%	10%	0%	
Capitol Area	25%	33%	33%	50%	33%	20%	
Monuments	50%	0%	50%	50%	50%	50%	
Downtown	33%	10%	33%	50%	20%	33%	
White House Area	25%	0%	20%	50%	33%	10%	
Estimated Daily Circulator Ridership							
Origin	Destination						TOTAL
	Mall	George- town	Capitol Area	Monuments	Downtown	White House Area	
Mall	963	-	429	782	270	175	2,619
Georgetown	-	347	190	-	20	-	558
Capitol Area	429	190	1,807	391	203	23	3,043
Monuments	782	-	391	6,378	203	116	7,870
Downtown	270	20	203	203	110	77	884
White House Area	175	-	23	116	77	16	408
TOTAL	2,619	558	3,043	7,870	884	408	15,381

Estimated Market Shares for Visitor Access/Egress Trips to/from Attraction Areas

Round Trips to/from Attraction Areas

Assumed Market Share							
Origin	Mall	George-town	Capitol Area	Monuments	Downtown	White House Area	
Blue/Orange Line	0%	2%	0%	45%	0%	2%	
Yellow/Green Line	2%	8%	8%	35%	0%	10%	
Red Line East	8%	8%	5%	35%	0%	2%	
Red Line West	5%	5%	5%	35%	0%	2%	
Convention Center	15%	15%	5%	15%	30%	5%	
Circulator Area Hotels	25%	25%	25%	45%	25%	25%	
TOTAL							
Estimated Daily Circulator Ridership							
Origin	Mall	George-town	Capitol Area	Monuments	Downtown	White House Area	TOTAL
Blue/Orange Line	-	513	-	5,684	-	65	6,263
Yellow/Green Line	266	405	419	845	-	64	1,999
Red Line East	731	298	180	580	-	9	1,798
Red Line West	1,159	426	433	1,491	-	22	3,531
Convention Center	533	202	37	47	480	10	1,309
Circulator Area Hotels	683	419	662	255	97	22	2,138
TOTAL	3,372	2,263	1,731	8,902	577	192	17,037

Estimated Market Shares for Circulation Trips by Employees and Shoppers

		Destination																
		Downtown	Union Sta.	NoMa	Capitol	Mall	White House	Mt. Vernon	L'Enfant	Waterfront	Southwest	Constitution West	GWU	Penn. Ave.	K Street	DuPont Circle	West End	Georgetown
Origin	Downtown	40%	40%	20%	40%	40%	40%	40%	40%	40%	0%	40%	40%	20%	20%	0%	0%	20%
	Union Sta.	40%	40%	40%	40%	40%	40%	20%	20%	0%	40%	40%	40%	40%	0%	0%	40%	
	NoMa	20%	40%	40%	20%	20%	40%	20%	20%	0%	20%	20%	40%	40%	0%	0%	40%	
	Capitol	40%	40%	20%	40%	40%	40%	20%	20%	0%	40%	40%	20%	20%	0%	0%	20%	
	Mall	40%	40%	20%	40%	40%	40%	40%	40%	0%	40%	40%	20%	20%	0%	0%	20%	
	White House	40%	40%	20%	40%	40%	40%	20%	20%	0%	40%	40%	20%	20%	0%	0%	20%	
	Mt. Vernon	40%	40%	40%	20%	40%	20%	40%	40%	0%	20%	20%	40%	40%	0%	0%	40%	
	L'Enfant	40%	20%	20%	20%	40%	20%	40%	40%	0%	20%	20%	20%	20%	0%	0%	20%	
	Waterfront	40%	20%	20%	20%	40%	20%	40%	40%	0%	20%	20%	20%	20%	0%	0%	20%	
	Southwest	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Constitution West	40%	40%	20%	40%	40%	40%	20%	20%	0%	40%	40%	40%	20%	0%	0%	20%	
	GWU	40%	40%	20%	40%	40%	40%	20%	20%	0%	40%	40%	40%	20%	0%	0%	20%	
	Penn. Ave.	20%	40%	40%	20%	20%	20%	40%	20%	0%	40%	40%	40%	40%	0%	0%	40%	
	K Street	20%	40%	40%	20%	20%	20%	40%	20%	0%	20%	20%	40%	40%	0%	0%	40%	
	DuPont Circle	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	West End	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	
	Georgetown	20%	40%	40%	20%	20%	20%	40%	20%	0%	20%	20%	40%	40%	0%	0%	40%	

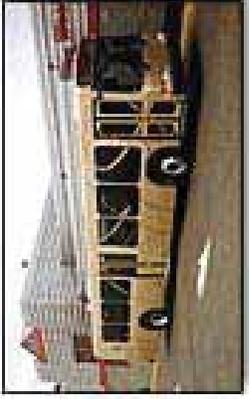
Appendix F

Vehicle Summary Table

Appendix F

Vehicle	Seated Passenger Capacity	Total Passenger Capacity	Vehicle Length	Vehicle Height	Vehicle Width	Vehicle Turning Radius	Fuel Type	Body Type	Vehicle Picture
EI Dorado National E-Z Rider II	29	58	30'	118"	102"	31'	Natural Gas	Standard	
New Flyer Model D40LF	39	>70	40'	120'	102"	44'	Natural Gas	Standard	
New Flyer Model D35LF	30	60	35'	120'	102"	36'	Natural Gas	Standard	
Neoplan AN 440 TLF	40	>70	bb40 or 45'	127"	102"	42'	Natural Gas	Standard	

Appendix F

Vehicle	Seated Passenger Capacity	Total Passenger Capacity	Vehicle Length	Vehicle Height	Vehicle Width	Vehicle Turning Radius	Fuel Type	Body Type	Vehicle Picture
Neoplan AN 435 TLF	37	>70	35'	127"	102"	38'	Natural Gas	Standard	
North American Bus Industries 40LFW	40	>70	40'	116"	102"	38'	Natural Gas	Standard	
Orion Bus Orion VII Low Floor	38	>70	40'	114"	101.8"	42.5"	Natural Gas	Standard	

Appendix F

Vehicle	Seated Passenger Capacity	Total Passenger Capacity	Vehicle Length	Vehicle Height	Vehicle Width	Vehicle Turning Radius	Fuel Type	Body Type	Vehicle Picture
Volvo 10BLE	45	>70	45'	127"	102"	42'	Natural Gas	Standard	
Volvo B10BL	40	>70	40'	127"	102"	42'	Natural Gas	Standard	
Nova Bus LFS	39	>70	40'	123"	102"	36.6'	Natural Gas	Standard	

Appendix F

Vehicle	Seated Passenger Capacity	Total Passenger Capacity	Vehicle Length	Vehicle Height	Vehicle Width	Vehicle Turning Radius	Fuel Type	Body Type	Vehicle Picture
MAN NM Low Floor MidiBus	30	60	35'	116"	102"	38'	Natural Gas	Standard	
TransBus Trident	32 on each level	50 on each level	39'	156"	98.4"	n/a	Diesel	Double Deck	
Volvo Super Olympian	34 on each level	52 on each level	40'	157"	100"	n/a	Diesel	Double Deck	

Appendix F

Vehicle	Seated Passenger Capacity	Total Passenger Capacity	Vehicle Length	Vehicle Height	Vehicle Width	Vehicle Turning Radius	Fuel Type	Body Type	Vehicle Picture
Designline City Bus	29	37	30'	118"	102"	31'	Electric Hybrid	Special Design	
NABI 30C-LF Composite Concept Bus	30	44	30'	118"	102"	31'	Electric Hybrid	Special Design	
TransTeq EcoMark	60	>100	60'	118"	106"	n/a	Electric Hybrid	Special Design	

Appendix F

Vehicle	Seated Passenger Capacity	Total Passenger Capacity	Vehicle Length	Vehicle Height	Vehicle Width	Vehicle Turning Radius	Fuel Type	Body Type	Vehicle Picture
Advanced Vehicle Systems	39	61	38'	118"	102"	31'	Electric Hybrid	Standard	
Irisbus Tramway Civis	60	>100	61'	134"	100"	n/a	Electric Hybrid or Fully Electric	Special Design	
Irisbus Trolleybus Cristalis	40	>70	39'	134"	100"	n/a	Electric Hybrid or Fully Electric	Special Design	

Appendix G

Photos of Possible Vehicles

Eldorado National E-Z Rider II Low –Floor Transit Bus



New Flyer Model D40LF



New Flyer Model D35LF



Neoplan AN440TLF



Neoplan AN435LF



North American Bus Industries Model 40LFW



Orion Bus Orion VII Low Floor



Volvo B10BLE



Volvo B10BL



Nova Bus LFS



MAN NM Low-Floor MidiBus



Advanced Vehicle Systems AVS38



Designline Electric Hybrid City Bus



North American Bus Industries 30C-LF CNG Hybrid-Electric Composite Concept Bus



Irisbus Tramway Civis



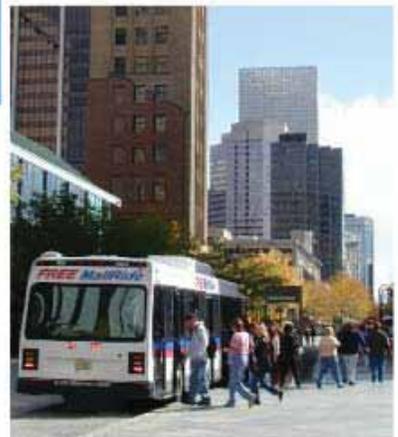
TransTeq EcoMark



TRANSPORTATION TECHNIQUES
1705 E. 39TH AVE.
DENVER, CO 303-382-1041

Leadership in hybrid electric technology since 1998

- World's largest fleet – 36 series hybrid electric BRT vehicles
- 55,000 passengers served daily
- Ultra-low emissions, lower noise, improved fuel economy, and reduced congestion
- Adaptive to technology advances, including fuel cells



Irisbus Trolleybus Cristalis



TransBus Trident



Volvo Super Olympian

