

16TH STREET NW TRANSIT PRIORITY



FINAL REPORT

MARCH 2016



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- » The Citizens Advisory Group
- » Advisory Neighborhood Commissions 1A, 1B, 1C, 1D, 2A, 2B, 2C, 2F, 4A, 4C
- » Pedestrian Advisory Council, Ward 1 and 2
- » Adams Morgan BID
- » DowntownDC BID
- » Golden Triangle BID

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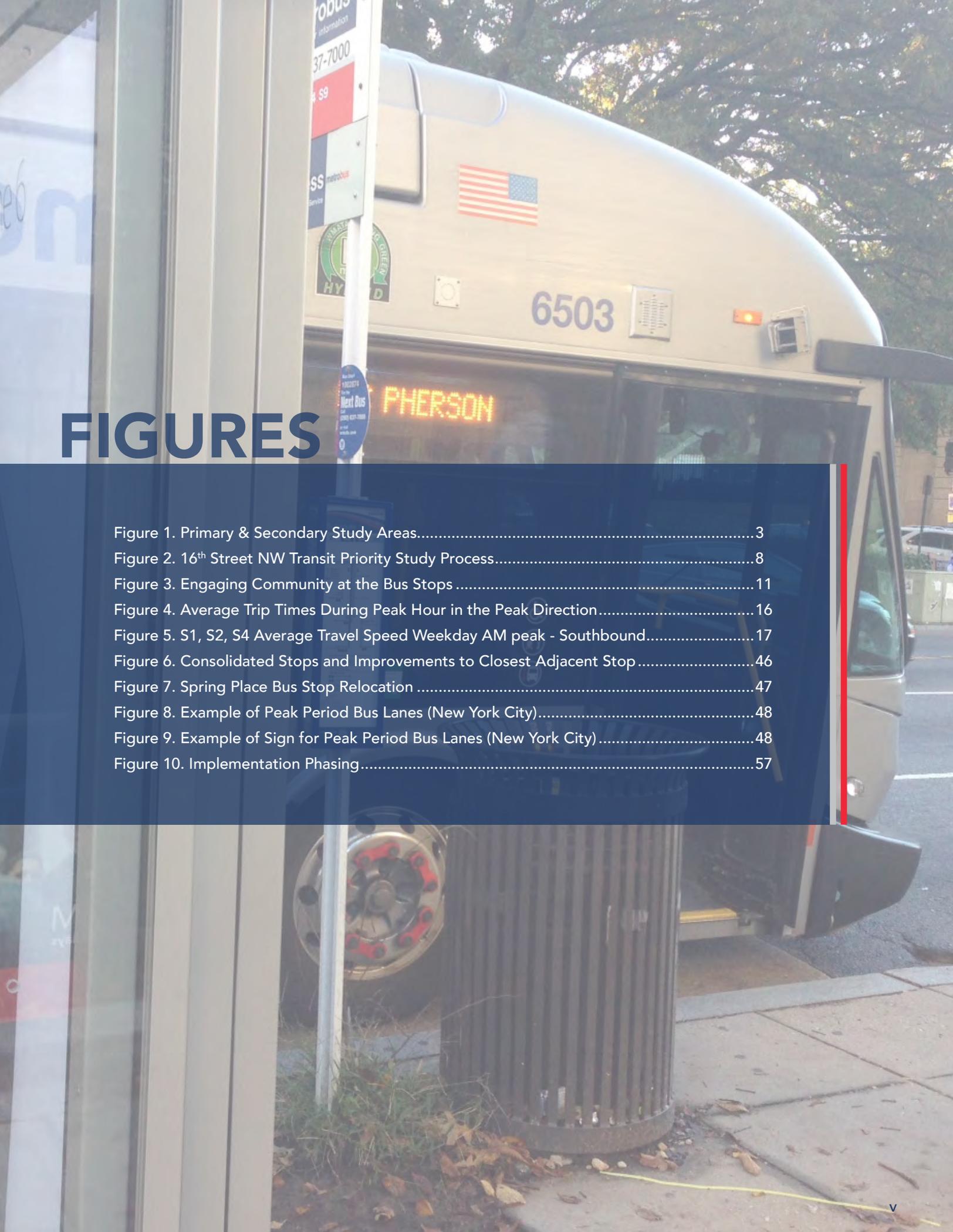
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GLOSSARY OF TERMS

GENERAL TRANSIT

Alighting	Passengers getting off the bus.
Boarding	Passengers getting on the bus.
Dwell Time	The amount of time a bus is stopped at a bus stop.
Far-Side Bus Stop	A bus stop that is positioned at the beginning of a block after you cross the intersection.
Headway	The time between bus arrivals at a bus stop.
Near-Side Bus Stop	A bus stop that is located at the end of a block before crossing an intersection.
Service Pattern	The start and end point for a bus route. Each route might have multiple service patterns. For example, some S2 buses start at Silver Spring and others start at Eastern Avenue or one of several other locations.
Transit Signal Priority (TSP)	The bus triggers the traffic signal to extend the green phase to allow buses to travel through intersections more efficiently.

SPECIFIC TO THIS STUDY

AM Peak	The morning time period when vehicular traffic on the roads and passenger volumes on public transit reach their highest levels. For the purposes of this Study the AM peak is 7-10 AM.
Draft Alternatives	Three draft sets of physical, transit service, and traffic operations improvements. These were shared with the public to get their feedback.
Final Alternatives	Three sets of physical, transit service, and traffic operations improvements. These were modified and finalized based on public and stakeholder feedback.
Peak Period	The parts of the day when vehicular traffic on roads and passenger volumes on public transit reach their highest levels. For the purposes of this study the peak periods occur in the morning 7-10 AM and in the evening 4-7:30 PM.
PM Peak	The evening time period when vehicular traffic on the roads and passenger volumes on public transit reach their highest levels. For the purposes of this study the PM peak is 4-7:30 PM.
Recommended Alternative	Final set of physical, transit service, and transit operations improvements.
Transit	For the purposes of this report, transit is defined as Metrobus service and does not include Metrorail services.



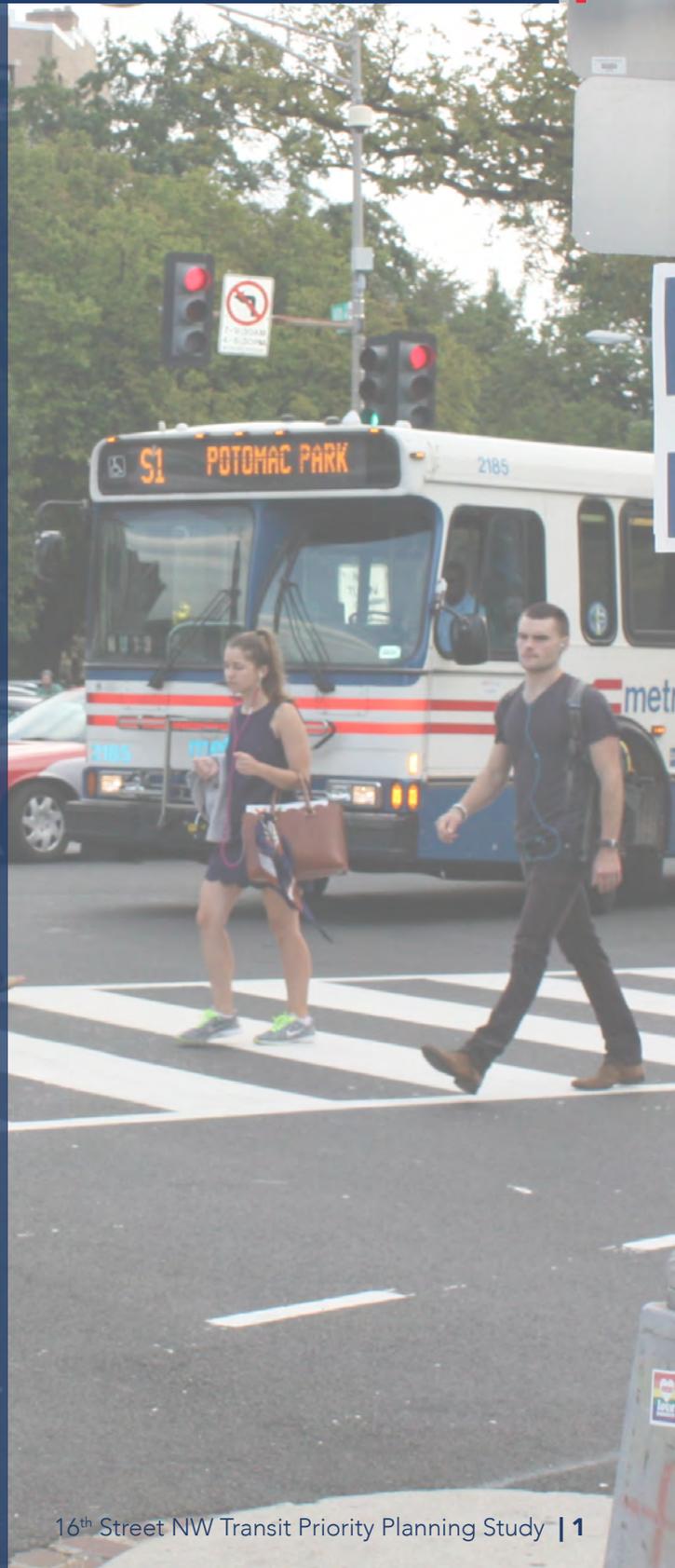
CHAPTER 1. STUDY OVERVIEW

The 16th Street NW corridor is a vital transportation route in the District of Columbia. It serves users of all modes and is one of the busiest Metrobus routes in the network, serving an average of over 20,000 passengers per weekday. In fact, Metrobus moves over 50 percent of the people in the morning peak hour using only about three percent of the vehicles that operate on the corridor.

In recent years, 16th Street NW has experienced transit service and operational improvements, implemented by the District Department of Transportation (DDOT) and the Washington Metropolitan Area Transit Authority (WMATA). These improvements include the S9 MetroExtra limited stop service and signal timing optimization along the corridor. In addition, DDOT and WMATA have been installing transit signal priority (TSP) during this Study, which will be implemented in Summer 2016. However, within the existing traffic and roadway conditions, the possibilities for future additional service improvements are available but limited.

The 16th Street NW Transit Priority Planning Study (the Study) was led by DDOT, in partnership with WMATA. The Study analyzed the existing conditions of 16th Street NW, evaluated a range of potential service, physical, and operational improvements, and determined the impacts these potential improvements would have on transit performance, multimodal mobility, and safety.

This document summarizes the Study, including recommendations in previous plans and studies, public outreach and feedback, development and evaluation of three alternatives, and implementation of the recommended improvements (Recommended Alternative).



BUILDING ON EXISTING STUDIES



The Study builds on two prior studies and the moveDC plan. The previous efforts all identified the need for transit priority improvements, such as dedicated bus lanes, at least part time, along 16th Street NW.

- » Metrobus 16th Street Line Study (2009)
- » 16th Street NW Safety and Mobility Study (2013)
- » moveDC plan (2014)

Metrobus 16th Street Line Study (2009)

In the Metrobus 16th Street Line Study, WMATA developed recommendations to improve the 16th Street NW Line buses focusing on issues identified through the use of passenger surveys and community workshops. WMATA has implemented many of these recommendations, including operation of the S9 (MetroExtra limited-stop service), the short-turn service, and the additional articulated buses along 16th Street NW. The Metrobus 16th Street Line Study also proposed the creation of bus lanes between Arkansas Avenue NW and Irving Street NW to improve travel times and service reliability, and to decrease bus bunching occurrences.

SHORT-TURN BUS SERVICE PROVIDES ADDITIONAL BUSES TO ALLEVIATE OVERCROWDING ON A SEGMENT OF THE EXISTING LINE.

WMATA started S2 short-turn bus service to relieve overcrowding on the southern portion of 16th Street NW during the AM peak period. The short-turn bus runs every 13 minutes from Harvard Street NW to Downtown DC, from 7:30-9:15 AM.

16th Street NW Safety and Mobility Study (2013)

The 16th Street NW Safety and Mobility Study is the predecessor to the current Study. Completed by DDOT in 2013, this study focused on improving safety and mobility for pedestrians and transit users. This 2013 study performed planning-level feasibility analysis of the corridor, identified key issues and locations of potential concerns, and developed concept-level recommendations for alternatives.

The 16th Street NW Safety and Mobility Study's preferred alternative noted that it was possible to operate bus lanes along 2.7 miles of 16th Street NW during peak hours and in peak travel directions. This study also noted a need for further analysis regarding potential vehicular delays.

moveDC (2014)

In 2014, DDOT released the moveDC plan, which outlines the long-term 25-year vision for the transportation system in the District. As more people come to the District to live, work, and play, the goal of the moveDC plan is to increase the share of non-auto commuter trips to 75 percent by 2040. To achieve this goal, the plan builds on existing transportation choices by identifying priority corridors through which more people could travel by modes other than automobile. The plan recommends 47 miles of improved bus service around the District, including the 16th Street NW corridor. The moveDC "2-year Action Plan" recommended a study for long-term transit priority improvements and the potential for a dedicated transit lane on 16th Street NW.

STUDY AREA

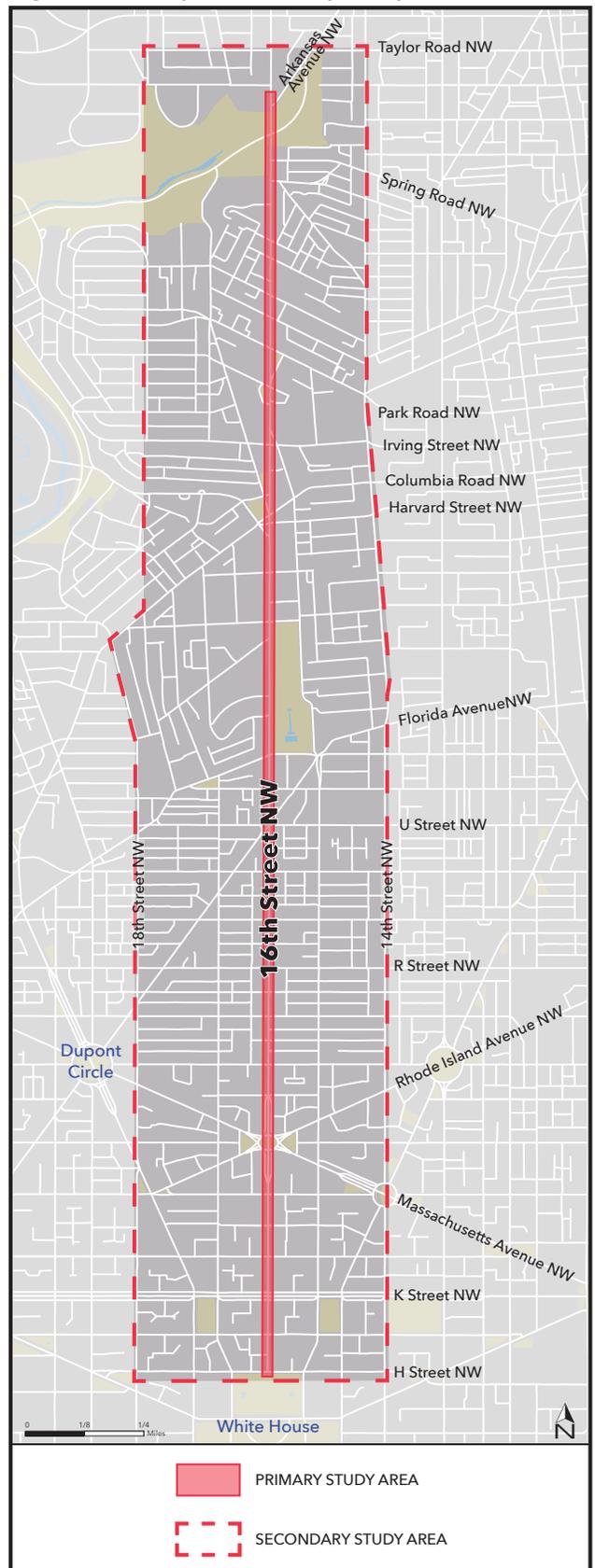


The Study Area is a 2.7-mile stretch of the 16th Street NW corridor served by the 16th Street Line Metrobuses, as displayed in Figure 1. The Primary Study Area encompasses 16th Street NW between H Street NW and Arkansas Avenue NW. The Secondary Study Area maintains H Street NW as the southern boundary with the northern boundary extending to Taylor Street NW. The eastern boundary of the Secondary Study Area is 14th Street NW and the western boundary generally follows the north-south alignment of 18th Street NW.

The Study focuses on the impacts to the Primary Study Area. The Secondary Study Area helps to provide context for the community and transportation network beyond the Primary Study Area.

The 2.7-mile Study Area was identified based on the recommendations from the 16th Street NW Safety and Mobility Study.

Figure 1. Primary & Secondary Study Areas



GOALS & OBJECTIVES



Based on input from the public at the outset of the Study, the following goals and objectives were developed.

Goals

- » Improve travel for people using public transit;
- » Develop alternatives based on public and stakeholder input; and
- » Evaluate alternatives in terms of their benefits to transit users, possible impacts on users of other transportation modes, and safety.

Objectives

- » Improve transit service reliability and travel times by identifying and addressing sources of potential issues (e.g., traffic congestion, signal timing, passenger boarding delays, bus capacity, number and location of bus stops, and/or parking enforcement);

- » Prioritize transit while maintaining operations for those traveling by other modes;
- » Improve passenger comfort and safety (e.g., overcrowding, street crossings, and bus stop amenities);
- » Accommodate current unmet passenger demand for public transit service; and
- » Develop an implementation plan which includes cost estimates.

RELIABILITY IMPROVEMENTS WOULD REDUCE:

- » Excessive wait times for passengers;
- » Late arrival at destinations;
- » Missed transfer connections;
- » Overcrowding on buses;
- » Bus bunching; and
- » Buses passing waiting passengers.

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CHAPTER 2. ENGAGING STAKEHOLDERS

Metrobus riders, commuters, adjacent residents, businesses, regional and local agencies, and other stakeholders provided feedback to help shape the Recommended Alternative. DDOT created a robust and comprehensive plan to reach the diverse range of people that use the corridor and to engage agency partners.

At the beginning of the Study, DDOT created four goals for public and stakeholder engagement:

- » Obtain feedback that represents the diversity of the corridor;
- » Share facts and data with stakeholders;
- » Translate stakeholder goals into quantitative indicators; and
- » Identify mutually beneficial actions for the short-, medium-, and long-term.



5,000+
RACK CARDS & FLYERS
distributed in the study area

2 LARGE PUBLIC MEETINGS

4 PUBLIC ENGAGEMENT
EVENTS at bus stops along 16th Street NW

4 CITIZENS ADVISORY GROUP
(CAG) MEETINGS (open to the public)

7 ADVISORY NEIGHBORHOOD
COMMISSION (ANC)
MEETINGS (open to the public)

200+
ATTENDEES
at public & Citizens
Advisory Group meetings

700+
PEOPLE ENGAGED
at public engagement events
at bus stops along 16th Street NW

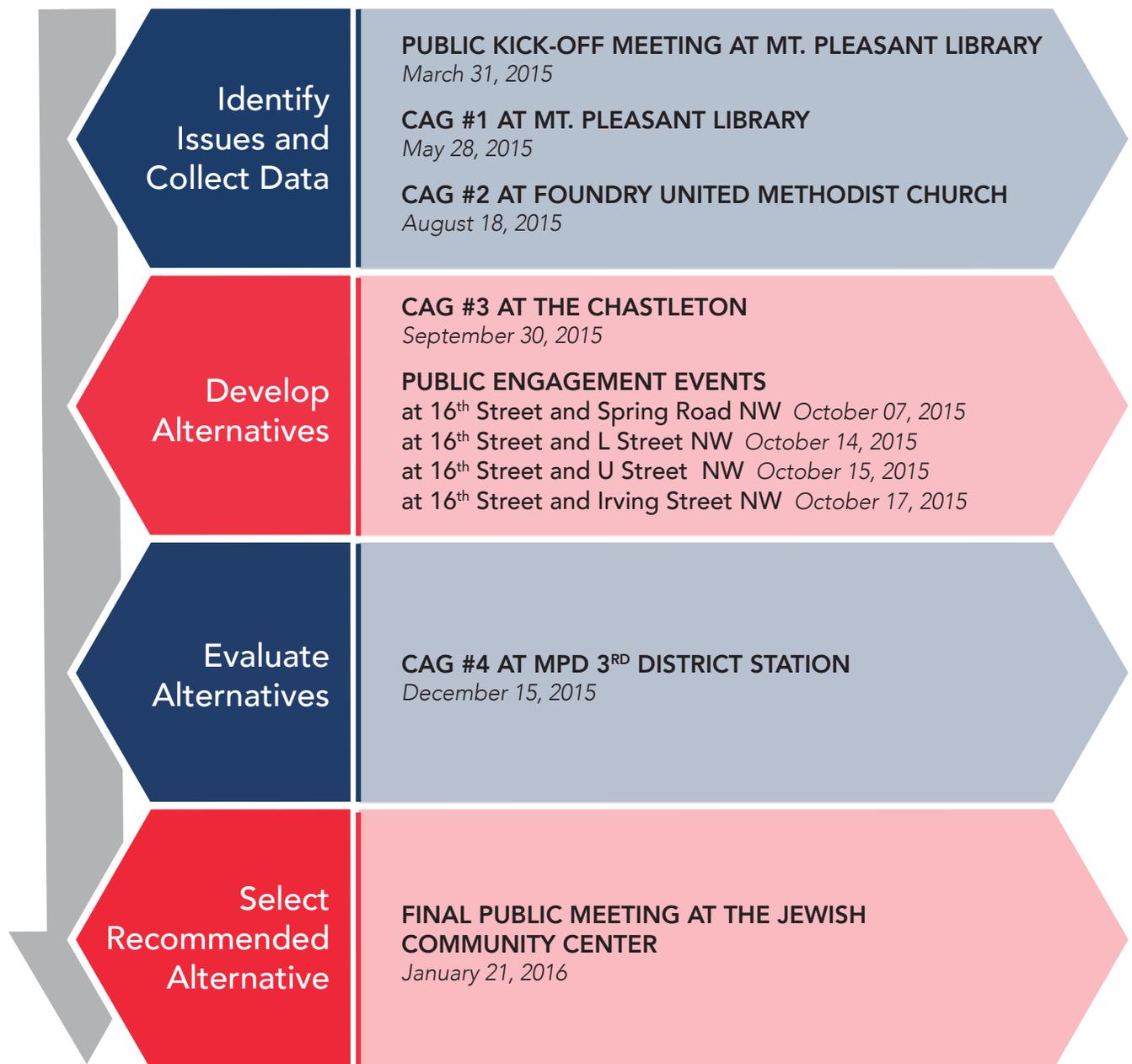
STUDY PROCESS



Throughout the process, DDOT met with agency and public stakeholders to gather feedback, share information, and ultimately refine the recommendations. Figure 2 outlines the process DDOT used to develop a Recommended Alternative for the 16th Street NW corridor.

The stakeholder engagement process described below in Figure 2 was set up to balance technical solutions with stakeholder feedback.

Figure 2. 16th Street NW Transit Priority Study Process



CONVENING A CITIZENS ADVISORY GROUP (CAG)



DDOT convened a Citizens Advisory Group (CAG) consisting of representatives from the Advisory Neighborhood Commissions (ANCs), Pedestrian Advisory Council, and the Business Improvement Districts (BIDs) located in the Primary Study Area, as well as other key stakeholders. As leaders in the community, the members of the CAG operated as a sounding board between larger public events and helped expand the dialog and reach of the planning process. During the meetings, DDOT shared data and analysis, including information that was in draft form to bring transparency to the process. The CAG provided feedback on the technical analyses conducted for the Study, and helped disseminate the information to their communities via social media, blogs, flyers, and community listservs. All of the CAG meetings were open to the public and provided opportunities for public comment.

Members of the CITIZENS ADVISORY GROUP (CAG)

ANC COMMISSIONERS



PEDESTRIAN ADVISORY COUNCIL

Wards 1 & 2
Representatives

BUSINESS IMPROVEMENT DISTRICTS

Adams Morgan
DowntownDC
Golden Triangle

OTHER KEY STAKEHOLDERS

MEETING WITH THE COMMUNITY AND AGENCY PARTNERS



Introducing the Study at a Community Kick-off Meeting March 31, 2015, 6-8 PM, Mt. Pleasant Neighborhood Library (Ward 1) Attendance: 82 people

DDOT introduced the study to the public at an open house. There was a short presentation and three interactive stations. Over 100 attendees provided feedback which was subsequently used to shape the goals and objectives, inform the criteria to evaluate recommendations for improvement, and guide future outreach efforts. The interactive workstations are summarized below.

Workstation A - Where are the Problems?

The purpose of this workstation was to tap the first-hand knowledge of frequent bus riders, residents, and stakeholders to identify potential sources of bus delay and reliability issues beyond available data. On an aerial map of the corridor, attendees identified the problems they experience when using transit on 16th Street NW.

Most of the issues identified by attendees were located at intersections, specifically the intersections of 16th Street NW with U Street, Euclid Street, Park Road, and Irving Street NW. The top four issues were overcrowding on the bus, bus bunching, bus passes by the stop, and traffic congestion.

Workstation B – What’s Important to you?

The purpose of this workstation was to identify stakeholder priorities for transit improvement. The board displayed a list of potential transit improvements for attendees from which they would identify their three most important factors. The top three choices for improvement were bus arriving on time, reduced travel time on the bus, and having enough room on the bus to sit or stand comfortably.

Workstation C – Where are you Going?

The purpose of this workstation was to better understand the origins and destinations of people using transit on 16th Street NW. In addition, this activity provided information regarding the communities represented at the meeting. Most of the trips people identified were concentrated within the Study Area.



Sharing Information at CAG #1

May 28, 2015, 6-8 PM, Mt. Pleasant Neighborhood Library (Ward 1)
Attendance: 25 people (including CAG representatives)

At this meeting DDOT presented a summary of the feedback from the first public meeting, including post-meeting emails, and shared the findings for information collected from field assessments and on-board data. The CAG advised DDOT to analyze the causes of congestion, to develop appropriate solutions, and to examine the morning and evening rush hour separately. They requested that DDOT share the transit data analysis at the next CAG meeting.

Presenting Transit Data at CAG #2

August 18, 2015, 6:30-8 PM, Foundry United Methodist Church (Ward 2)
Attendance: 38 people (including CAG representatives)

As requested at the previous meeting, the CAG received an update from DDOT on the transit data analysis, existing traffic conditions, and major sources of bus delay. During the discussion, the CAG asked DDOT to clarify the definition of congestion and slow traffic. There was a brief discussion on proposed improvements. The CAG advised DDOT to test the improvements separately to identify the most effective alternative and to include parking enforcement in the alternatives.

Getting Feedback on the Draft Alternatives at CAG #3

September 20, 2015, 6:30-8 PM, The Chastleton (Ward 2)
Attendance: 37 people (including CAG representatives)

DDOT presented the three Draft Alternatives at the third CAG meeting. The Draft Alternatives are described in Chapter 4. The CAG provided feedback on the improvements including concerns the team may hear from the community. Based on comments and questions from the CAG, DDOT prepared additional handouts for the Public Awareness Events.

Engaging Community at the Bus Stops

People Surveyed: 78

DDOT hosted four Public Engagement Events at four different bus stops (Figure 3) to gain feedback on the Draft Alternatives from residents, bus riders, and users of the 16th Street NW corridor. Three events were held during the evening rush hour and one was held on a Saturday. The events included a table with Draft Alternative handouts, Draft Alternative Boards, and a survey via handheld tablets. During the Public Engagement Events, 78 people completed the survey. In addition, DDOT passed out 500 English and 200 Spanish Draft Alternatives handouts with information on how to submit comments. Subsequently, DDOT received nearly 150 emails and letters commenting on the Draft Alternatives.

Figure 3. Engaging Community at the Bus Stops



Getting Feedback on the Draft Recommended Alternative at CAG #4

*December 15, 2015, 6:30-8PM,
Metropolitan Police Department 3rd
District Station (Ward 1)
Attendance: 28 (including CAG
representatives)*

During the final CAG meeting DDOT provided a progress update, presented the findings from modeling the three Draft Alternatives, and described the resulting Draft Recommended Alternative. The CAG provided support for some of the improvements and raised concerns about those improvements that could have a negative impact on their communities, particularly on transit service improvements and consolidation of the Lamont Street NW bus stop.

Presenting the Recommended Alternative at the Final Public Meeting

*January 21, 2016, 3:30-8 PM, Jewish
Community Center (Ward 1)
Attendees: 70*

DDOT hosted a final public meeting to present an overview of the study process and provided a detailed description of the Recommended Alternative. A 31-foot wall map displayed the physical improvements included in the Recommended Alternative. Additional boards displayed more details about the full set of improvements in the Recommended Alternative and outlined key aspects of the Study. Boards from previous meetings were available for people who had not attended the previous meetings. Attendees provided feedback during question and answer session, and on comment cards and post-it notes on the wall map. Feedback received at the meeting is documented in Chapter 6.



WORKING WITH AGENCY PARTNERS



WMATA was a key partner throughout the Study. DDOT and WMATA met over a series of six Core Interagency Group (CIG) meetings. Each CIG meeting was scheduled prior to meeting with the public and the CAG. The CIG worked together to review the data analysis, identify sources of delay, draft the three alternatives, create the Recommended Alternative, and map out a plan for implementation.

In addition to the CIG, DDOT engaged the 16th Street Line Metrobus operators at their monthly safety meetings on March 12, 2015 and October 8, 2015.

The purpose of this engagement was to introduce the Study and get feedback on improvements that would help bus operations based on the operators' unique knowledge of the corridor. The operators provided an overview of the routes, feedback on causes of delay and where they occur, gave suggestions for improvement, and responded to the suggested improvements.



CHAPTER 3.

EXISTING CONDITIONS

In the spring and summer of 2015, DDOT undertook extensive data collection and analysis to better understand the existing conditions along the corridor, including transit service, traffic operations, safety, and pedestrian access. To identify the issues and constraints, DDOT collected data by reviewing existing information, walking the corridor, riding the buses, and analyzing the comments from the Public Kickoff Meeting.

The findings from this analysis were detailed in an Existing Conditions Report. The data referenced throughout the Existing Conditions Report is current as of August 2015, unless otherwise noted. The Existing Conditions Report was instrumental in developing effective recommendations for transit service and operational improvements.

For more details on the content of the Existing Conditions Report of the Study, the full report can be found following the link: <http://www.scribd.com/doc/285921031/16th-Street-Transit-Priority-Planning-Study-Existing-Conditions#ScribdDocs>.



ISSUES AFFECTING TRANSIT TRAVEL TIMES AND RELIABILITY



DDOT identified a series of key conditions and issues impacting transit travel times and reliability.

Travel Time

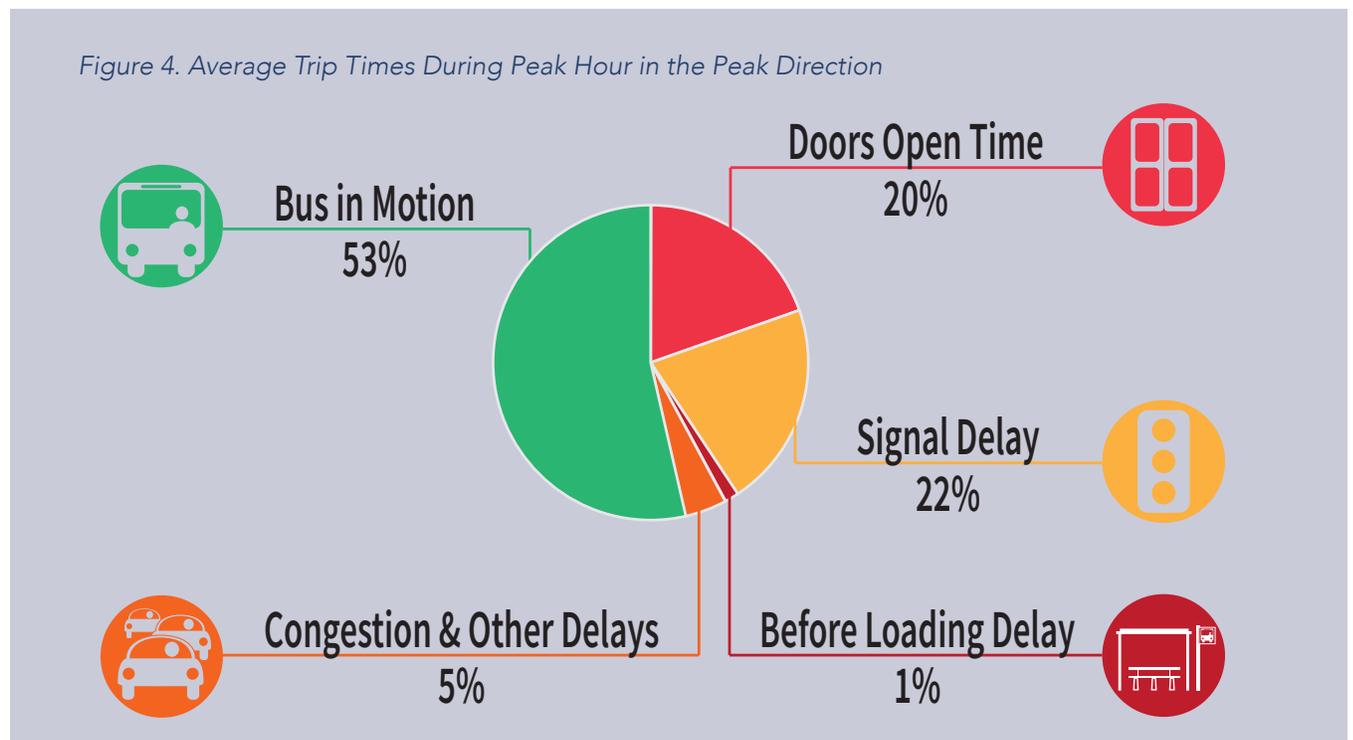
In general, the buses are in motion for just over half (53 percent) of their total trip time from trip start to end. The remaining part of the trip time is spent idling, mostly split between dwell time at bus stops and time waiting at traffic signals. Average delays due to traffic congestion were a small share of the overall delay; however, it should be noted that congestion also affects bus moving times as they often slow down the travel speeds. Figure 4 presents the breakdown of how the 16th Street Line buses typically spend time traveling within the Primary Study Area.

Bus Bunching

At the Public Kickoff Meeting, attendees identified bus bunching, or multiple closely spaced buses followed by longer gaps, as a key issue. Buses are entering the Primary Study Area bunched and buses are bunched throughout the day, including the early night period (7-11 PM). This is in part due to the multiple service patterns operated along the 16th Street Line and because actual bus trip times are longer than the scheduled trip times.



Figure 4. Average Trip Times During Peak Hour in the Peak Direction



Travel Speeds

In general, bus speeds are slower during the AM peak and PM peak periods than during other times of the day. During the peak period, the average bus speed can be as low as 7.6 miles per hour. The travel speed slowdown in the AM and PM peak extends past the peak periods. Midday and early night speeds are slow too, in part because of off-peak parking along the corridor. The S9 route is faster than the S1, S2, and S4 during both the AM peak southbound (Figure 5) and PM peak northbound periods. This is due, in part, to fewer bus stops along the S9 route.

Passengers Boarding and Alighting and Bus Loads

The overall travel time of the 16th Street Line buses is affected by the time needed for passengers to get on and off the bus, also called boarding and alighting. When buses are crowded, it takes longer to board passengers, contributing to longer dwell times. The S4 is the most crowded route, but maximum loads are high on all routes. In addition, boarding and alighting takes longer when passengers have to climb steps to get on the bus, as with WMATA's older bus fleet. The time per passenger to board the S9 route, which uses low-floor buses, is lower than for the local routes.

Boardings



Alightings

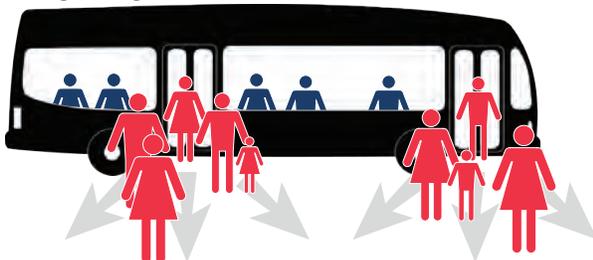
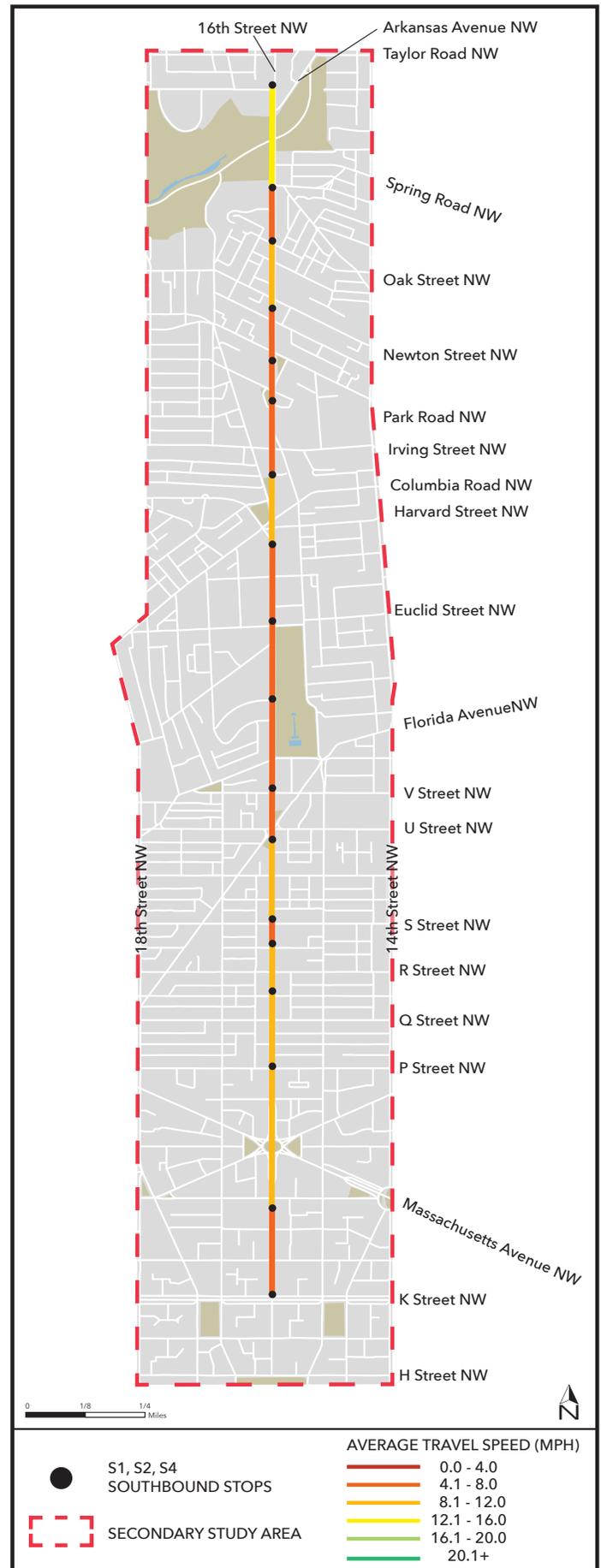


Figure 5. S1, S2, S4 Average Travel Speed Weekday AM peak - Southbound





CHAPTER 4. DEVELOPING ALTERNATIVES

DDOT developed three Draft Alternatives guided by the goals and objectives of the Study and feedback from the community. A series of potential improvements categorized as Physical, Transit Service, and Traffic Operations Improvements comprise each of the Draft Alternatives. Base improvements included in all alternatives have also been identified, such as expanding the lengths of the bus stops, upgrading the bus fleet to low-floor buses, and extending peak period parking restrictions.

The three distinct Draft Alternatives were assembled to represent and test the following types and combinations of transit improvement approaches:

- » Alternative 1 – Service Focus (i.e., improvements to how, when, and where buses operate);
- » Alternative 2 – Infrastructure Focus (i.e., improvements to the roadway and other infrastructure elements); and
- » Alternative 3 – Mixed Service and Infrastructure.

DDOT shared the Draft Alternatives summarized in Table 7 with the public at the third meeting of the CAG and during four public engagement events at bus stops along the corridor. Based on the feedback from the public, the Draft Alternatives were refined into Final Alternatives summarized in Table 8 before undergoing a detailed analysis. It is important to note that any proposed service changes would require WMATA to lead future public involvement efforts prior to implementing the changes.



BASE IMPROVEMENTS INCLUDED IN ALL DRAFT ALTERNATIVES



The Base Improvements form the foundation for improved transit on 16th Street NW and are common to all three alternatives. The Base Improvements are

categorized by physical, transit, and traffic operational improvements and are summarized below in Table 1, Table 2, and Table 3.

Table 1. Base Improvements: Physical

PHYSICAL IMPROVEMENTS	
Improvement	Explanation
<p>Bus Stop Removal/Consolidation:</p> <ul style="list-style-type: none"> » 4 southbound locations (Newton, Lamont, V Streets, and Riggs Place NW) » 5 northbound locations (L, Q, V, Lamont and Newton Streets NW) 	<p>Bus stop consolidation refers to the closure of a bus stop, requiring passengers to use an adjacent stop to access a bus. There are currently 16 southbound and 18 northbound bus stops within the 2.7-mile Primary Study Area, which averages to about a stop every 1/6th of a mile. With the proposed consolidation, the average distance between stops would increase to about every 1/5th of a mile.</p> <p>The stops selected for consolidation are generally located within one block of an adjacent stop and are not S9 stops. The S9 stops are located at major cross streets and are classified as enhanced stops under WMATA's guidelines indicating higher level of customer amenities.</p> <p>Bus stop consolidation is one way to improve overall bus travel times, as the buses spend less time at bus stops. Bus stop consolidations will also enable DDOT to allow other curbside uses, such as parking or loading zones, which are not possible today because of the bus stops. More information on bus stop consolidation, including proposed improvements at adjacent bus stops and distance to adjacent bus stops, is provided in Chapter 6.</p> <p>Note: Riggs Place was consolidated by WMATA in fall 2015.</p>
<p>Far-Side Bus Stop Expansion: 2 southbound locations (Harvard and M Streets NW)</p>	<p>For far-side bus stops, if the bus zone is only long enough to accommodate one bus, trailing buses are often forced to wait on the near-side of the intersection if a bus is already at the stop. This causes the trailing buses to often miss the green phase of the traffic signal while waiting, adding to the overall travel time.</p> <p>The proposed improvement would expand the capacity of these bus stops to serve two buses and enhance reliability and travel times.</p>
<p>Relocate southbound Spring Place bus stop north to Spring Road to improve pedestrian safety</p>	<p>Pedestrians trying to access the southbound bus stop sometimes cross 16th Street NW at Spring Place NW, which does not have a crosswalk or a traffic signal, rather than walking to Spring Road NW, which has a marked crosswalk and a traffic signal. In this improvement, the southbound Spring Place NW bus stop would be relocated north to Spring Road NW to discourage passengers from crossing 16th Street NW at an unsignalized intersection.</p>
<p>Upgrade bus stops to WMATA zone lengths</p>	<p>For buses to safely and easily access a bus stop, there must be adequate clear space along the curb to allow the bus to move out of, or merge back, into general traffic. There are several bus stop locations where buses have insufficient clear space to merge into and out of stops when parking is permitted, which can impact passenger boarding and alighting and travel times.</p>

Table 2. Base Improvements: Transit Service

TRANSIT SERVICE IMPROVEMENTS	
Improvement	Explanation
Headway-based Service	<p>A headway-based service provides passengers with a consistent amount of time between buses, similar to the 70s Lines on Georgia Ave/7th Street NW and the DC Circulator. Currently, the 16th Street Line buses operate according to a published schedule but are frequently behind schedule and bunched. Moving to a headway-based service would improve service reliability by reducing bus bunching.</p> <p>Transitioning to consistent bus arrivals helps to alleviate the overcrowding that occurs as a result of bus bunching as well. Often the first bus in a bunch is overcrowded, while there may be excess capacity on the last bus. Headway-based service also reduces the need for passengers to consult bus schedules.</p>
S2 Route patterns reduced to two in each direction	<p>Buses enter the Primary Study Area already bunched, due in part to the multiple operational patterns utilized by the bus line. For example, the S2 route has nine southbound patterns and three northbound patterns on weekdays. These patterns converge onto 16th Street NW at various cross-streets, including Missouri Avenue NW, Colorado Avenue NW, and Harvard Street NW, and it is difficult to ensure that buses enter at evenly spaced intervals. This improvement would reduce the number of southbound operational patterns on the S2 route, making it easier to maintain consistent headways in the corridor, since buses would originate or terminate at fewer locations.</p>
S1 and S2 service eliminated along 14 th Street NW between Northern Bus Garage and 16 th Street NW	<p>Some S1 and S2 patterns originate at the Northern Bus Garage, located at 14th and Buchanan Streets NW. These buses travel north along 14th Street NW, stopping at several bus stops, before heading west along Missouri Avenue NW to 16th Street NW. This improvement would eliminate revenue service along 14th Street NW, meaning that buses would not pick up passengers until they turn south onto 16th Street NW. The proposed change would simplify the schedule and eliminate out-of-direction travel (i.e., southbound service operating in the northbound direction), both of which are potentially confusing to passengers. This measure would improve service reliability and would make it easier to operate a headway-based service.</p>
Running and recovery time added to schedule	<p>On average, the actual trip times are longer than the scheduled trip times for the 16th Street Line buses. Insufficient runtime has a cascading effect throughout the day, because a bus that is running behind schedule may never “catch up” to its schedule on subsequent trips. This results in missed or dropped trips and bus bunching. Adding runtime to the 16th Street Line schedules would improve the on-time performance and subsequently the reliability of the service.</p>
Fleet mix upgraded with low-floor and articulated buses	<p>Low-floor buses allow passengers to walk directly into the buses without having to climb steps. This reduces the time it takes each passenger to board or alight the bus. Articulated buses are longer, multi-sectional buses that carry approximately 60 seated passengers, compared to 40 for a regular bus. WMATA has begun upgrading the 16th Street Line fleet to use more low-floor and articulated buses, which will improve travel times and increase capacity for more passengers.</p>

Table 3. Base Improvements: Traffic Operations

TRAFFIC OPERATIONS IMPROVEMENTS	
Improvement	Explanation
Transit Signal Priority (TSP) at 15 planned locations and five additional locations configured for headway-based service	Transit Signal Priority (TSP) grants buses an early green phase or an extended green phase at an intersection. For this improvement, TSP will be configured for headway-based service, meaning that it will help to keep the buses evenly spaced. If a bus is running behind its headway, it will be granted priority to help it catch up, improving reliability.
Peak period parking restrictions extended to 7-10 AM (from 9:30 AM) and 4-7:30 PM (from 6:30 PM)	Slow bus travel speeds extend past the current peak period, in part because on-street parking reduces the roadway capacity. Extending the parking restrictions allows for greater capacity to move buses and general traffic. The proposed improvement would extend the no parking designation to later in the morning and evening to improve bus travel times.
Southbound reversible lane extended to 7 -10 AM (from 9:30 AM)	The existing reversible lane along 16 th Street NW between Arkansas Avenue NW and Irving Street NW provides an additional travel lane in the peak period. Increasing the time period for the southbound reversible lane operation by 30 minutes in the morning to 10 AM, would reduce bus travel time and align with the extended peak period parking restrictions.
Pedestrian safety improvements, including at Arkansas Avenue, Sacred Heart Way, and Harvard Street/Columbia Road/Mt. Pleasant Street NW	<p>This improvement includes a range of potential improvements to improve pedestrian safety and access, including installation of Americans with Disabilities Act (ADA) compliant ramps, tactile warning surfaces to existing ramps, and crosswalk markings.</p> <p>At Arkansas Avenue NW, the curb at the southeast corner would be extended to shorten the crossing distance across Arkansas Avenue NW and slow right-turning vehicles. At Sacred Heart Way NW, the metal fencing would be removed and a raised crosswalk would be installed to allow pedestrians to cross Sacred Heart Way NW. At Harvard Street/ Columbia Road/Mt. Pleasant Street NW, the intersection would be reconfigured to improve pedestrian safety and simplify crossings.</p>
Bus stop amenity and access improvements	The proposed improvements would upgrade bus stops along the corridor in accordance with WMATA's Guidelines for the Design and Placement of Transit Stops. Amenities would include new or expanded shelters, information displays, enhanced lighting, and trash receptacles. ADA improvements would also be made to ensure that each stop is accessible.
Correct parking restrictions northbound between L and M Streets NW to prohibit PM peak parking	Currently, parking is allowed on the east side of 16 th Street NW between L and M Streets NW during the PM peak, which differs from the rest of the corridor. This improvement would replace the existing AM peak period parking restriction with a restriction during the extended PM Peak period. This would improve reliability and travel times during the PM peak period with minor, or no impact, to the AM peak period bus service.
Work with Downtown hotels on taxi and loading zone relocation	This improvement would relocate the curbside space reserved for hotel taxi and loading 16 th Street NW in Downtown, in advance of the installation of bus lanes in the curb lane.

DRAFT ALTERNATIVES



Alternative 1 focuses on transit service improvements, ranging from headway-based service to modifications of the S1 and S2 routes. Alternative 2 focuses on infrastructure improvements, including full length bus lanes in both directions and intersection reconfigurations. Alternative 3 is a mix of service and infrastructure improvements, with peak period peak direction bus lanes and off-board fare payment and all-door boarding for the S9 routes. An overview of each alternative is provided below.

lane or making other large infrastructure investments. Alternative 1 seeks to improve bus travel times through queue jump lanes, off-board fare payment and all-door boarding, S1 conversion to limited stop service, and the removal of midday parking. The alternative includes several service changes which would address bus reliability and bunching, namely truncated service patterns in the downtown area and deadhead service relocated to Arkansas Avenue NW. Overall traffic operations would be improved through the use of automated enforcement for peak hour parking restrictions and separation of the southbound left-turn lane at W Street NW.

Alternative 1 – Service Focus

Alternative 1 was developed with a focus on transit service improvements and is the only alternative without a bus lane. The goal of this alternative was to explore options for improving transit without installing a bus

The roadway configuration, including the number of travel lanes and the length of the existing reversible lane, for Alternative 1 would remain unchanged from the existing conditions. Additional information about each of the improvements is provided below in Table 4.

Table 4. Alternative 1: Service Focus Improvements

IMPROVEMENT	EXPLANATION
Physical Improvement	
Queue jump lanes	A queue jump lane is a relatively short lane that allows buses to bypass queues of traffic at an intersection, reducing bus travel times. A bus typically enters a right-turn lane at an intersection approach and is given a green light in advance of general traffic. Queue jump lanes would be installed Columbia Road NW (southbound), U Street NW (northbound), and M Street NW (northbound).
Transit Service Improvements	
Off-Board Fare Payment	Off-board fare payment would allow passengers to pay their fare at kiosks located at the bus stops before boarding the bus. This improvement has been shown to reduce passenger boarding times by as much as 0.75 seconds per passenger on bus routes in other transit networks. Off-board fare payment would be implemented for all buses at all bus stops in the Primary Study Area.
All-Door Boarding	All-door boarding allows passengers to board the bus through either the front or rear door of the bus. Implementation of all-door boarding could reduce bus dwell times at stops by an average of 1 second per rider, but requires fare inspectors to reduce fare evasion. All-door boarding would be implemented for all buses at all bus stops in the Primary Study Area.
S1 converted to limited stop service using current S9 stops	This improvement would convert the local S1 bus service to a limited stop service using the current S9 stops. Once the bus turns onto K Street NW, the S1 route would continue to operate as it currently does, serving all stops along K Street NW, 18 th /19 th Streets NW, and Virginia Avenue NW. This would decrease the travel time by about two and one-half minutes on the S1.
Service Patterns Truncated in Downtown » Farragut Square for S1 » McPherson Square Metrorail Station for S2/S4	This improvement would truncate all S1 trips at Farragut Square and S2/S4 trips at McPherson Square Metrorail Station. This would improve reliability in the Primary Study Area by reducing the route length and making it easier for buses to stay on schedule, however passengers travelling to Potomac Park and Federal Triangle would be required to transfer.

IMPROVEMENT	EXPLANATION
Transit Service Improvements	
Deadhead Service relocated to Arkansas Avenue NW from Missouri Avenue NW	Currently, buses leaving the Northern Bus Garage travel north on 14 th Street NW to Missouri Avenue NW. This improvement would route buses via Arkansas Avenue NW instead, which is a more direct route to 16 th Street NW. This would simplify the route pattern, which would reduce bus bunching and save operating costs.
Traffic Operations	
Automatic Enforcement on Buses	Automated enforcement uses technology to issue tickets instead of having to rely on police or parking enforcement personnel. The cameras work in much the same way as red light or speed cameras and would be used to enforce the peak hour parking restrictions. Consistent enforcement would reduce the potential vehicles parking illegally in the curb lane.
Remove Midday Parking	Midday bus speeds are not substantially faster than peak period bus speeds, in part due to on-street parking. Removing on-street parking along 16 th Street NW in both directions during the midday period would increase roadway capacity and reduce bus travel times by nearly two minutes. Approximately 525 on-street parking spaces would be impacted.
Left-Turn Restrictions » Southbound at Irving Street NW » Northbound at Mt. Pleasant Street NW	This improvement would restrict left-turns southbound at Irving Street NW and northbound at Mt. Pleasant Street NW to improve vehicle operations in Columbia Heights. However, left-turning vehicles would be required to use an alternate route.
Southbound left-turn lane separation and advance signage at W Street NW	The number of southbound through lanes reduces from three to two north of the W Street NW intersection. The center through lane transitions to a left-turn-only lane and does not extend south of W Street NW. Many drivers in the center lane seeking to travel southbound through the intersection do not merge prior to the transition to a left-turn lane. This creates a conflict as the drivers seek to merge into the through lane. The installation of flexible bollards and early warning signage would eliminate this pattern by eliminating the potential for merging from the left-turn lane and by encouraging merging prior to the left-turn lane.

Alternative 2 – Infrastructure Focus

Alternative 2 was developed with a focus on infrastructure improvements, primarily to understand the benefits and tradeoffs from an all-day full length bus lane in both directions. Bus lanes would improve bus travel times, but would require reconfiguration of the roadway. This alternative includes fewer transit service and traffic operations improvements than the other two alternatives. Automated enforcement would be used to help keep the bus lanes clear and would be supported by a pilot dedicated towing program.

The roadway configuration for Alternative 2 would change from the existing conditions in two key ways in order to accommodate the installation of curbside bus lanes in both directions. First, a fifth travel lane would be added between O and U Streets NW. The fifth lane would be added by restriping the roadway with narrower lanes, and the curbs would remain in place. Second, the center reversible lane would be extended south to downtown in order to maintain two general vehicle lanes in the peak direction. Appendix A displays the proposed lane configurations. Parking would not be allowed during the AM and PM peaks. Both of these changes would help to maintain vehicle operations in the peak direction with the dedication of both curbside lanes to buses. Additional information about each of the improvements is provided below in Table 5.

Table 5. Alternative 2: Infrastructure Focus Improvements

IMPROVEMENT	EXPLANATION
Physical Improvement	
Bus Lanes	This improvement would create a curbside bus lane along the full length of the Primary Study Area in both directions from 7 AM – 10 PM. Right-turning vehicles and taxis would be allowed to enter the bus lane. Bus lanes help reduce overall bus travel time. On average, bus lanes typically save an average of 1 minute per mile of bus travel time.
Lane configuration changes between U and O Streets NW due to bus lanes	The existing center reversible lane would be extended south to downtown in order to add capacity in the peak direction of travel, which would help maintain vehicle operations with the addition of bus lanes. Similarly, the segment of 16 th Street NW between O and U Streets NW would be restriped from four lanes to five lanes, and the curbs would remain in place.
Intersection Reconfiguration at Harvard Street/Columbia Road/Mt. Pleasant Street NW	Currently Harvard Street, Columbia Road, and Mt. Pleasant Street NW merge to form a six-leg intersection, with three signalized intersections, along 16 th Street NW. Reconfiguring the intersection so that the number of traffic signals can be reduced would decrease delays for buses and general traffic. In addition, the intersection is currently difficult for pedestrians and east-west traffic to cross, so reconfiguration would improve access for all modes.
Transit Service Improvements	
Off-Board Fare Payment	SmarTrip Card top off would enable passengers to add value to their SmarTrip Cards at kiosks located at the bus stops before boarding the bus, reducing delays from passengers reloading their SmarTrip Cards when boarding.
Traffic Operations	
Automatic Enforcement on Buses	Automated enforcement uses technology to issue tickets instead of having to rely on police or parking enforcement personnel. The cameras work in much the same way as red light or speed cameras and would be used to keep the bus lanes clear. Consistent enforcement would reduce the potential vehicles parking illegally or driving in the bus lanes.
Dedicated Towing	As a pilot program, a dedicated fleet of tow trucks would be dedicated to 16 th Street NW to remove vehicles illegally parked in the bus lanes. The pilot program could be possibly extended based on need and resources.

Alternative 3 – Mixed Service and Infrastructure

Alternative 3 is a mix of service and infrastructure improvements, seeking to find the middle ground between Alternatives 1 and 2. Alternative 3 seeks to improve bus travel times through peak hour peak direction bus lanes, which would benefit transit riders travelling southbound in the morning and northbound in the evening, but would require extension of the reversible lane south to downtown. S9 riders would also benefit from all-door boarding and off-board fare payment. A dedicated towing fleet would be used to keep the bus lanes clear, improving reliability. Overall traffic operations would be improved through the extension of peak-period signal timing through the midday, which prioritizes north-south traffic. Additional information about each of the improvements is provided below.

The roadway configuration for Alternative 3 would extend the reversible lane south to downtown in order to accommodate the installation of peak hour peak direction bus lanes and maintain two general vehicle lanes in the peak direction. Between U and O Streets NW, where the roadway is currently four lanes, a lane shift would occur. In the AM peak, there would be one southbound bus lane, two southbound vehicle lanes, and one northbound vehicle lane. In the PM peak, there would be one northbound bus lane, two northbound vehicle lanes, and one southbound vehicle lane. Appendix A displays the proposed lane configuration. Parking would not be allowed during the AM and PM peaks. Both of these changes would help to maintain vehicle operations in the peak direction with the dedication of both curbside lanes to buses. Additional information about each of the improvements is provided below in Table 6.

Table 6. Alternative 3: Mix Service and Infrastructure Improvements

IMPROVEMENT	EXPLANATION
Physical Improvement	
Bus Lanes	This improvement would create a curbside bus lane along the full length of the Primary Study Area that would operate southbound from 7-10 AM and northbound from 4-7:30 PM. Right-turning vehicles and taxis would be allowed to enter the bus lane. Bus lanes help reduce overall bus travel time. On average, bus lanes typically save an average of 1 minute per mile of bus travel time.
Lane configuration changes between U and O Streets NW due to bus lanes (see Appendix A)	A center reversible lane would add capacity in the peak direction of travel, which would help maintain vehicle operations with the addition of bus lanes. From U to O Streets NW, which currently has four lanes, a lane shift would be used and current parking restrictions would be maintained. The lane shift would operate as follows: <ul style="list-style-type: none"> » 2 lanes southbound and 1 lane northbound 7–10 AM (parking allowed in the northbound curb lane) » 2 lanes northbound and 1 lane southbound 4–7:30 PM (parking allowed in the southbound curb lane)
Transit Service Improvements	
Off-Board Fare Payment	Off-board fare payment would allow passengers to pay their fare at kiosks located at the bus stops before boarding the bus and would be implemented for the S9 buses and bus stops only. This improvement has been shown to reduce passenger boarding times by as much as 0.75 seconds per passenger on bus routes in other transit networks.
All-Door Boarding	All-door boarding allows passengers to board the bus through either the front or rear door of the bus and would be implemented for the S9 buses and bus stops only. Implementation of all-door boarding could reduce bus dwell times at stops by an average of 1 second per rider, but requires fare inspectors to reduce fare evasion.
Traffic Operations	
Dedicated Towing	A dedicated fleet of tow trucks would be dedicated to 16 th Street NW to remove vehicles illegally parked in the bus lanes.
Left-Turn Restrictions <ul style="list-style-type: none"> » Southbound at Irving Street NW » Northbound at Mt. Pleasant Street NW 	This improvement would restrict left-turns southbound at Irving Street NW and northbound at Mt. Pleasant Street NW to improve vehicle operations in Columbia Heights in conjunction with the extension of the center reversible lane. However, left-turning vehicles would be required to use an alternate route.
Peak hour signal timing extended for north-south traffic through midday (pending further analysis as part of the ongoing citywide Traffic Signal Optimization effort)	This improvement would maintain the peak period signal timing along 16 th Street NW through the midday. The peak period timing prioritizes north-south traffic over east-west traffic. This improvement would reduce bus travel times during the midday period. Further analysis will be needed to assess the impact on overall intersection level-of-service as part of DDOT’s ongoing citywide Traffic Signal Optimization effort.

Table 7. Matrix Summarizing the Draft Alternatives

IMPROVEMENT		ALTERNATIVE 1 Service Focus	ALTERNATIVE 2 Infrastructure Focus	ALTERNATIVE 3 Mixed Service and Infrastructure
PHYSICAL IMPROVEMENTS				
BASE IMPROVEMENTS	Bus Stop Removal/Consolidation: - 4 southbound locations (Newton, Lamont, V Streets and Riggs Place NW) - 5 northbound locations (L, Q, V, Lamont and Newton Streets NW)	✓	✓	✓
	Far-Side Bus Stop Expansion: 2 southbound locations (Harvard and M Streets NW)	✓	✓	✓
	Relocate southbound Spring Place NW bus stop north to Spring Road NW to improve pedestrian safety	✓	✓	✓
	Upgrade bus stops to WMATA zone lengths	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Bus Lanes		Full length, both directions 7 AM-10 PM	Full length, extended peak period peak direction: - 7-10 AM southbound - 4-7:30 PM northbound
	Lane configuration changes between U and O Streets NW due to bus lanes		Addition of center reversible lane	Lane shift: - 2 lanes southbound and 1 lane northbound 7-10 AM - 2 lanes northbound and 1 lane southbound 4-7:30 PM
	Queue Jump Lanes	✓		
	Intersection Reconfiguration at Harvard Street/Columbia Road/Mount Pleasant Street NW		✓	
TRANSIT SERVICE IMPROVEMENTS (Any proposed service changes would require a future public involvement process led by WMATA)				
BASE IMPROVEMENTS	Headway-based service	✓	✓	✓
	S2 Route patterns reduced to two in each direction	✓	✓	✓
	S1 and S2 service eliminated along 14 th Street NW between Northern Bus Garage and 16 th Street NW	✓	✓	✓
	Running and recovery time added to schedule	✓	✓	✓
	Fleet mix upgraded with low-floor and articulated buses	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Off-Board Fare Payment	All buses, all stops	SmarTrip Card top-off only	S9 buses and stops only
	All-Door Boarding	All buses, all stops		S9 buses and stops only
	S1 converted to limited stop service using current S9 stops	✓		
	Service Patterns Truncated in Downtown - Farragut Square for S1 - McPherson Square Metrorail Station for S2/S4	✓		
	Deadhead service relocated to Arkansas Avenue from Missouri Avenue NW	✓		
TRAFFIC OPERATIONS IMPROVEMENTS				
BASE IMPROVEMENTS	Transit signal priority (TSP) at 15 planned locations and five additional locations configured for headway-based service	✓	✓	✓
	Peak period parking restrictions extended to 7-10 AM (from 9:30 AM) and 4-7:30 PM (from 6:30 PM)	✓	✓	✓
	Southbound reversible lane extended to 7-10 AM (from 9:30 AM)	✓	✓	✓
	Southbound left turn lane separation and advance signage at W Street	✓	✓	✓
	Pedestrian safety improvements, including at Arkansas Avenue, Sacred Heart Way, and Harvard Street/Columbia Road/Mount Pleasant Street NW	✓	✓	✓
	Bus stop amenity and access improvements	✓	✓	✓
	Correct parking restrictions northbound between L and M Streets NW to prohibit PM peak parking	✓	✓	✓
	Work with Downtown hotels on taxi and loading zone relocation	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Automated Parking Enforcement on Buses	Enforcement of peak hour restrictions	Enforcement of bus lanes	
	Dedicated Towing		Pilot program with potential extension	✓
	Remove Midday Parking	✓		
	Left-Turn Restrictions - Southbound at Irving Street NW - Northbound at Mount Pleasant Street NW	✓		✓
	Peak hour signal timing extended for north-south traffic through midday (pending further analysis as part of the ongoing citywide Traffic Signal Optimization effort)			✓

PUBLIC FEEDBACK ON THE DRAFT ALTERNATIVES



DDOT presented the three Draft Alternatives at the third CAG meeting and during a series of Public Engagement Events at four bus stops along the corridor. This section outlines the input that the public provided during those meetings and in comments received after the meetings. The list of public meetings was presented in Chapter 2.

Public Support for Selected Proposed Improvements

Exclusive bus lanes, regardless of the type, received the most support of any of the proposed improvements. The majority of comments preferred the all-day bus lanes in Alternative 2 over the peak-hour, peak-direction bus lanes in Alternative 3. The public supported the concept of dedicated space in the roadway and agreed that this kind of facility would allow the buses to move faster through the corridor. However, some expressed concern about extending parking restrictions for the all-day bus lane and potential delays caused by right-turning vehicles in the bus lane. Proponents of the peak-hour bus lane did not believe an all-day bus lane is necessary. However, some people expressed concern that peak-hour lanes would be difficult to enforce and could confuse drivers.

Many people were also supportive of off-board fare collection and all-door boarding, though some expressed concerns about fare enforcement. Participants at the engagement events and the CAG meeting did not support the concept of off-board fare collection and all-door boarding for only the S9 buses because it would

be confusing for riders.

SUPPORT IMPROVEMENTS:

- » Bus lanes
- » All-door boarding
- » Parking enforcement
- » Off-board fare collection

CONCERNS EXPRESSED:

- » Truncation of S1 Route
- » Removal of midday parking
- » Bus stop consolidation
- » Deadhead service on Arkansas Avenue NW

Least Supported Proposed Improvements

Most participants opposed the truncation of service in Downtown for any of the 16th Street Line buses, but particularly for the S1. In addition, some commenters strongly opposed operation of buses along Arkansas Avenue NW due to existing traffic and safety issues. Participants were also concerned with the removal of midday parking. While some people supported the potential for moving buses faster, many expressed concerns about placing more strain on existing residential parking.

FINAL ALTERNATIVES



Based on feedback from the public and agency partners, DDOT modified the Draft Alternatives to create the three Final Alternatives described in Table 8. The Final Alternatives were subjected to a detailed screening analysis, which is presented in Chapter 5.

The Final Alternatives differ from the Draft Alternatives in two key ways:

Truncation of the S1

The proposed truncation of the S1 route was removed from Alternative 1. This change responds to public feedback, the lack of sufficient alternative bus routes, and findings which indicate that a substantial percentage of the route passengers would be negatively impacted by the proposed truncation.

Lane Configuration

The proposed lane configuration modifications between O and U Streets NW in Alternatives 2 and 3 were extended to W Street NW, creating a continuous center reversible

lane between O Street NW and Arkansas Avenue NW. The time period for the southbound direction of travel in the reversible lane would be extended from 7-10 AM to 7 AM-12 PM.

Table 8. Matrix Summarizing the Final Alternatives

IMPROVEMENT		ALTERNATIVE 1 Service Focus	ALTERNATIVE 2 Infrastructure Focus	ALTERNATIVE 3 Mixed Service and Infrastructure
PHYSICAL IMPROVEMENTS				
BASE IMPROVEMENTS	Bus Stop Removal/Consolidation: - 4 southbound locations (Newton, Lamont, V Streets, and Riggs Place NW) - 5 northbound locations (L, Q, V, Lamont and Newton Streets NW)	✓	✓	✓
	Far-Side Bus Stop Expansion: 2 southbound locations (Harvard and M Streets)	✓	✓	✓
	Relocate southbound Spring Place NW bus stop north to Spring Road NW to improve pedestrian safety	✓	✓	✓
	Upgrade bus stops to WMATA zone lengths	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Bus Lanes		Full length, both directions 7 AM-10 PM	Full length, extended peak period peak direction: - 7-10 AM southbound - 4-7:30 PM northbound
	Lane configuration changes between U and O Streets NW due to bus lanes		Addition of center reversible lane	Lane shift: - 2 lanes southbound and 1 lane northbound 7-10 AM - 2 lanes northbound and 1 lane southbound 4-7:30 PM
	Queue Jump Lanes	✓		
	Intersection Reconfiguration at Harvard Street/Columbia Road/Mount Pleasant Street NW		✓	
TRANSIT SERVICE IMPROVEMENTS (Any proposed service changes would require a future public involvement process led by WMATA)				
BASE IMPROVEMENTS	Headway-based service	✓	✓	✓
	S2 Route patterns reduced to two in each direction	✓	✓	✓
	S1 and S2 service eliminated along 14 th Street NW between Northern Bus Garage and 16 th Street NW	✓	✓	✓
	Running and recovery time added to schedule	✓	✓	✓
	Fleet mix upgraded with low-floor and articulated buses	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Off-Board Fare Payment	All buses, all stops	SmarTrip Card top off only	S9 buses and stops only
	All-Door Boarding	All buses, all stops		S9 buses and stops only
	S1 converted to limited stop service using current S9 stops	✓		
	S2/S4 Service Patterns Truncated in Downtown to McPherson Square Metrorail Station	✓		
	Deadhead service relocated to Arkansas Avenue from Missouri Avenue NW	✓		
TRAFFIC OPERATIONS IMPROVEMENTS				
BASE IMPROVEMENTS	Transit signal priority (TSP) at 15 planned locations and five additional locations configured for headway-based service	✓	✓	✓
	Peak period parking restrictions extended to 7-10 AM (from 9:30 AM) and 4-7:30 PM (from 6:30 PM)	✓	✓	✓
	Southbound reversible lane extended to 7-10 AM (from 9:30 AM)	✓	✓	✓
	Southbound left turn lane separation and advance signage at W Street	✓	✓	✓
	Pedestrian safety improvements, including at Arkansas Avenue, Sacred Heart Way, and Harvard Street/Columbia Road/Mount Pleasant Street NW	✓	✓	✓
	Bus stop amenity and access improvements	✓	✓	✓
	Correct parking restrictions northbound between L and M Streets NW to prohibit PM peak parking	✓	✓	✓
	Work with Downtown hotels on taxi and loading zone relocation	✓	✓	✓
	ADDITIONAL IMPROVEMENTS	Automated enforcement on buses	Enforcement of peak hour restrictions	Enforcement of bus lanes
Dedicated towing			Pilot program with potential extension	✓
Remove midday parking		✓		
Left-turn restriction southbound at Irving Street NW		✓		✓
Left-turn restriction northbound at Mount Pleasant Street NW		✓		
	Peak hour signal timing extended for north-south traffic through midday (pending further analysis as part of the ongoing citywide Traffic Signal Optimization effort)			✓



CHAPTER 5.

EVALUATING THE FINAL ALTERNATIVES

After developing the Final Alternatives, the project team analyzed the performance for each alternative based on key performance metrics. The purpose of the screening phase is to identify the components of the Final Alternatives – the set of individual improvements – that best meet the goals and objectives of the Study outlined in Chapter 1. In particular, the Study seeks to improve travel for people using public transit through the improvement of transit service reliability and travel times, while maintaining operations for other modes. The metrics (reduced end-to-end bus travel time, reduced dwell time, improved bus service reliability, and maintenance of multimodal operations) are drawn from those guiding principles. The results of the evaluation phase are used to assemble the Recommended Alternative in Chapter 6.

REDUCED END-TO-END BUS TRAVEL TIME



Ten improvements to reduce bus travel time are included among the Final Alternatives. Table 9 identifies the range of estimated travel time savings by improvement during the peak period in the peak direction in the Primary Study Area. It should be noted that actual bus travel time savings may differ from below and total savings are anticipated to be less than the sum of individual improvements. The savings below are provided for comparison of alternatives.

The estimated new peak period transit travel time savings by Alternative are shown in Table 10. The resultant estimated new peak period transit travel times are shown in Table 11. The bolded red cells are the best

performing alternatives for each route by time of day.

Alternative 1 provides the most travel time savings for the S1 route, largely due to the conversion of the S1 to limited stop service. The savings for the other routes mainly come from all-door boarding and off-board fare payment for all buses and all bus stops. The S2 and S4 benefit the most from Alternative 2, which provides full length bus lanes in both directions coupled with SmarTrip Card top off. Alternative 3 provides the most savings for the S9, as it combines peak period peak direction bus lanes with all-door boarding and off-board fare payment.

Table 9. Estimated Peak Period Peak Direction Time Savings per Improvement

IMPROVEMENT	SAVINGS (MIN)	ALTERNATIVE(S)
Bus Stop Removal/Consolidation	1.0 - 1.3	1, 2, 3
Bus Lanes	2.4 - 2.7	2, 3
Queue Jump Lanes	< 0.1	1
Intersection Reconfiguration at Harvard Street/Columbia Road/Mt. Pleasant Street NW	0.1 – 0.3	2
Fleet Mix Upgraded with Low-Floor and Articulated Buses	0.5 – 0.6	1, 2, 3
Off-Board Fare Payment	1.3 – 1.6 (S1, S2, S4) 0.9 - 1.5 (S9)	1, 3 (S9 only)
SmarTrip Card Top-Off	0.3 - 0.5	2
All-Door Boarding	0.6 – 0.7 (S1, S2, S4) 0.4 – 0.6 (S9)	1, 3 (S9 only)
S1 Converted to Limited Stop Service	2.6	1
Remove Midday Parking	1.7 – 1.9	1, 2

Table 10. Estimated Peak Period Transit Travel Time Savings

ROUTE	AM PEAK SOUTHBOUND (MIN)			PM PEAK NORTHBOUND (MIN)		
	S1	S2/S4	S9	S1	S2/S4	S9
Alternative 1	4.9	3.2	1.3	4.6	3.3	2.2
Alternative 2	4.2	4.3	2.9	4.3	4.3	2.9
Alternative 3	3.4	3.6	3.7	3.9	3.9	4.6

Table 11. Estimated New Peak Period Transit Travel Times

ROUTE	AM PEAK SOUTHBOUND (MIN)			PM PEAK NORTHBOUND (MIN)		
	S1	S2/S4	S9	S1	S2/S4	S9
Existing	23.6	24.9	21.6	16.7*	21.0	18.0
Alternative 1	18.7	21.7	20.3	12.1	17.7	15.8
Alternative 2	19.4	20.6	18.7	12.4	16.7	15.1
Alternative 3	20.2	21.3	17.9	12.8	17.1	13.4

* Low value due to small sample size. Actual value is likely similar to the S2/S4 existing travel time.

REDUCED DWELL TIME



Dwell time is defined as the amount of time a bus remains at a bus stop to board or alight passengers. Reducing dwell time reduces the total trip time and reduces the potential for bus bunching. The resulting total trip dwell times within the Primary Study Area for the alternatives are presented in Table 12. The bolded red cells are the lowest dwell times for each route by time of day.

Total dwell times for the S9 route are lower than for the S1, S2, and S4 routes as the S9 route serves fewer bus stops.

Alternative 1 has the lowest total dwell time because it includes off-board fare payment and all-door boarding for all buses at all stops. Alternative 3 includes off-board fare payment and all-door boarding for S9 buses, and the corresponding dwell times for the S9 route are the same as for Alternative 1. SmarTrip Card top off, included as part of Alternative 2, does not have a substantial impact on dwell times compared to off-board fare payment, especially since off-board fare payment can be coupled with all-door boarding.

DWELL TIMES ARE DETERMINED BY FOUR FACTORS:

- » Boarding and alighting demand
- » Fare payment and boarding procedures
- » Vehicle type
- » Bus crowding

Table 12. Estimated Dwell Times

ROUTE	AM PEAK SOUTHBOUND (MIN)		PM PEAK NORTHBOUND (MIN)	
	S1/S2/S4	S9	S1/S2/S4	S9
Existing	5.0	1.6	4.9	3.2
Alternative 1	2.9	1.4	3.0	2.1
Alternative 2	3.8	2.5	3.6	3.0
Alternative 3	4.0	1.4	3.9	2.1

IMPROVED BUS SERVICE RELIABILITY



At the Public Kickoff Meeting, most attendees stated that a bus arriving on time is one of the most important factors for improving bus service. If there is uncertainty regarding bus arrival time, headway spacing, travel times, and loading capacity, passengers react by adjusting their departure time to account for the possibility that their trips may take longer than anticipated, or they chose not to ride transit at all.

The draft improvements that were selected to improve reliability are summarized in Table 13. Each of the three Final Alternatives would improve reliability, including bus

on-time performance, improve schedule adherence, and reduce bus over-crowding. Unfortunately, at this time there are limited means to quantitatively estimate impacts on reliability from potential improvements.

BUS SERVICE RELIABILITY INCLUDES FACTORS SUCH AS:

- » On-time performance
- » Regularity of bus arrivals and travel time
- » Loading capacity

Table 13. Reliability Improvements

RELIABILITY IMPROVEMENTS		ALTERNATIVE		
		1	2	3
BASE IMPROVEMENTS	Far-side bus stop expansion: 2 southbound locations (Harvard and M Streets NW)	•	•	•
	Upgrade bus stops to WMATA zone lengths	•	•	•
	Headway-based service	•	•	•
	S2 Route patterns reduced to two in each direction	•	•	•
	S1 and S2 service eliminated along 14 th Street NW between Northern Bus Garage and 16 th Street NW	•	•	•
	Running and recovery time added to schedule	•	•	•
	Transit Signal Priority (TSP) at 15 planned locations and five additional locations configured for headway-based service	•	•	•
	Peak period parking restrictions extended to 7-10 AM (from 9:30 AM) and 4-7:30 PM (from 6:30 PM)	•	•	•
	Southbound reversible lane extended to 7-10 AM (from 9:30 AM)	•	•	•
	Southbound left-turn separation and advance signage at W Street NW	•	•	•
	Correct parking restrictions northbound between L and M Streets NW to prohibit PM peak parking	•	•	•
	Work with Downtown hotels on taxi and loading zone relocation	•	•	•
ADDITIONAL IMPROVEMENTS	S2/S4 Service Patterns Truncated in Downtown to McPherson Square Metrorail Station	•		
	Deadhead service relocated to Arkansas Avenue NW from Missouri Avenue NW	•		
	Automated enforcement on buses	•	•	
	Dedicated towing		•	•
	Remove midday parking	•		
	Left-turn restriction southbound at Irving Street NW	•		•
	Left-turn restriction northbound at Mt. Pleasant Street NW	•		
Peak hour signal timing extended for north-south traffic through midday			•	

MAINTENANCE OF MULTIMODAL OPERATIONS



Multimodal VISSIM traffic models were developed to assess the impacts of the three Final Alternatives on other roadway users compared to Existing Conditions. The models included outputs for AM peak, PM peak, and midday periods.

Multimodal Level of Service (LOS)

The Highway Capacity Manual provides a grade scale for traffic to assess levels of service (LOS). The manual defines LOS as a measure of average total vehicle delay of all movements through a particular intersection. Table 14 presents the delay criteria and qualitative description of LOS levels for signalized intersections.

The level of service at key intersections and approaches throughout the Primary Study Area was analyzed for the Existing Condition and for each of the Final Alternatives. Table 15 identifies the intersections and approaches which demonstrated a failing level of service (a LOS of E or F) and provides a comparison of the results by alternative, and peak and midday periods. The LOS for each intersection is provided in Appendix G.

Alternative 1 results in improved LOS due to the traffic operations improvements, such as the left-turn

separation at W Street NW, and the maintenance of all existing vehicle lanes. Alternative 2 has substantial impacts on vehicle operations, particularly in the peak periods in the off-peak direction. This is largely because the off-peak direction is reduced to one travel lane along nearly all of the Study Area. Alternative 3 has moderate impacts on vehicle operations in general. Similar to Alternative 2, Alternative 3 results in worse LOS in the peak periods in the off-peak direction. In the AM peak, the slowdown occurs in the Dupont Circle neighborhood for northbound traffic, where the off-peak direction is reduced to one travel lane. In the PM peak, the southbound traffic experiences congestion along Meridian Hill Park, due to queuing behind left-turning vehicles at W Street NW.

There is currently one travel lane in the off-peak direction in the Dupont Circle neighborhood, as curbside parking is allowed in the off-peak direction during the peak periods. However, there is space for through vehicles to pass left-turning vehicles as the parking is pulled back from the intersection, so traffic flows fairly smoothly. Under Alternatives 2 and 3 in this section, vehicles travelling in the off-peak direction would be reduced to one travel lane and would not be able to pass left-turning vehicles, resulting in increased congestion.

Table 14. LOS Criteria and Description

LOS	AVERAGE CONTROL DELAY (SEC/VEHICLE)	GENERAL DESCRIPTION
A	≤10	Free Flow
B	>10 – 20	Stable Flow (slight delays)
C	>20 – 35	Stable flow (acceptable delays)
D	>35 – 55	Approaching unstable flow (tolerable delay, occasionally wait through more than one signal cycle before proceeding)
E	>55 - 80	Unstable flow (intolerable delay)
F	>80	Forced flow (jammed)

TABLE 15 KEY:

- NB Northbound direction approaching the intersection
- SB Southbound direction approaching the intersection
- Overall All streets approaching the intersection

Table 15. LOS E or F: Overall and Approaches (2015)

INTERSECTIONS	AM PEAK			PM PEAK			MIDDAY		
	OVERALL	SB	NB	OVERALL	SB	NB	OVERALL	SB	NB
EXISTING CONDITIONS									
I Street NW					•				
L Street NW						•			
W Street NW		•							
TOTAL	0	1	1	0	1	1	0	0	0
ALTERNATIVE 1									
TOTAL	0	0	0	0	0	0	0	0	0
ALTERNATIVE 2									
I Street NW								•	
K Street NW						•			
M Street NW						•			
R Street NW			•						
S Street NW			•						
T Street NW			•						
U Street and New Hampshire Avenue NW			•						•
V Street NW			•						
W Street NW	•		•						
Crescent Place NW		•			•				
Euclid Street NW	•	•		•	•				
Fuller Street NW	•	•	•	•	•				
Harvard Street NW	•			•	•	•			
Mt. Pleasant Street NW				•					

INTERSECTIONS	AM PEAK			PM PEAK			MIDDAY		
	OVERALL	SB	NB	OVERALL	SB	NB	OVERALL	SB	NB
ALTERNATIVE 2 (cont'd)									
Irving Street NW				•		•			
Lamont Street NW			•	•	•	•			
Park Road NW				•	•				
Monroe Street NW				•	•				
Newton Street NW				•	•				
Oak Street NW		•			•				
Spring Road NW					•				
Arkansas Avenue NW	•	•		•	•				
TOTAL	5	5	8	10	11	5	0	1	1
ALTERNATIVE 3									
I Street NW					•				
M Street NW									
P Street NW			•						
Q Street NW			•						
U Street and New Hampshire Avenue NW			•						
W Street NW				•	•				
Crescent Place NW					•				
Euclid Street NW					•				
Fuller Street NW					•				
Harvard Street NW			•						
TOTAL	0	0	4	1	5	0	0	0	0

- Overall intersection E/F
- Approach LOS E/F

Vehicle Travel Time

Table 16 presents the change in total end-to-end vehicle travel times for each Final Alternative in the peak periods compared to Existing Conditions.

Compared to 2015 Existing Conditions, Alternative 1 would improve travel time in both directions during AM and PM peak periods. This improvement is due, in part, to the improved southbound traffic operations from the proposed left-turn separation at W Street NW, as well as left-turn restrictions northbound at Mt. Pleasant Street and southbound at Irving Street NW. Alternative 1 also maintains the existing number of lanes for general vehicle traffic.

Among the alternatives, Alternative 2 adds the most travel time for general vehicles traveling through the Primary Study Area in both directions during AM and PM peak periods. Alternative 2 includes adding a center reversible lane between O and W Streets NW, but would require the loss of one general vehicle lane in each direction north of W Street NW.

Alternative 3 increases trip times, but to a lesser degree than in Alternative 2. The impact to the AM peak southbound operation is minor; however, the impact to the PM peak northbound operation is more pronounced. The off-peak direction travel times can potentially be reduced through mitigation measures.

Table 16. Estimated Change in Vehicle Travel Time

ALTERNATIVE	AM PEAK		PM PEAK	
	SOUTHBOUND (MIN)	NORTHBOUND (MIN)	SOUTHBOUND (MIN)	NORTHBOUND (MIN)
Alternative 1	(-4.6)	(-0.1)	(-3.7)	(-0.7)
Alternative 2	8.2	25.7	31.3	10.1
Alternative 3	1.2	12.4	8.0	5.1

COSTS



The project team calculated preliminary estimates for both capital and operating and maintenance (O&M) costs for the three alternatives. For purpose of the Study, all costs are in 2015 dollars.

Capital Costs

Table 17 summarizes the preliminary capital cost estimates for the three alternatives. The estimates reflect the conceptual level of design development and the potential for unknown existing conditions. During implementation of the Recommended Alternative, a more rigorous cost estimate, based on detailed design, will establish a reliable budget-level estimate. The basis of the capital cost estimates is provided in Appendix D.

Table 17. Capital Cost Comparison (Existing Dollars)

ALTERNATIVE	TOTAL CAPITAL COSTS
Alternative 1	\$8,267,772
Alternative 2	\$11,174,741
Alternative 3	\$7,238,733

The 7 AM-10 PM bus lanes in Alternative 2 account for the increased cost over Alternatives 1 and 3.

Operating Costs

O&M cost estimates were developed for the existing transit services and for the three Final Alternatives and the results are presented in Table 18. The general operating plan for the alternatives and the methodology for developing the cost estimates are presented in Appendix D.

Table 18. Annual O&M Cost Estimates (Existing Dollars)

ALTERNATIVE	ANNUAL O&M COST ESTIMATE
Existing S Routes	\$16,850,719
Alternative 1	\$15,943,550*
Alternative 2	\$17,429,730
Alternative 3	\$17,960,538

* DDOT opted not to advance the relocation of deadhead service to Arkansas Avenue, which was part of Alternative 1. This improvement is not included in the estimated annual O&M cost for Alternative 1 shown in Table 24 above.

The cost estimates for the existing conditions and three alternatives reflect the additional cost for adding running and recovery time to the schedule. The cost estimates assume that the time added to the schedule and recovery time would equal the current actual amount of time the bus routes operate behind schedule, as identified in the Existing Conditions Report.

The reduction of O&M costs in Alternative 1 compared to Existing Conditions and Alternatives 2 and 3 is due to the truncation of the S2 and S4 routes at McPherson Square Metro and conversion of the S1 route to a limited stop service.



CHAPTER 6.

RECOMMENDED ALTERNATIVE

Based on the results of the screening analysis discussed in Chapter 5 and feedback from the public, DDOT assembled a series of physical, transit service and traffic operations improvements into a Recommended Alternative. The Recommended Alternative is a hybrid of the Final Alternatives, and contains improvements from Alternatives 1, 2, and 3. During the CAG #2 meeting, the public encouraged DDOT to evaluate individual improvements as part of the screening analysis in order to identify the most effective alternative. DDOT adopted this approach and Table 19 lists the improvements that were advanced as part of the Recommended Alternative, as compared to the Final Alternatives.



Table 19. Final Alternatives and Draft Recommended Alternative

IMPROVEMENT		ALTERNATIVE 1 Service Focus	ALTERNATIVE 2 Infrastructure Focus	ALTERNATIVE 3 Mixed Service and Infrastructure	DRAFT RECOMMENDED ALTERNATIVE
PHYSICAL IMPROVEMENTS					
BASE IMPROVEMENTS	Bus stop removal/consolidation: - 4 southbound locations (Newton, Lamont, V Streets, and Riggs Place NW) - 5 northbound locations (L, Q, V, Lamont and Newton Streets NW)	✓	✓	✓	✓
	Far-side bus stop expansion: 2 southbound locations (Harvard and M Streets NW)	✓	✓	✓	✓
	Relocate southbound Spring Place NW bus stop north to Spring Road NW to improve pedestrian safety	✓	✓	✓	?
	Upgrade bus stops to WMATA zone lengths	✓	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Bus lanes		Full length, both directions 7 AM-10 PM	Full length, extended peak period peak direction: - 7-10 AM southbound - 4-7:30 PM northbound	Full length, extended peak period peak direction: - 7-10 AM southbound - 4-7:30 PM northbound
	Extension of reversible lane to O Street NW		✓	✓	✓ Add fifth lane south of W Street NW
	Queue jump lanes	✓			
	Intersection reconfiguration at Harvard Street/Columbia Road/Mount Pleasant Street NW		✓		Future Project
TRANSIT SERVICE IMPROVEMENTS (Any proposed service changes would require a future public involvement process led by WMATA)					
BASE IMPROVEMENTS	Headway-based service	✓	✓	✓	✓
	S2 Route patterns reduced	✓	✓	✓	✓
	S1 and S2 service eliminated along 14 th Street NW between Northern Bus Garage and 16 th Street NW	✓	✓	✓	✓
	Running and recovery time added to schedule	✓	✓	✓	✓
	Fleet mix upgraded with low-floor and articulated buses	✓	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Off-board fare payment	All buses, all stops	SmarTrip Card top off only	S9 buses and stops only	All buses, all stops
	All-door boarding	All buses, all stops		S9 buses and stops only	All buses, all stops
	S1 converted to limited stop service using current S9 stops	✓			✓
	S2/S4 service patterns truncated in downtown to McPherson Square Metrorail Station	✓			✓
	Deadhead service relocated to Arkansas Avenue from Missouri Avenue NW	✓			
TRAFFIC OPERATIONS IMPROVEMENTS					
BASE IMPROVEMENTS	Transit signal priority (TSP) at 15 planned locations and two additional locations configured for headway-based service	✓	✓	✓	✓
	Peak period parking restrictions extended to 7-10 AM (from 9:30 AM) and 4-7:30 PM (from 6:30 PM)	✓	✓	✓	✓
	Southbound reversible lane extended to 7-10:00 AM (from 9:30 AM)	✓	✓	✓	✓
	Pedestrian safety improvements, including at Arkansas Avenue, Sacred Heart Way, and Harvard Street/Columbia Road/Mount Pleasant Street NW	✓	✓	✓	✓
	Bus stop amenity and access improvements	✓	✓	✓	✓
	Correct parking restrictions northbound between L and M Streets NW to prohibit PM peak parking	✓	✓	✓	✓
	Work with downtown hotels on taxi and loading zone relocation	✓	✓	✓	✓
ADDITIONAL IMPROVEMENTS	Automated enforcement on buses	Enforcement of peak hour restrictions	Enforcement of bus lanes		Enforcement of driving and parking in bus lanes
	Dedicated towing		Pilot program with potential extension	✓	
	Remove midday parking	✓	✓		
	Left-turn restriction southbound at Irving Street NW	✓		✓	✓
	Left-turn restriction northbound at Mount Pleasant Street NW	✓			?
	Southbound left turn lane separation and advance signage at W Street NW	✓			
Peak hour signal timing extended for north-south traffic through midday (pending further analysis as part of the ongoing citywide Traffic Signal Optimization effort)			✓		

PUBLIC FEEDBACK ON THE DRAFT RECOMMENDED ALTERNATIVE



On December 15, 2015, DDOT presented the Draft Recommended Alternative at the fourth and final CAG meeting. In general, the CAG supported the Draft Recommended Alternative, including the peak hour peak direction bus lanes, off-board fare payment, and all-door boarding.

The attendees had questions on the proposed five lane configuration south of W Street NW. During the meeting, DDOT stated that the general traffic lanes would be narrowed to accommodate a fifth lane. The attendees expressed concern that narrowing the roadway would lead to more collisions and the signage for the reversible lane would not be compatible with the historic character of the neighborhood. DDOT informed the community that they will coordinate and consult with the State Historic Preservation Office as the project

moves through implementation and will ensure that the design meets all federal and local standards.

The CAG expressed concerns about the proposed truncation of S2/S4 at McPherson Square Metro and consolidation of bus stops, particularly the Lamont Street NW stop. They were concerned that truncating the S2/S4 would require people to transfer, which could add additional time and cost to riders' commutes. The Lamont Street NW stop generated discussion due to its proximity to the Mt. Pleasant Library, the only library in Ward 1.

Lastly, the attendees were concerned about the left-turn restrictions at Mt. Pleasant Street NW and Irving Street NW. They stated that the restriction would be difficult because of the volume of people that are turning, especially going left on Irving Street NW.

RECOMMENDED ALTERNATIVE



After additional data analysis and feedback from the CAG and the community, DDOT made the following changes to create the Recommended Alternative.

Physical Improvements

In order to better serve the Mt. Pleasant Library, the Recommended Alternative includes shifting the location of the southbound Irving Street NW bus stop. The southbound Irving Street NW stop would be relocated to the north side of Irving Street NW, on the same block as the Mt. Pleasant Library.

Transit Service Improvements

Based on feedback from the CAG and additional conversations with WMATA, DDOT removed the conversion of the S1 to limited stop service and truncation of the S2/S4 at McPherson Square Metrorail Station from the Recommended Alternative. DDOT and WMATA developed broader principles regarding transit

service improvements, including increasing limited stop service and transitioning to simpler patterns, which are reflected in the Recommended Alternative. DDOT and WMATA will continue to work together to refine the service improvements, as outlined in Chapter 7.

Traffic Operations Improvements

After additional analysis and in consideration of public feedback, DDOT made several traffic operations refinements for the Recommended Alternative, presented below.

- » The northbound left-turn restriction at Mt. Pleasant Street NW was removed. A full-time left-turn lane can remain through reconfiguration of the roadway, as shown in Appendix B. The southbound left-turn restriction at Irving Street NW was also removed.
- » A left-turn restriction was added for southbound W Street NW in the PM peak. As discussed in Chapter 5, southbound vehicles in the PM peak experience congestion resulting from queuing behind left-turning vehicles at W Street NW. This restriction

would help to address that slowdown.

- » Over the fall, DDOT met with the Golden Triangle and DowntownDC BIDs to discuss hotel loading, parking, and taxi stands on 16th Street NW, including the identification of alternate curbside locations off 16th Street NW. In many cases, there were limited alternate locations given the density of uses and activities in downtown. In order to maintain full-time hotel loading, parking, and taxi stands on one side of the street, the Recommended Alternative proposes the addition of a fifth lane between K and H Streets NW and the extension of the center reversible lane south to K Street NW.
- » The Draft Recommended Alternative included extending the reversible lane in the southbound direction from 7-9:30 AM to 7-10 AM, which was modified to 7 AM-12 PM in the Recommended Alternative based on the northbound versus southbound traffic volume split.
- » The Recommended Alternative includes installation of TSP at 18 locations, instead of the 20 originally proposed. Additional analysis revealed that at two locations there would not be enough time in the signal cycle to extend the green phase for buses on 16th Street NW and provide enough time for pedestrians crossing the street, so they were removed.

Table 20. Recommended Alternative

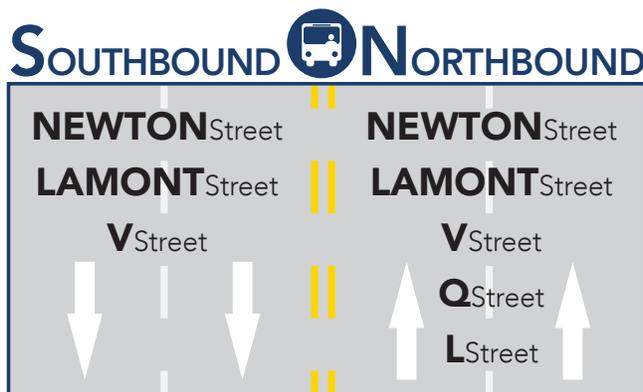
IMPROVEMENT	RECOMMENDED ALTERNATIVE
PHYSICAL IMPROVEMENTS	
Bus stop consolidation: - 3 southbound locations (Newton, Lamont, and V Streets NW) - 5 northbound locations (L, Q, V, Lamont, and Newton Streets NW)	✓
Far-side bus stop expansion: 2 southbound locations (Harvard and M Streets NW)	✓
Relocate southbound Spring Place NW bus stop north to Spring Road NW to improve pedestrian safety	✓
Upgrade stops to WMATA zone lengths	✓
Bus lanes	Full length, extended peak period peak direction: - 7-10 AM southbound - 4-7:30 PM northbound
Extension of center reversible lane from Arkansas Avenue to K Street NW	✓
Install fifth lane W Street to O Street and K Street to H Street NW	✓
Intersection reconfiguration at Harvard Street/Columbia Road/Mount Pleasant Street NW	Future Project
TRANSIT SERVICE IMPROVEMENTS (Any service changes would require a future public involvement process led by WMATA)	
Headway-based service	✓
Increase limited stop service (may include converting some local bus trips to limited stops)	✓
Transition to simpler patterns	✓
Running and recovery time added to schedule	✓
Fleet mix upgraded with low-floor and articulated buses	✓
Off-board fare payment	All buses, all stops
All-door boarding	All buses, all stops
TRAFFIC OPERATIONS IMPROVEMENTS	
Transit signal priority (TSP) at 18 locations configured for headway-based service	✓
Peak period parking restrictions extended to 7-10 AM (from 9:30 AM) and 4-7:30 PM (from 6:30 PM). No parking from Arkansas Avenue to M Street NW during AM and PM peak periods.	✓
Pedestrian safety improvements, including at Arkansas Avenue, Sacred Heart Way, and Mount Pleasant Street NW	✓
Bus stop amenity and access improvements	✓
Automated enforcement	Enforcement of driving and parking in bus lanes
PM peak period southbound left turn restriction at W Street	✓

RECOMMENDED PHYSICAL IMPROVEMENTS



Bus Stop Consolidation

There are currently 16 southbound bus stops and 18 northbound bus stops within the 2.7-mile study corridor, which averages to about a stop every 1/6th of a mile. As part of the Recommended Alternative, DDOT proposes to consolidate three southbound and five northbound stops, which would increase the average distance between stops to every 1/5th of a mile. The stops proposed for consolidation are:



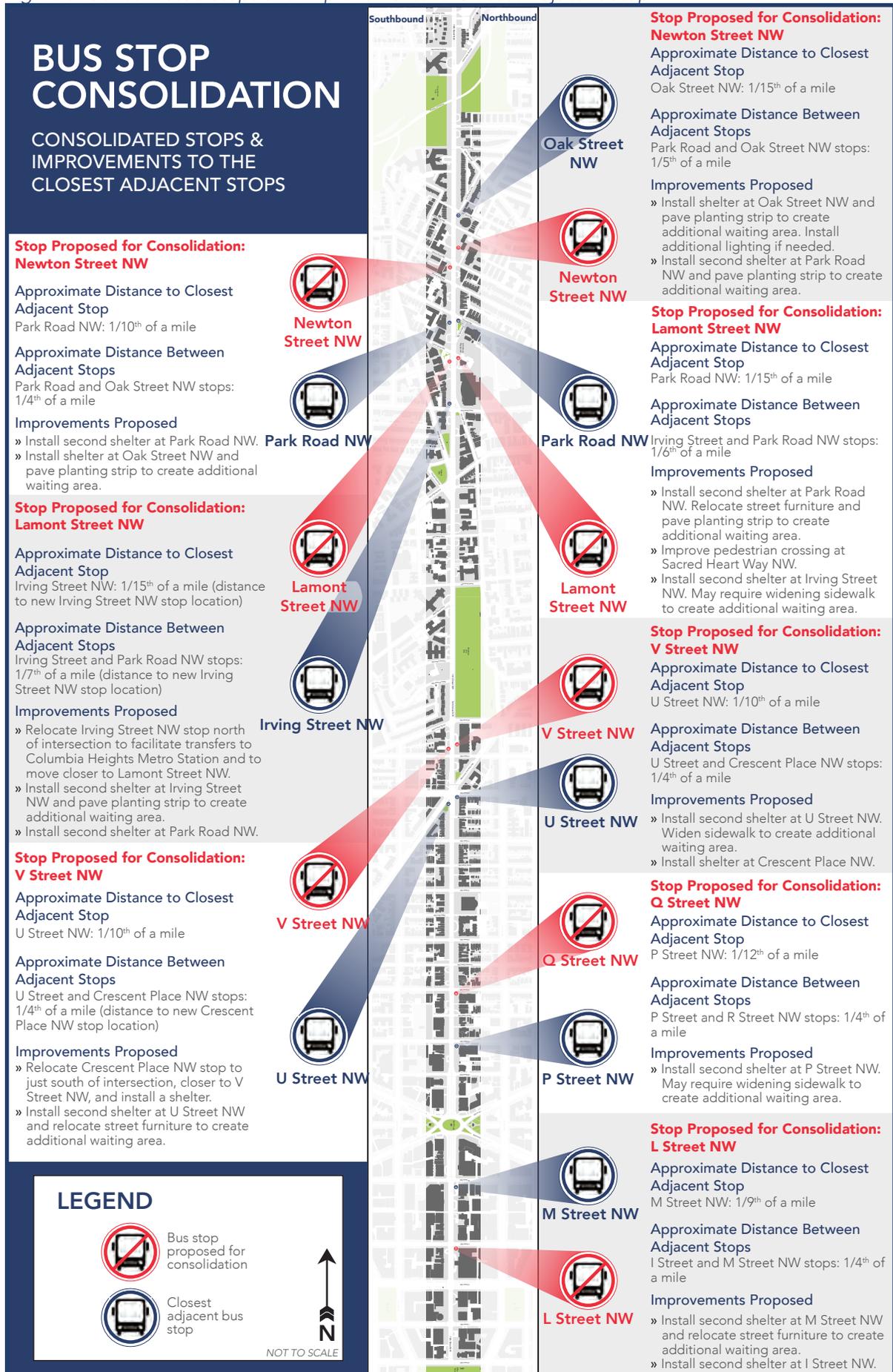
These stops were selected for consolidation for two major reasons:

- » They are generally located within one block of an adjacent stop; and
- » They are not S9 MetroExtra service stops (S9 stops are located at major cross streets and are classified as enhanced stops under WMATA's guidelines, indicating a higher level of customer amenities).

With the consolidation of these stops, DDOT conservatively estimates travel time savings of 1 to 1.5 minutes per bus trip, which translates into approximately 15 to 25 percent of the total travel time savings estimated under the Recommended Alternative for the S1, S2, and S4 routes. Bus stop consolidations would also enable DDOT to allow other curbside uses, such as parking or loading zones, which are currently not possible due to the multiple bus stops.

DDOT recognizes that bus stop consolidation would increase the distance that some pedestrians would need to walk in order to access the bus. In addition, many of the adjacent stops would be crowded with people waiting for the bus. To address this concern, DDOT would work to improve access to the adjacent bus stops and would install additional shelters, expand waiting areas, and improve pedestrian safety at the stops. These improvements would need to be in place before stops are consolidated (Figure 6).

Figure 6. Consolidated Stops and Improvements to Closest Adjacent Stop



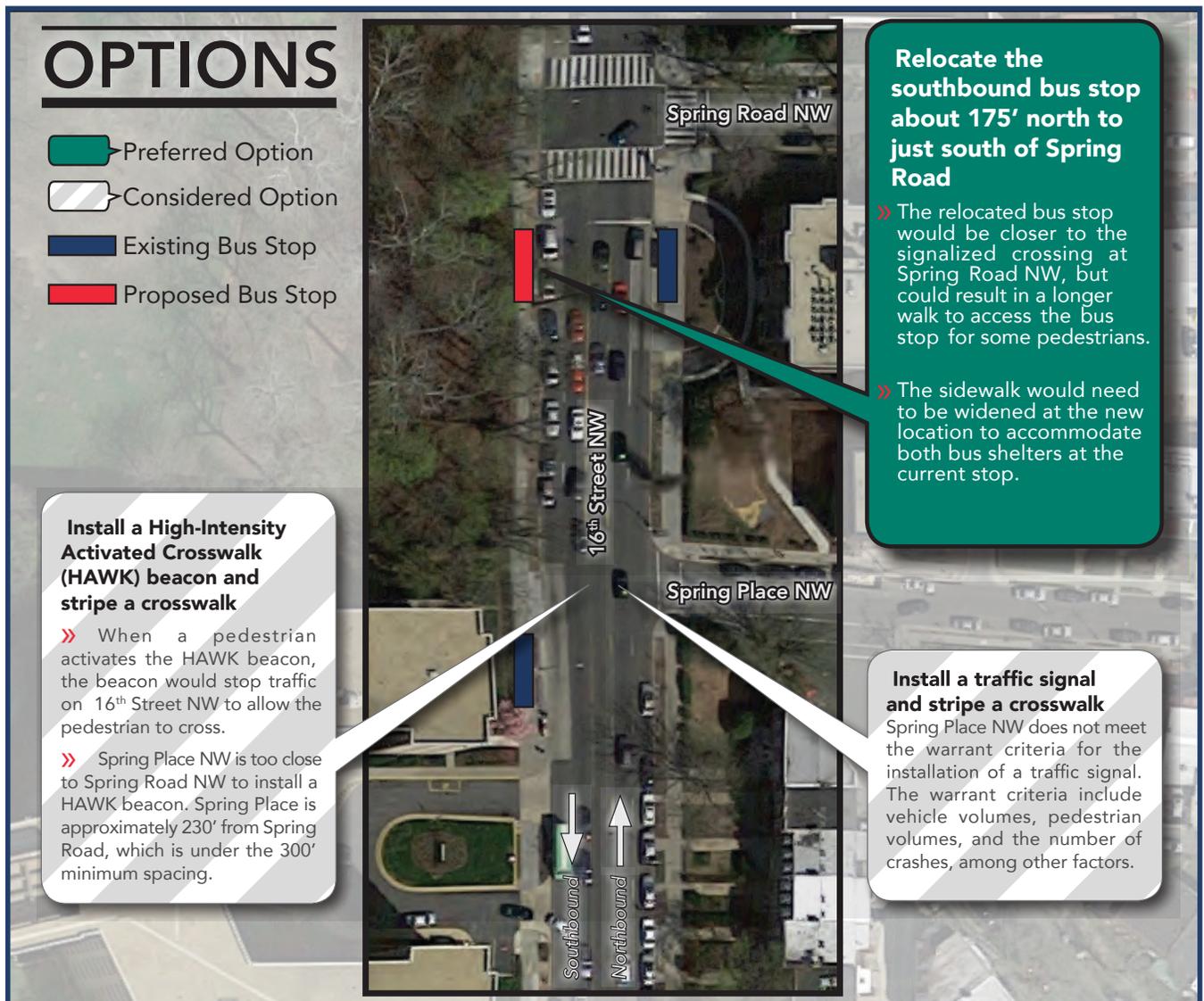
Far-Side Bus Stop Expansion

To improve reliability, the Recommended Alternative includes an expanded capacity for buses at the southbound Harvard and M Streets NW bus stops. The stops are located on 16th Street NW south of the intersection, and currently each stop has capacity for one bus to board and alight passengers. As a result, a trailing bus is required now to wait north of the intersection if another bus is occupying the stop, which often results in the trailing bus waiting through a green traffic signal phase and subsequent red traffic signal phase before proceeding to the bus stop. The proposed bus stop expansion would allow both buses to occupy the stop simultaneously, reducing travel time for the trailing bus.

Spring Place Bus Stop Relocation

Pedestrians trying to access the southbound bus stop sometimes cross 16th Street at Spring Place NW, which does not have a crosswalk, or a traffic signal, rather than walking to Spring Road NW, which has a marked crosswalk and a traffic signal. DDOT examined three options to improve pedestrian safety on 16th Street NW between Spring Place and Spring Road NW. Figure 7 shows the improvement included in the Recommended Alternative. The relocated bus stop would be closer to the signalized crossing at Spring Road NW, which would encourage passengers to cross at a signalized intersection, but could result in a longer walk for some passengers to access the bus stop. In addition the sidewalk would need to be widened at the new location to accommodate the relocation of both bus shelters at the current stop.

Figure 7. Spring Place Bus Stop Relocation



Upgrade Stops to WMATA Zone Lengths

For buses to safely and easily access a bus stop, there must be adequate clear space along the curb to allow the bus to move out of, or merge back, into general traffic. The Recommended Alternative includes upgrading 21 bus stops to meet WMATA's recommended minimum zone lengths and replacing missing signage. Adequately sized and clearly delineated bus stop zone lengths would improve reliability, but may require the elimination of parking spaces in some locations. The locations of the proposed upgrades are shown in Appendix B.

Peak Period Bus Lanes

This improvement would create a curbside bus lane along the full length of the Primary Study Area that would operate in the peak direction during the extended peak period. This improvement would offer considerable travel time savings (i.e., approximately 2.5 minutes) for bus passengers traveling in the peak direction without substantially impacting general traffic. These savings comprise approximately 40 percent of total travel time estimated under the Recommended Alternative.

The layout of the roadway, including the extended peak period bus lanes, is presented in Appendix B. Only one bus lane would operate in the peak direction during the extended peak hours (southbound 7-10 AM and northbound 4-7:30 PM). No parking would be allowed during the peak periods, with the exception of one side of the street for four blocks in downtown for hotel loading and parking. Right-turning vehicles and taxis would be allowed to enter the bus lane.

Figure 8. Example of Peak Period Bus Lanes (New York City)



Figure 9. Example of Sign for Peak Period Bus Lanes (New York City)



Extension of Center Reversible Lane

The Recommended Alternative includes a center reversible lane between Arkansas Avenue NW and K Street NW. This improvement enables the installation of the extended peak period bus lane while maintaining two general traffic lanes in the peak direction. The existing reversible lane operates between Arkansas Avenue NW and mid-block south of Lamont Street NW. A new reversible lane is proposed for the following segments:

- » Mid-block south of Lamont Street NW to Mt. Pleasant Street NW;
- » Columbia Road NW to O Street NW; and
- » M to K Streets NW.

The reversible lane will require new lane markings and signage in the new segments, but will fit within the existing curb-to-curb width.

A non-reversible lane configuration would be installed between Mt. Pleasant Street NW and Columbia Road NW to accommodate the existing northbound left-turn lane at Mt. Pleasant Street NW, which is necessary to provide access to the Mt. Pleasant neighborhood. However, the roadway is wide enough in this section to install a bus lane and maintain two travel lanes in the peak direction.

The existing reversible lane operates in the southbound direction between 7-9:30 AM. Under the Recommended Alternative, the reversible lane would operate southbound between 7 AM-12 PM.

Install Fifth Lane

A fifth lane would be added to the following three segments of 16th Street NW:

- » W Street NW and mid-block south of V Street NW;
- » Caroline and O Streets NW; and
- » K and H Streets NW.

DDOT is not proposing to widen the roadway in order to accommodate the additional fifth lane; the roadway would be restriped with narrower lanes and the curbs would remain in place. The proposed roadway configuration is shown in Appendix B.

The addition of a fifth lane in these sections helps to maintain traffic operations for general vehicles and buses, particularly in the off-peak direction. Under the Recommended Alternative, the roadway through the Dupont Circle Neighborhood, for example, would be five lanes wide. During the AM peak period, the westernmost lane would be a southbound bus lane, followed by two southbound vehicle lanes, followed by two northbound vehicle lanes.

With the installation of a bus lane and the need to maintain two vehicle lanes in the peak direction, a four-lane cross section would only leave one lane for the off-peak direction. There is currently only one lane in the off-peak direction through the Dupont Circle neighborhood due to parking allowed in the off-peak direction during the peak periods. However, there is space for through vehicles to pass left-turning vehicles as the parking is pulled back from the intersection, so traffic flows fairly smoothly. With the installation of a bus lane, no parking would be allowed on either side of the street during the peak periods in Dupont Circle, and off-peak direction

through vehicles, including buses, would be in the curb lane and have no way to pass left-turning vehicles. This results in considerable traffic congestion for the off-peak direction.

There are several unsignalized crosswalks in Dupont Circle, such as at Swann Street NW. The addition of a fifth lane, as well as a reversible lane, may present a challenge to pedestrians crossing 16th Street NW at these locations. DDOT will continue to work closely with the community during the design phase to identify appropriate countermeasures to enable safe and convenient pedestrian access across 16th Street NW.

Columbia Heights Intersection Reconfiguration

Reconfiguring the intersections of 16th Street NW with Harvard Street NW, Columbia Road NW, and Mt. Pleasant Street NW would provide additional travel time, reliability, and safety benefits. The signalized intersections are closely spaced and the side streets intersect at various angles. This complicated geometry and close signal proximity create challenges for all modes of travel, including pedestrians accessing bus stops. Given the complexity of this segment of 16th Street NW, reconfiguring the intersections is recommended for study as part of a future project with a separate design phase from this Study.

RECOMMENDED TRANSIT SERVICE IMPROVEMENTS



Any service changes would require a future public involvement process led by WMATA.

Headway-Based Service

A headway-based service provides passengers with a consistent amount of time between buses, similar to the 70s Line on Georgia Ave/7th Street NW and the DC Circulator. Currently, the 16th Street Line buses operate according to a published schedule but are frequently behind schedule and bunched. The Recommended Alternative includes transitioning to headway-based service for the 16th Street Line to improve reliability.

Under this improvement, all four routes will operate on regular headways, which will also help to address the overcrowding that results from bus bunching.

Increase Limited Stop Service

WMATA introduced the S9 MetroExtra limited stop service in 2012, and it has proven to be very popular with riders. There are currently 111 S9 trips per weekday, including 12 southbound trips between 7 AM-10 AM and 13 northbound trips between 4-8 PM. This improvement would increase the frequency of the S9 route.

The S9 buses stop less often than other 16th Street Line buses, resulting in faster travel times. Ideally, the additional service will be provided through additional buses. However, due to funding and garage capacity constraints, it may be necessary to shift some service from local routes to the S9 route. The extent to which this may be required will be determined during the service planning conducted as part of implementing the Recommended Alternative.

Transition to Simpler Patterns

The 16th Street Line is comprised of four routes, each of which has multiple patterns. However, these numerous patterns contribute to bus bunching, which occurs before buses arrive at the Primary Study Area. In addition, the convergence of multiple patterns on various points along 16th Street NW would lessen WMATA's ability to operate headway-based service successfully. Transitioning to simpler patterns will improve reliability on the 16th Street Line, while maintaining service along the entire 16th Street NW corridor.

Running and Recovery Time Added to Schedule

In part, due to the growth in ridership, the existing bus schedules do not provide enough running and recovery time for buses to travel their routes during peak periods; the actual trip times are longer than the scheduled times on average. Insufficient runtime has a cascading effect throughout the day, because a bus that is running behind schedule may never "catch up" to its schedule on subsequent trips. This results in missed or dropped trips and bus bunching. Adding runtime to the 16th Street Line schedules would improve the on-time performance and subsequently the reliability of the service.

Fleet Mix Upgraded with Low-floor and Articulated Buses

Low-floor buses allow passengers to walk directly into the buses versus walking up steps without having to climb steps. This reduces the time it takes each passenger to board or alight the bus. WMATA already operates low-floor buses on the S9 route; however, upgrading the fleet mix so that all buses on the 16th Street Line are low-floor will reduce travel time and improve reliability. The savings is conservatively estimated to be 0.5 minutes per trip along the Primary Study Area. Low-floor buses also improve bus accessibility for the elderly and people with disabilities.

Articulated buses are longer, multi-sectional buses that carry approximately 50 percent more passengers than a standard bus. The Recommended Alternative includes expanding the number of articulated buses on the 16th Street Line to help meet the current and anticipated future demand for bus service. However, the 16th Street Line operates out of the Northern Bus Garage on 14th Street NW and Buchanan Street NW, which has limited capacity to store articulated buses. The Study recommends that additional bus division capacity be identified and developed so that additional articulated buses can be used.

Off-Board Fare Payment

Off-board fare payment would allow passengers to pay their fare at kiosks located at the bus stops before boarding the bus. Implementing off-board fare payment for all stops on all routes results in notable travel and dwell time savings: over one minute on all routes during peak periods in the peak direction. It accounts for 22 to 27 percent of the overall travel time savings for the Recommended Alternative on the S1, S2, and S4 routes in the peak periods and for 24 to 33 percent of the overall travel time savings for the Recommended Alternative on the S9 route. The improvement would be implemented in concert with the all-door boarding.

DDOT will work closely with the community on the placement of the off-board fare payment kiosks, which would be located at each bus stop.

A STANDARD BUS is 40 feet long and holds 46-48 total passengers, including 39-40 seated.

AN ARTICULATED BUS is 60 feet long and holds 70-72 total passengers, including 59-60 seated.

Note: WMATA calculates total bus capacity based on 120 percent of seated capacity. Bus capacity varies by manufacturer and seating arrangement.

All-Door Boarding

All-door boarding allows passengers to board the bus through either the front or rear door of the bus. The Recommended Alternative includes introducing all-door boarding in coordination with off-board fare payment. This improvement reduces the length of the queue for passengers to board the bus, thus reducing travel

and dwell times. It accounts for 10 to 12 percent of the overall travel time savings for the Recommended Alternative on the S1, S2, and S4 routes in the peak periods and for 11 to 13 percent of the overall travel time savings for the Recommended Alternative on the S9 route.

All-door boarding would require a team of fare inspectors, who would randomly board buses to ensure that all passengers have paid the fare. Passengers who have not paid would be asked to exit the bus to pay at the next stop or would be fined.

RECOMMENDED TRAFFIC OPERATIONS IMPROVEMENTS



Transit Signal Priority (TSP)

TSP grants buses an early green phase or an extended green phase at an intersection. DDOT and WMATA are scheduled to begin implementation of TSP for S9 buses in 2016. Under this initial implementation, the TSP will extend the green time for buses that are significantly behind schedule. Under the Recommended Alternative, TSP will be used for all 16th Street Line buses and will be used in conjunction with the headway-based operating plan, meaning that it will help to keep the buses evenly spaced. If a bus is running behind its headway, it will be granted priority to help it catch up, improving reliability. The intersections proposed for TSP are shown in Appendix B.

including installation of Americans with Disabilities Act (ADA) compliant ramps, tactile warning surfaces to existing ramps, and crosswalk markings.

At Arkansas Avenue NW, the curb at the southeast corner would be extended to shorten the crossing distance across Arkansas Avenue NW and slow right-turning vehicles. At Sacred Heart Way NW, the metal fencing would be removed and a raised crosswalk would be installed to allow pedestrians to cross Sacred Heart Way NW. At Harvard Street/Columbia Road/Mt. Pleasant Street NW, the intersection would be reconfigured to improve pedestrian safety and simplify crossings.

The specific pedestrian improvements are displayed in Appendix B and E.

Peak Period Parking Restrictions

Slow bus travel speeds extend past the current peak period, in part because on-street parking reduces the roadway capacity. Extending the parking restrictions allows for greater capacity to move buses and general traffic. The proposed improvement would extend the no parking designation to 7-10 AM (from 9:30 AM) and 4-7:30 PM (from 6:30 PM). This improvement is necessary to install the bus lanes and helps to improve travel times for all modes. DDOT will coordinate with the Department of Public Works regarding street sweeping time restrictions on the side streets to align with the new 16th Street NW parking restrictions.

Bus Stop Amenity and Access Improvements

The Recommended Alternative includes several enhancements at bus stops and improvements for passenger safety and access. These include:

- » Shifting the location of three southbound bus stops, including Spring Place, Irving Street, and Crescent Place NW, to improve safety and/or access;
- » Installing additional shelters at seven northbound and eight southbound bus stops;
- » Expanding pedestrian waiting areas at seven northbound and eight southbound bus stops; and
- » Installing, or expanding rear-door landing areas, at 21 bus stops.

These improvements are shown in Appendix B.

Pedestrian Safety Improvements

These recommendations include a range of improvements to enhance pedestrian safety and access,

Automated Enforcement

Automated enforcement uses technology to issue tickets instead of having to rely on police or parking enforcement personnel. The cameras work in much the same way as red light or speed cameras. Consistent enforcement, particularly during weekday peak periods, would reduce the potential of vehicles parking illegally in the curb lane or driving in the bus lane. The Recommended Alternative includes implementing a combination of cameras mounted on traffic poles and cameras mounted on the front of buses to provide automated enforcement and monitoring. DDOT will coordinate with the Metro Transit Police Department (MTPD) and the Metropolitan Police Department (MPD) on enforcement and monitoring.

Peak Period Left-turn Restriction

The restriction of southbound left turns from 16th Street NW to W Street NW during the extended PM peak (4-7:30 PM) is included in the Recommended Alternative to maintain multimodal traffic operations. The proposed center reversible lane would replace the dedicated southbound left-turn lane at W Street NW. Dispersing left turns to alternate locations, including Euclid, T, and S Streets NW, help to decrease congestion along the entire corridor.

OUTCOMES OF THE RECOMMENDED ALTERNATIVE



This section summarizes the reduction in travel time and dwell time for buses, impacts on multimodal operations, and costs for the Recommended Alternative.

Reduced End-to-End Bus Travel Time

The improvements in the Recommended Alternative result in the estimated peak period bus travel time savings shown in Table 21. Average existing peak period bus travel times are approximately 20 to 25 minutes for the S1, S2, and S4 routes and 18 to 22 minutes for the S9 routes. The estimated savings would reduce bus travel times by 17 to 30 percent in the peak period peak direction.

Table 21. Estimated Peak Period Transit Travel Time Savings

	AM PEAK (MIN)	PM PEAK (MIN)
S1/S2/S4 Southbound	5.9	2.0
S9 Southbound	3.7	0.8
S1/S2/S4 Northbound	2.4	5.9
S9 Northbound	1.1	4.6

Reduced Dwell Time

Three improvements in the Recommended Alternative would reduce bus dwell times: fleet mix upgraded with low-floor and articulated buses, off-board fare payment, and all-door boarding. Table 22 presents dwell times for the existing conditions and Recommended Alternative by route in the peak direction during the peak period. Under the Recommended Alternative, the dwell times are reduced by approximately 35 percent to 48 percent.

Table 22. Estimated Dwell Time

ROUTE	AM PEAK SOUTHBOUND (MIN)		PM PEAK NORTHBOUND (MIN)	
	S1/S2/S4	S9	S1/S2/S4	S9
Existing	5.0	2.7	4.9	3.2
Recommended Alternative	2.9	1.4	3.0	2.1

Maintenance of Multimodal Operations

Multimodal Level of Service

Under the Recommended Alternative, all intersections maintain an overall LOS D or better at 2015 and 2040 projected traffic volumes. For the 16th Street NW intersection approaches (16th Street NW northbound and southbound), nearly all operate LOS D or better in 2015. The exception is the southbound approach in the AM peak period at Arkansas Avenue NW, which currently operates at LOS B and is projected to operate at LOS E in 2015 and LOS F in 2040 under the Recommended Alternative. The decline in LOS is due to the reduction of southbound lanes in this segment from three to two in the Recommended Alternative. The southbound approach to I Street NW in the PM peak period currently operates at LOS E and will remain unchanged in 2015 and 2040 for the Recommended Alternative. During the design phase, DDOT will consider additional traffic operations improvements to address congestion at these two locations. The LOS for all intersections under the Recommended Alternative for 2015 and 2040 is shown in Appendix G.

Vehicle Travel Time

The Recommended Alternative has been shown to result in no increase of southbound vehicle travel times during the AM peak. For southbound vehicles in the PM peak and northbound vehicles in the AM and PM

peaks, the increase is expected to be 2 minutes or less, as shown in Table 23. The addition of the fifth travel lane and extension of the center reversible lane, in addition to other traffic operations improvements, help to keep vehicle travel time increases at a minimum with the installation of a peak period peak direction bus lane.

Table 23. Recommended Alternative Vehicle Travel Time Changes

TRAVEL TIME CHANGES	
AM peak	Remains the same (Southbound)
	Lengthens by 1.5 minutes (Northbound)
PM peak	Lengthens by 1.9 minutes (Southbound)
	Lengthens by 2.0 minutes (Northbound)

Cost

As shown in Appendix E, the estimated capital cost for the Recommended Alternative is approximately \$8.0 million in 2015 dollars. The capital cost estimate, draws on cost data from recent transit projects in the Washington metropolitan area and assumes 10 percent of the cost goes towards the design, 12 percent for traffic maintenance, 15 percent for construction management, and 40 percent for contingency. The cost estimates will be refined and the contingency can be reduced as the design of the project progresses. The operating cost will be developed as part of the ongoing service planning with WMATA.

FEEDBACK FROM THE PUBLIC



On January 21, 2016, DDOT hosted a final public meeting for the planning study to present the Recommended Alternative. DDOT solicited feedback from the public at the meeting and in the weeks following via emails, letters, and phone calls. A summary of the comments received through January 29, 2016, as well as an overview of the meeting content and format, are provided in Appendix F. DDOT continued to receive comments after the requested deadline of January 29, 2016, which have been reviewed and cataloged. All feedback received will help to inform future project phases, starting with the design.



CHAPTER 7.

IMPLEMENTATION

This section summarizes the phasing for implementation of the Recommended Alternative.

PHASING



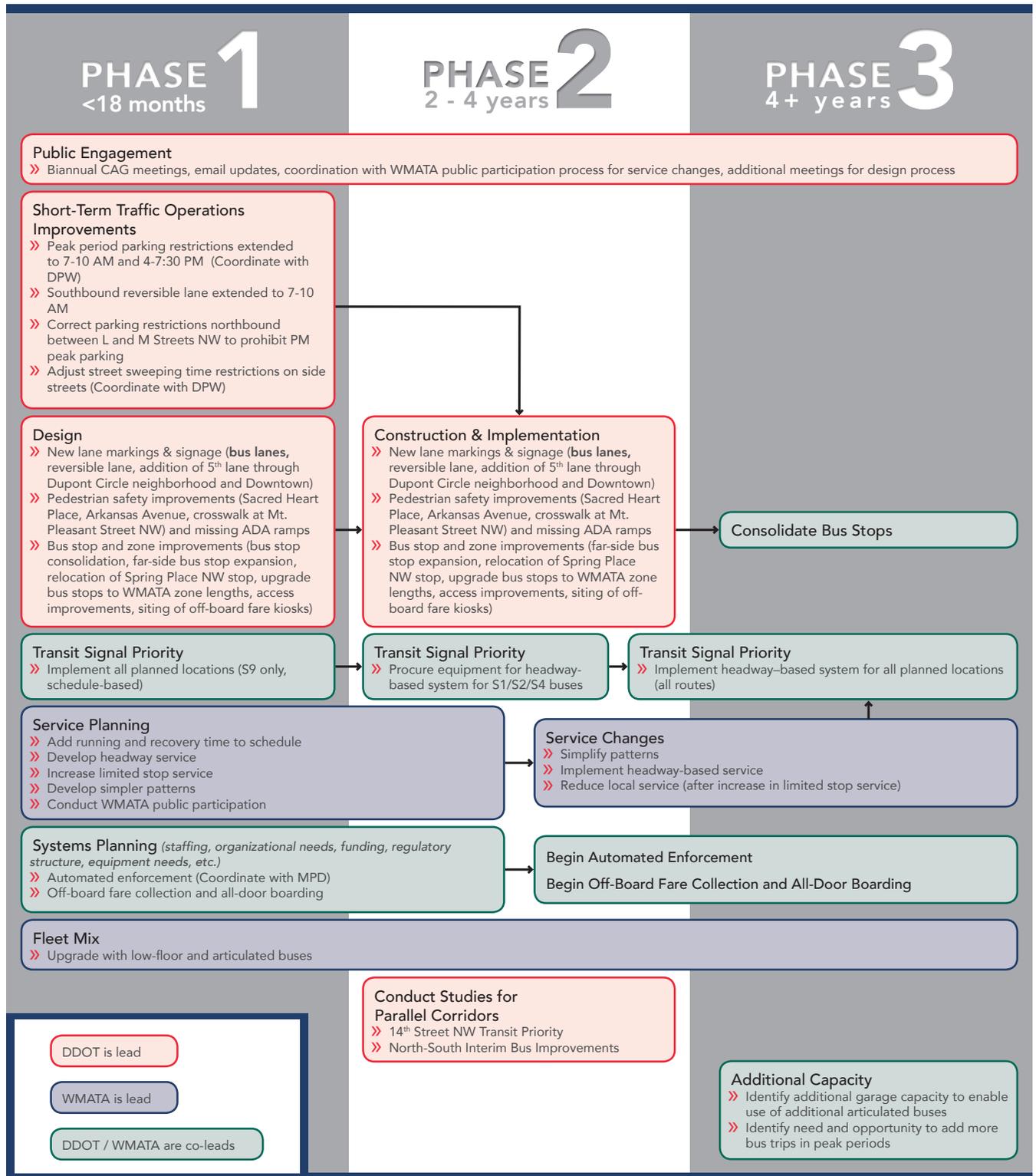
As shown in Figure 10, implementation of the Recommended Alternative will occur in three phases. Some elements will be led by DDOT, some by WMATA, and others will be co-led by both agencies. Phase 1, which occurs over the next 18 months, includes the following short-term next steps:

- » Implement short term traffic operation improvements, including extension of peak period parking restrictions (DDOT is lead);
- » Begin the design process for the new lane markings, signage, pedestrian safety improvements, and bus stop improvements (DDOT is lead);
- » Implement schedule-based TSP for the S9 buses (DDOT / WMATA are co-leads);
- » Undertake additional service planning for adding running and recovery time to the schedule, headway-based service, increased limited stop service, and transition to simpler patterns (WMATA is lead);

- » Initiate systems planning for automated enforcement, off-board fare collection, and all-door boarding (DDOT / WMATA are co-leads);
- » Continue to upgrade the bus fleet with low-floor and articulated buses (WMATA is lead); and
- » Continue public engagement with ongoing CAG meetings, coordination with the WMATA public participation process, and additional meetings during the design process (DDOT is lead).

The plan for implementation includes studying transit improvements on parallel corridors, such as 14th Street NW. moveDC identifies 14th Street NW as a high-frequency local and regional bus corridor. DDOT anticipates that improved transit service on the 16th Street Line will attract additional passengers from parallel corridors, possibly eroding the anticipated benefits from the Recommended Alternative. Measures to improve bus service and operations parallel corridors are important to protecting future investments made on 16th Street NW.

Figure 10. Implementation Phasing





APPENDICES

A. LANE CONFIGURATIONS - ALTERNATIVES 2 AND 3

Appendix A presents the lane configurations considered under Alternative 2 and 3 of the Study.

A.1 ALTERNATIVE 2

Figures A1 to A7 illustrate the resulting lane configuration of 16th Street NW considered under Alternative 2.

Figure A1 - Alternative 2 Lane Configuration – Taylor Street NW to Oak Street NW – 7 AM to 10 PM

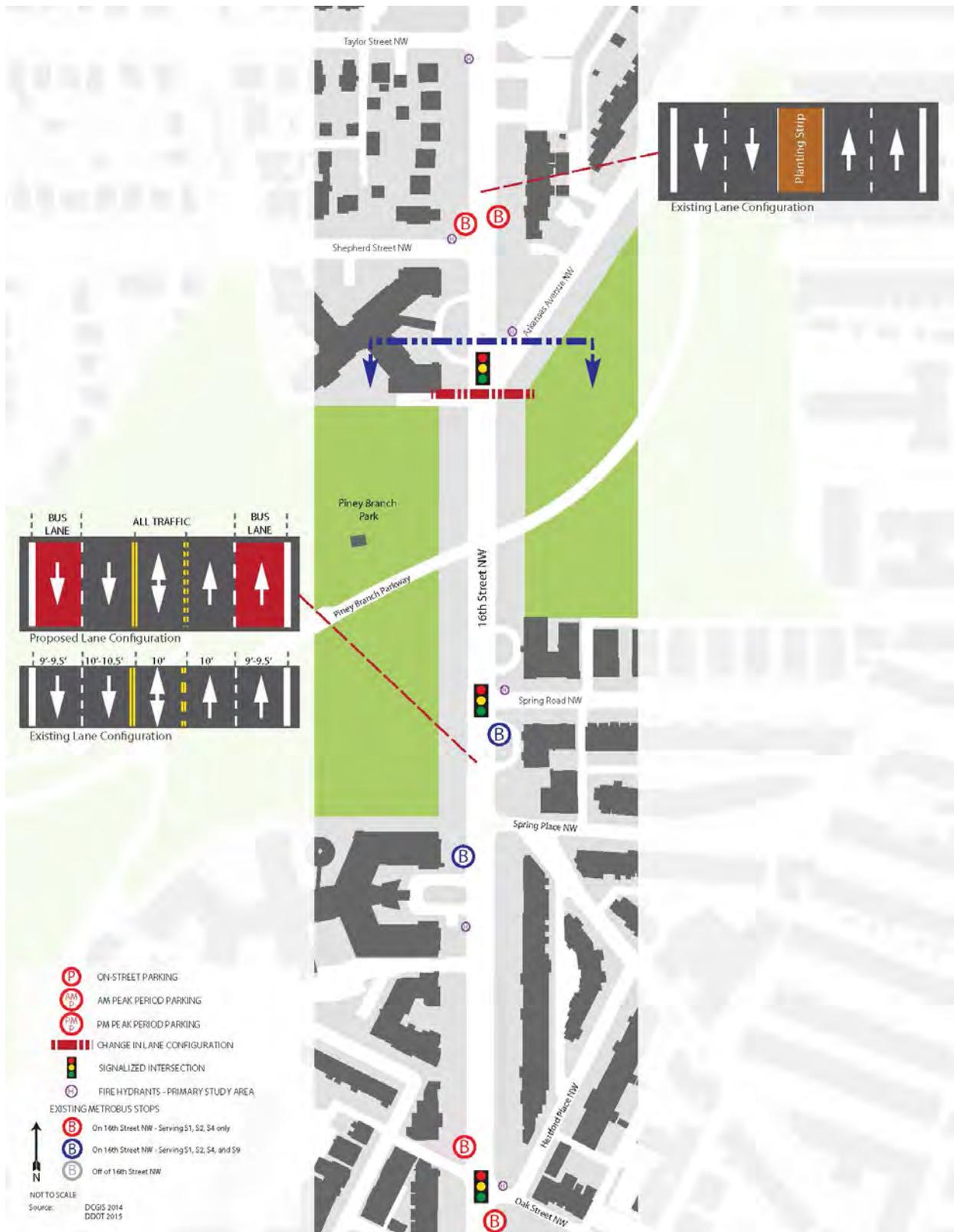


Figure A2 - Alternative 2 Lane Configuration – Oak Street NW to Irving Street NW – 7 AM to 10 PM

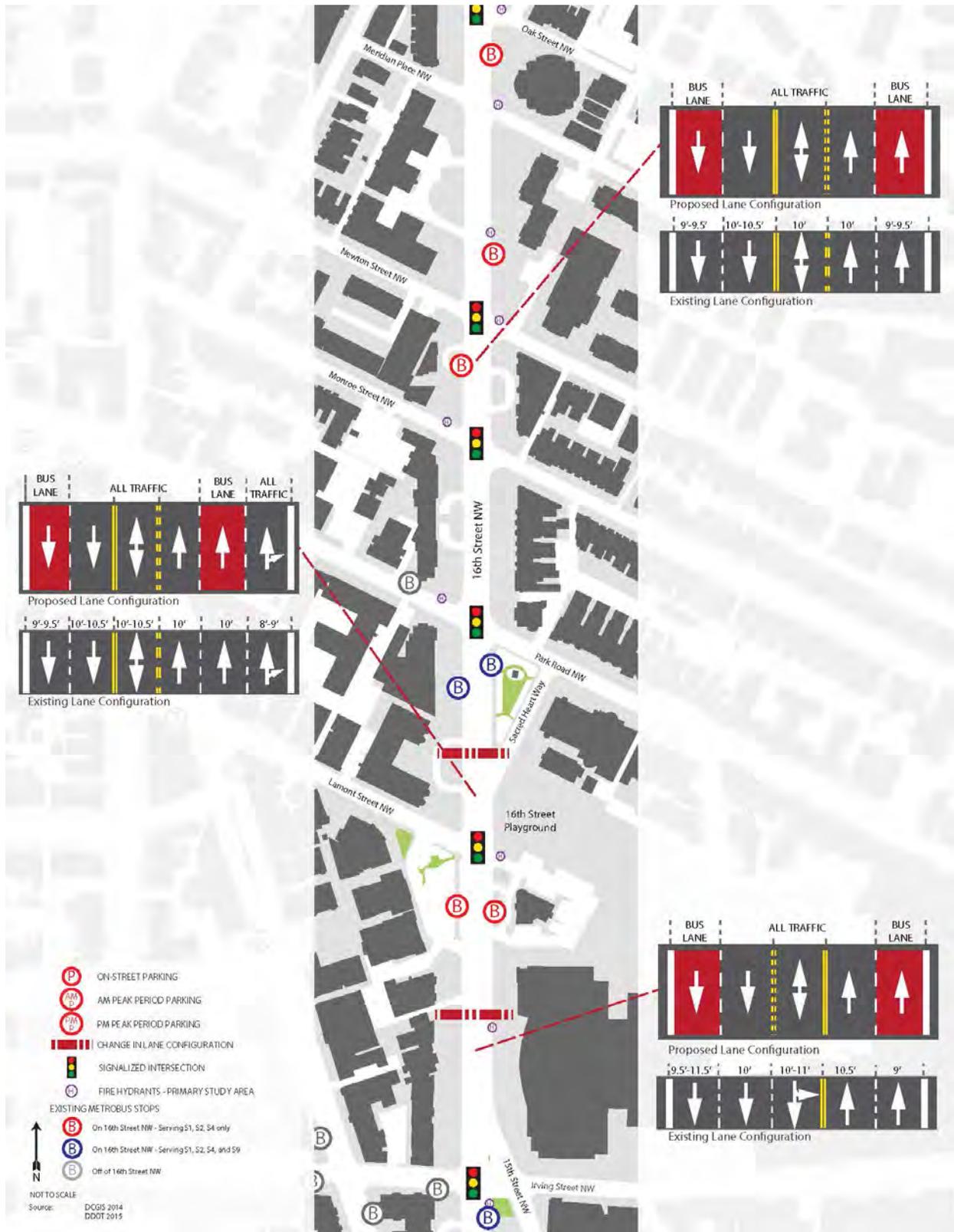


Figure A3 - Alternative 2 Lane Configuration – Irving Street NW to Kalorama Road NW- 7 AM to 10 PM



Figure A4 - Alternative 2 Lane Configuration – Kalorama Road NW to U Street NW – 7 AM to 10 PM

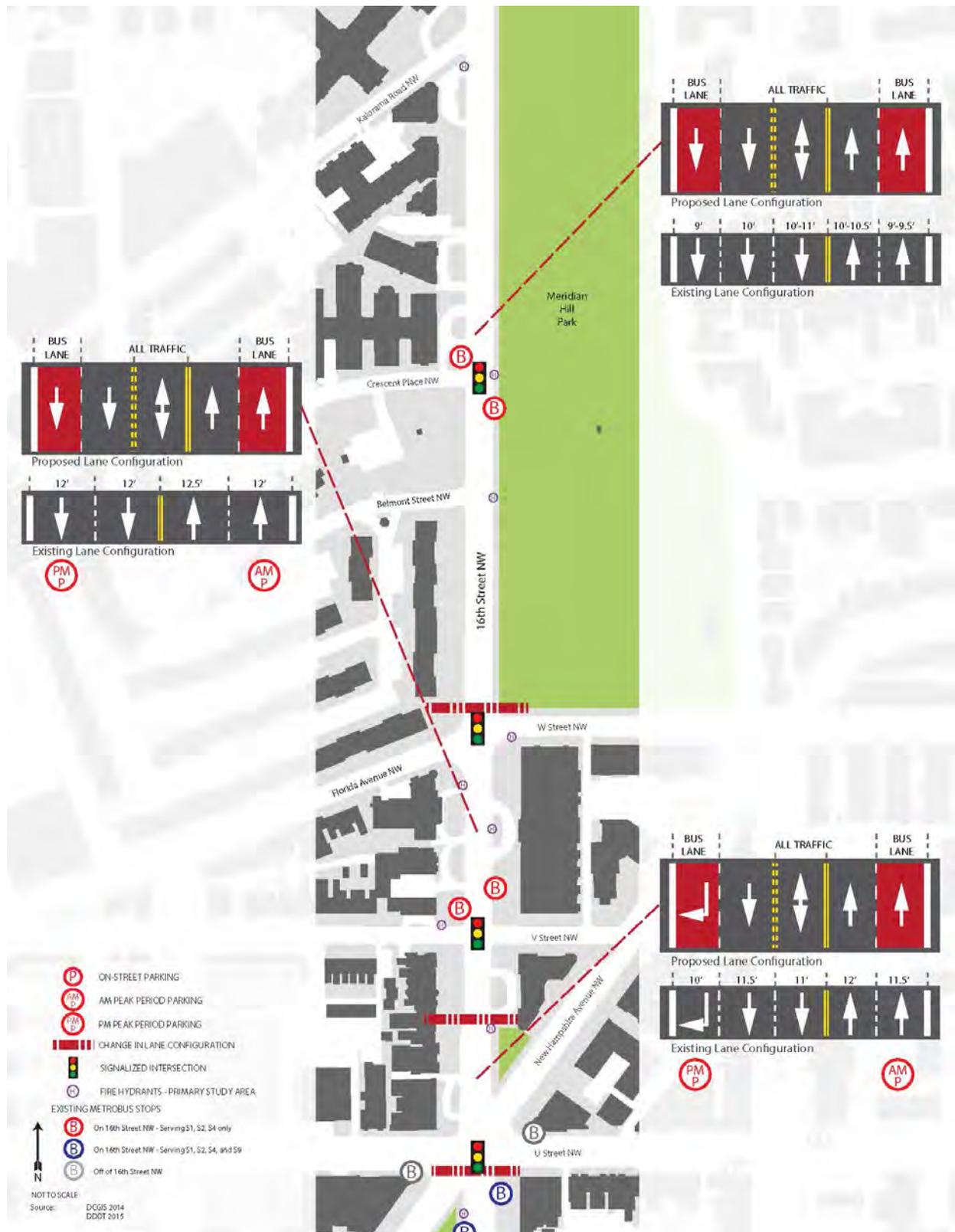


Figure A5 - Alternative 2 Lane Configuration – U Street NW to Q Street NW – 7 AM to 10 PM

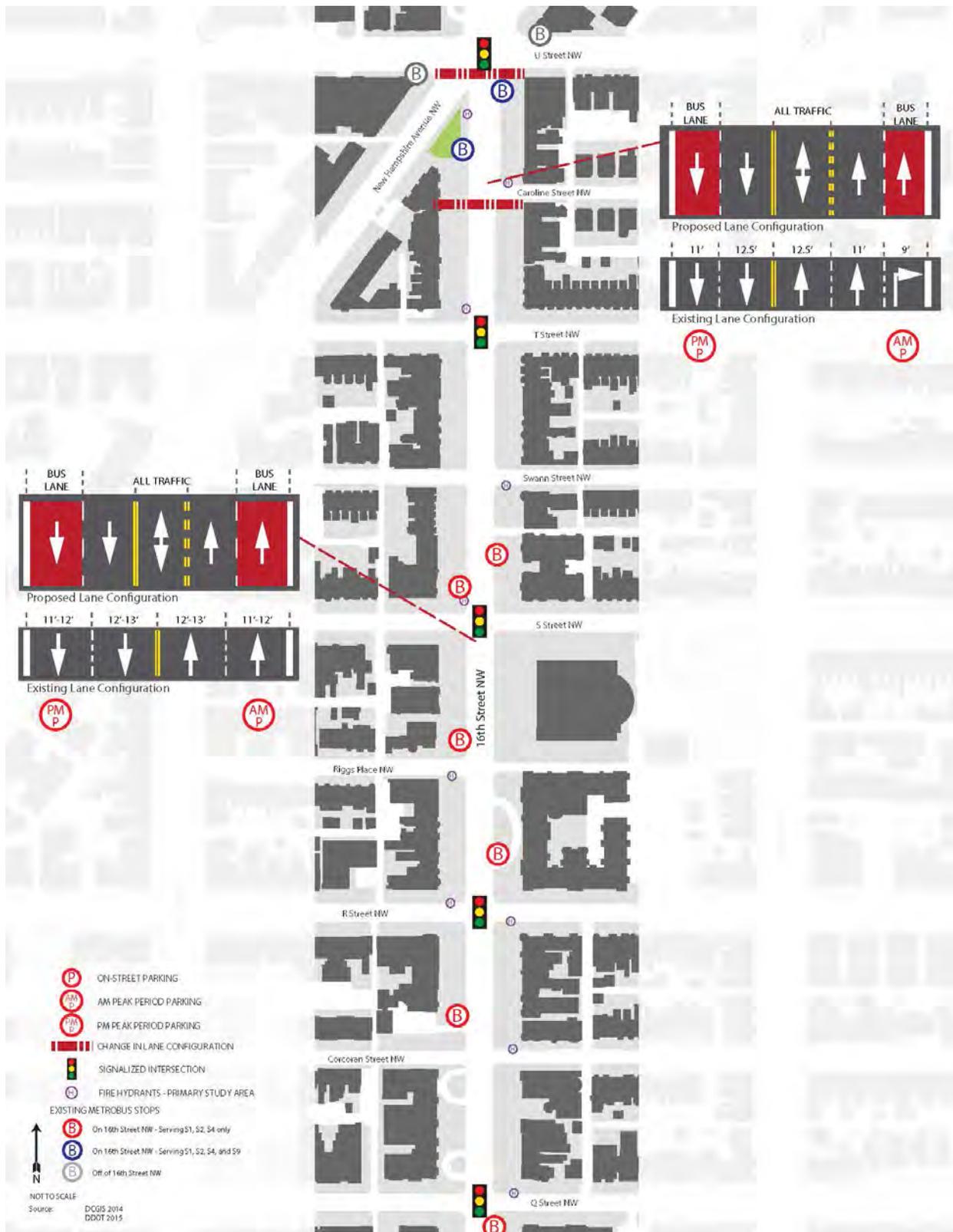


Figure A6 - Alternative 2 Lane Configuration – Q Street NW – M Street NW – 7 AM to 10 PM

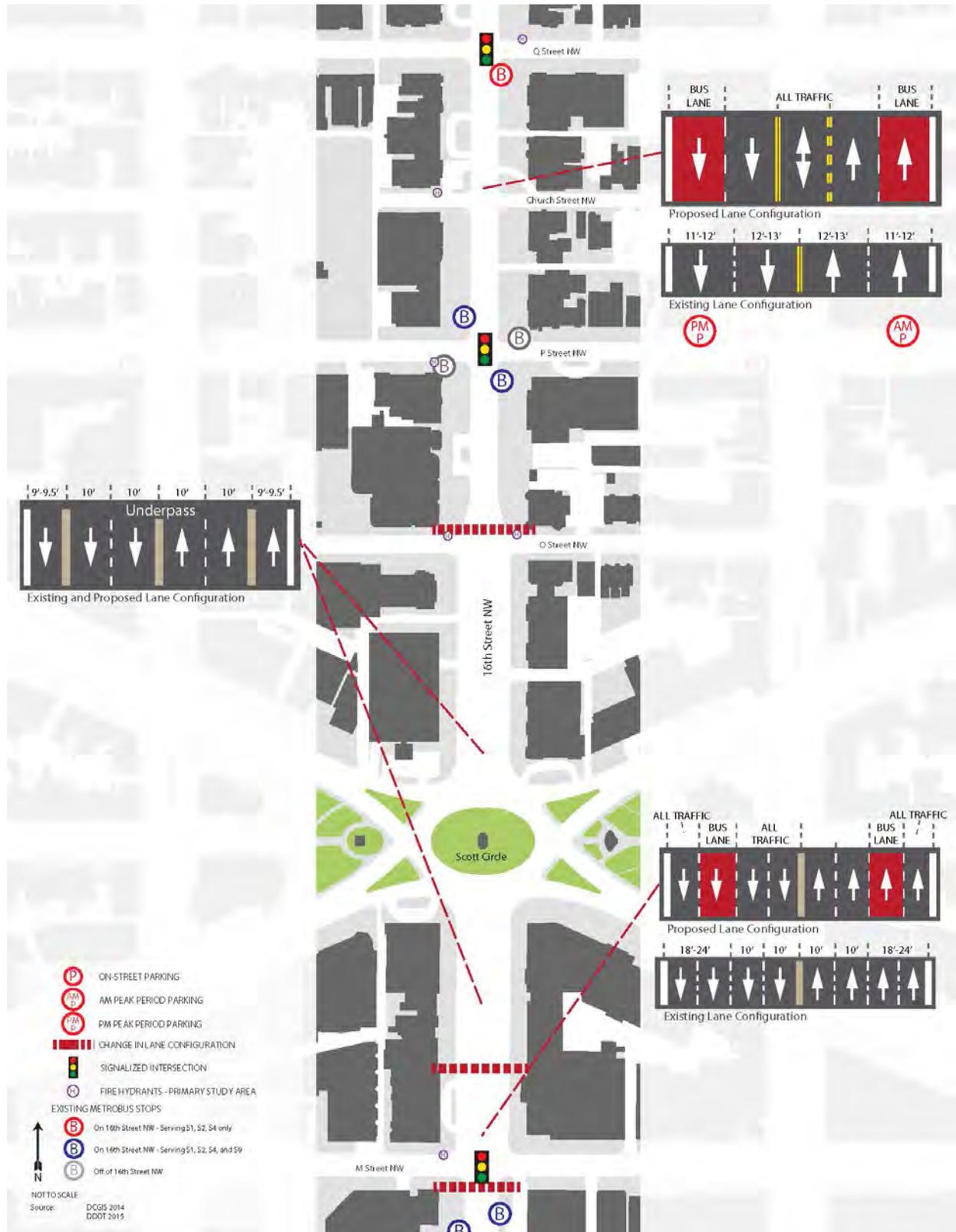
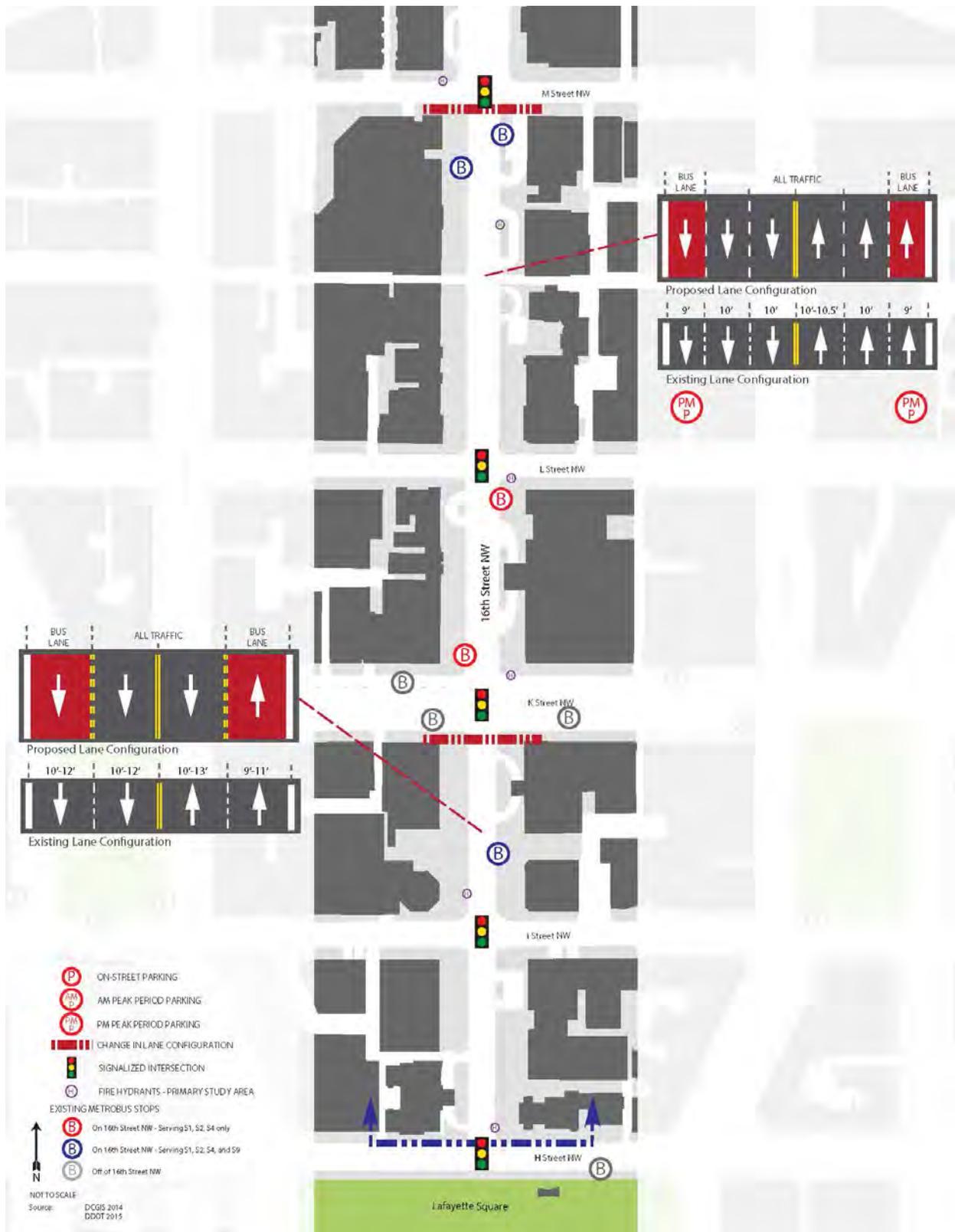


Figure A7 - Alternative 2 Lane Configuration – M Street NW – H Street NW – 7 AM to 10 PM



A.2 ALTERNATIVE 3

Figures A8 to A14 illustrate the resulting lane configuration of 16th Street NW considered under Alternative 3. The extended AM Peak period is 7-10AM and the extended PM Peak period is 4-7:30PM.

Figure A8 - Alternative 3 Lane Configuration – Taylor Street NW to Oak Street NW – Extended AM/Peak Period

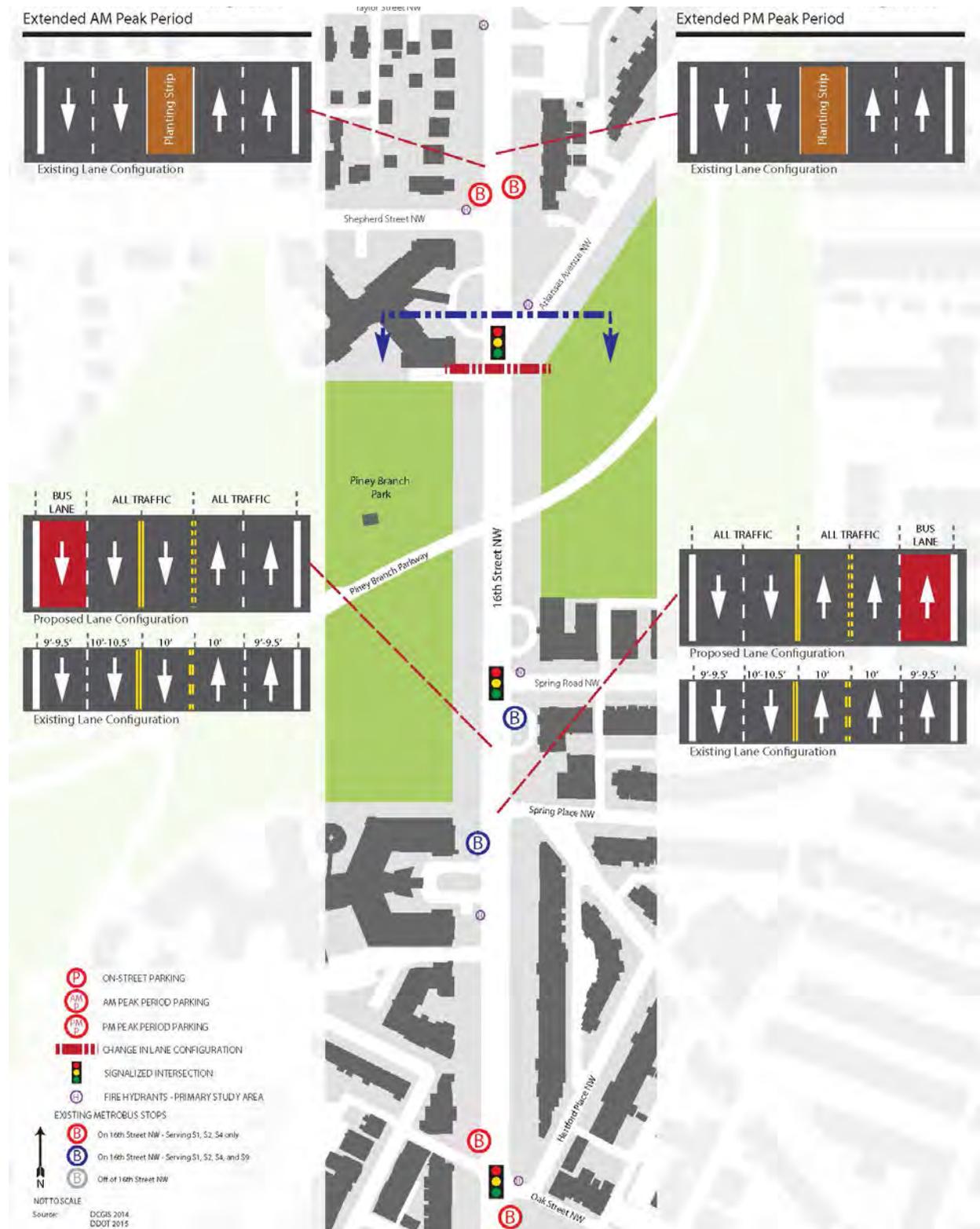


Figure A9 - Alternative 3 Lane Configuration – Oak Street NW to Irving Street NW - Extended AM/Peak Period

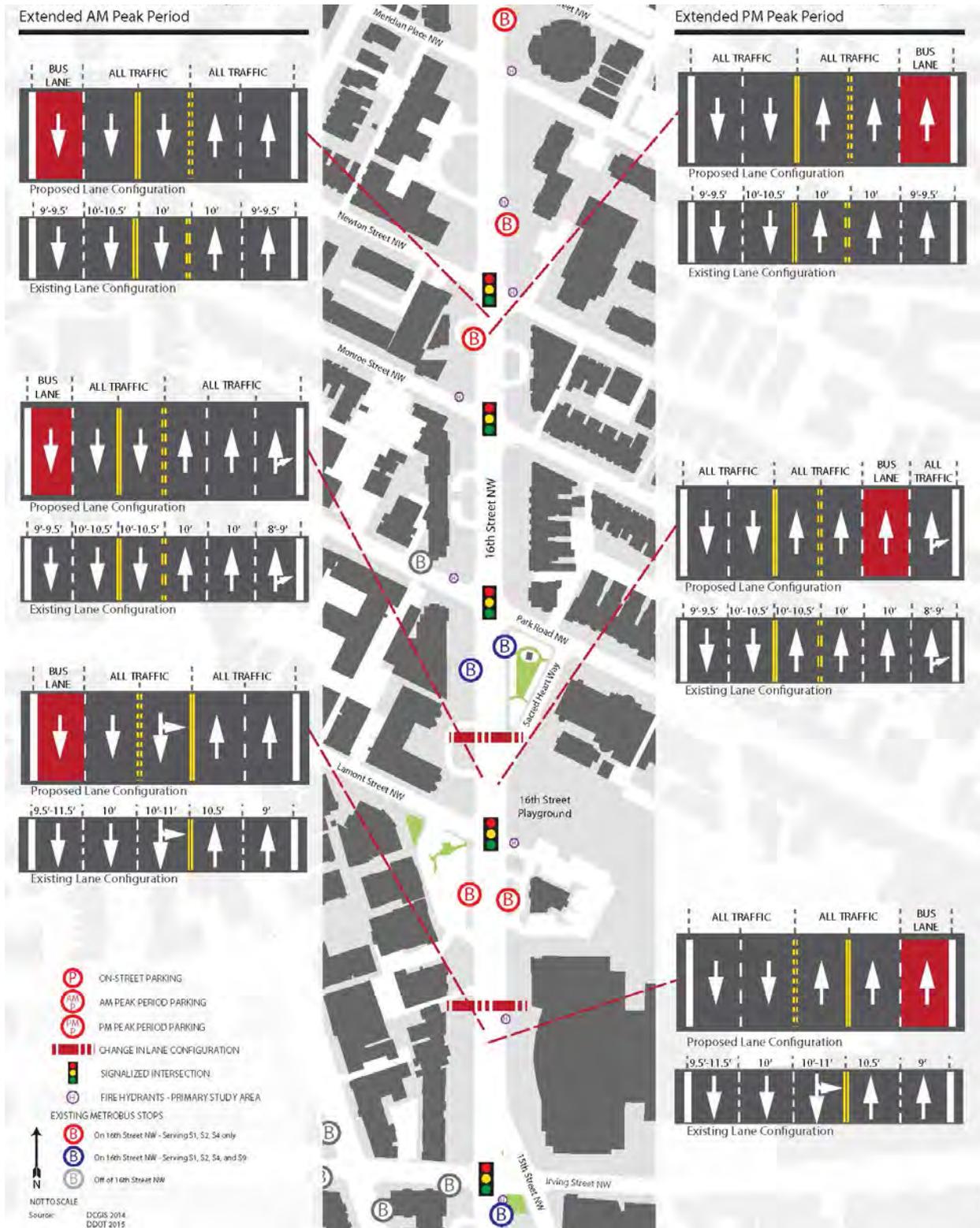


Figure A10 - Alternative 3 Lane Configuration – Irving Street NW to Kalorama Road NW- Extended AM/Peak Period

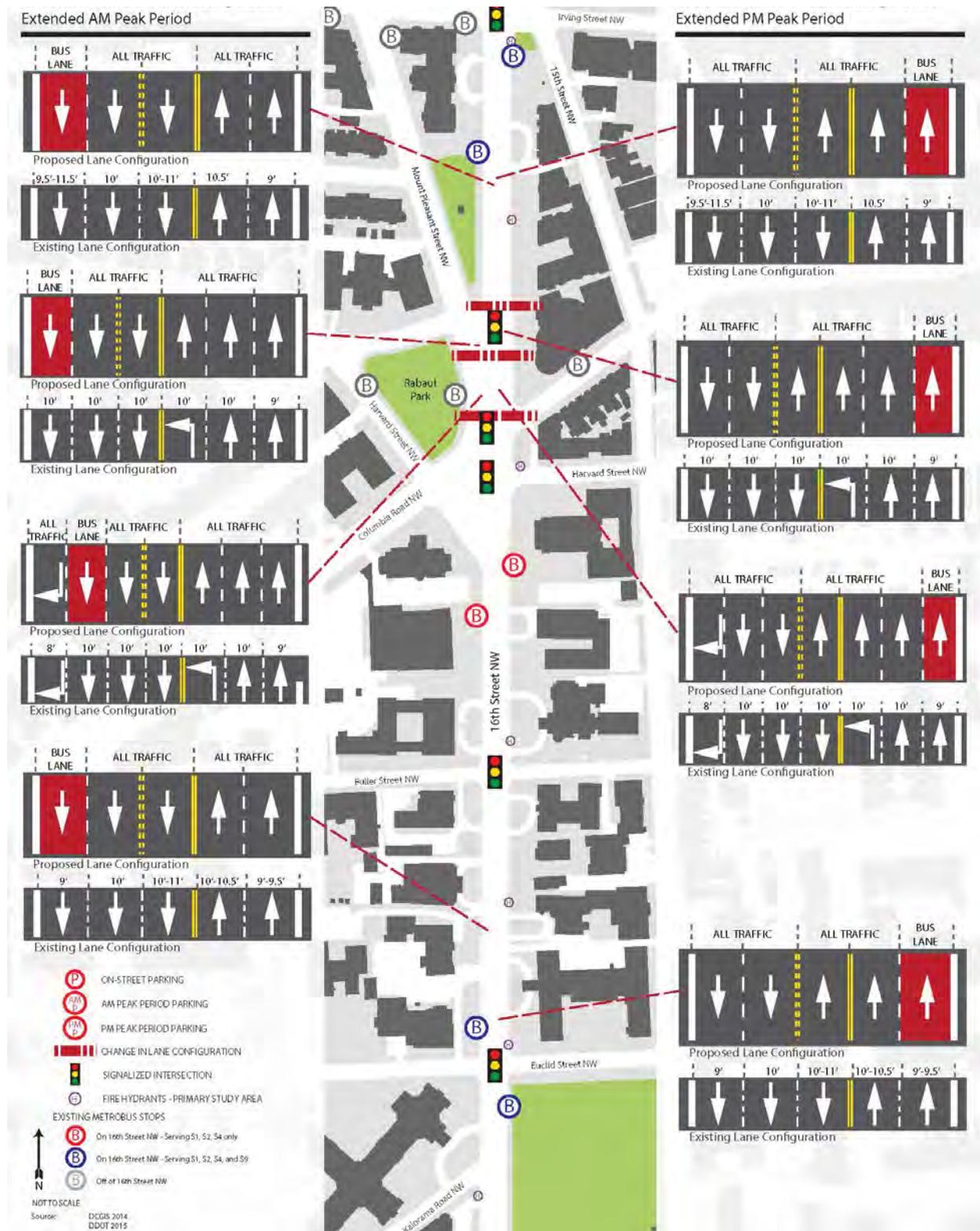


Figure A11 - Alternative 3 Lane Configuration – Kalorama Road NW to U Street NW - Extended AM/Peak Period

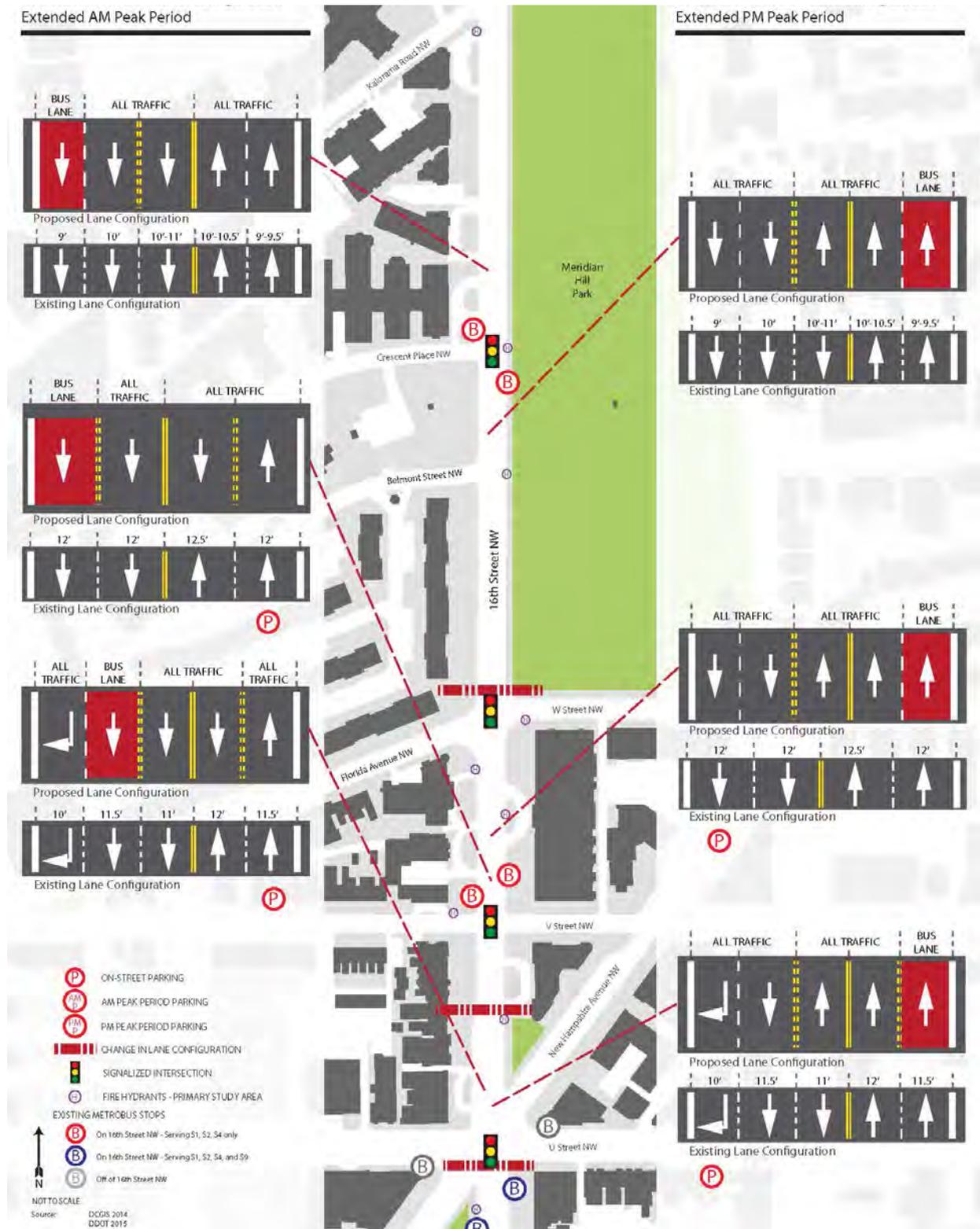


Figure A12 - Alternative 3 Lane Configuration – U Street NW to Q Street NW - Extended AM/Peak Period



Figure A13 - Alternative 3 Lane Configuration – Q Street NW – M Street NW - Extended AM/Peak Period

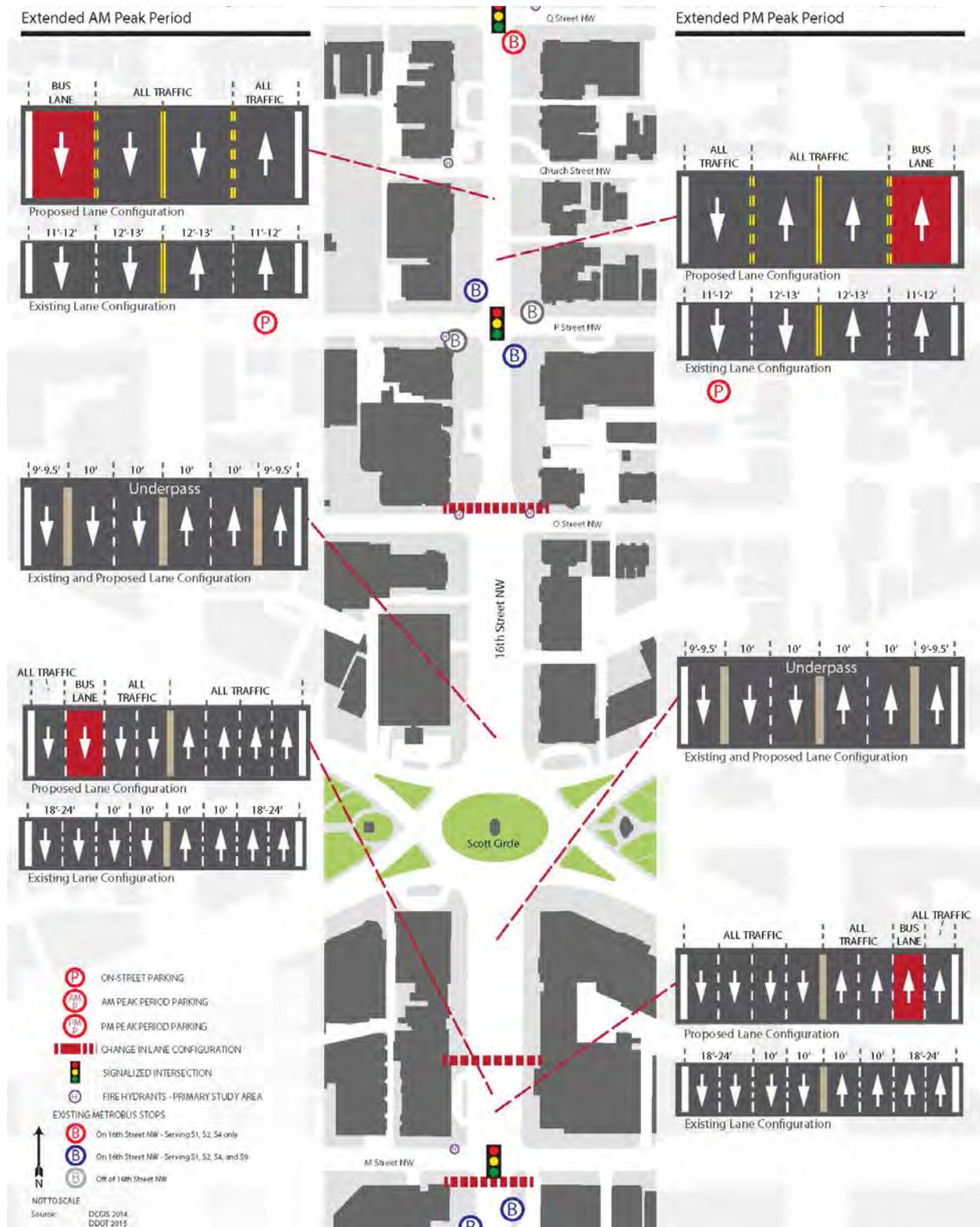


Figure A14 - Alternative 3 Lane Configuration – M Street NW – H Street NW - Extended AM/Peak Period



B. RECOMMENDED IMPROVEMENTS MAP

Appendix B summarizes the improvements presented under the Recommended Alternative. Figure B1 presents the legend identifying the different improvements that are presented on the maps displaying the Recommended Alternative (Figures B2).

Figure B11 - Recommended Improvements – Legend

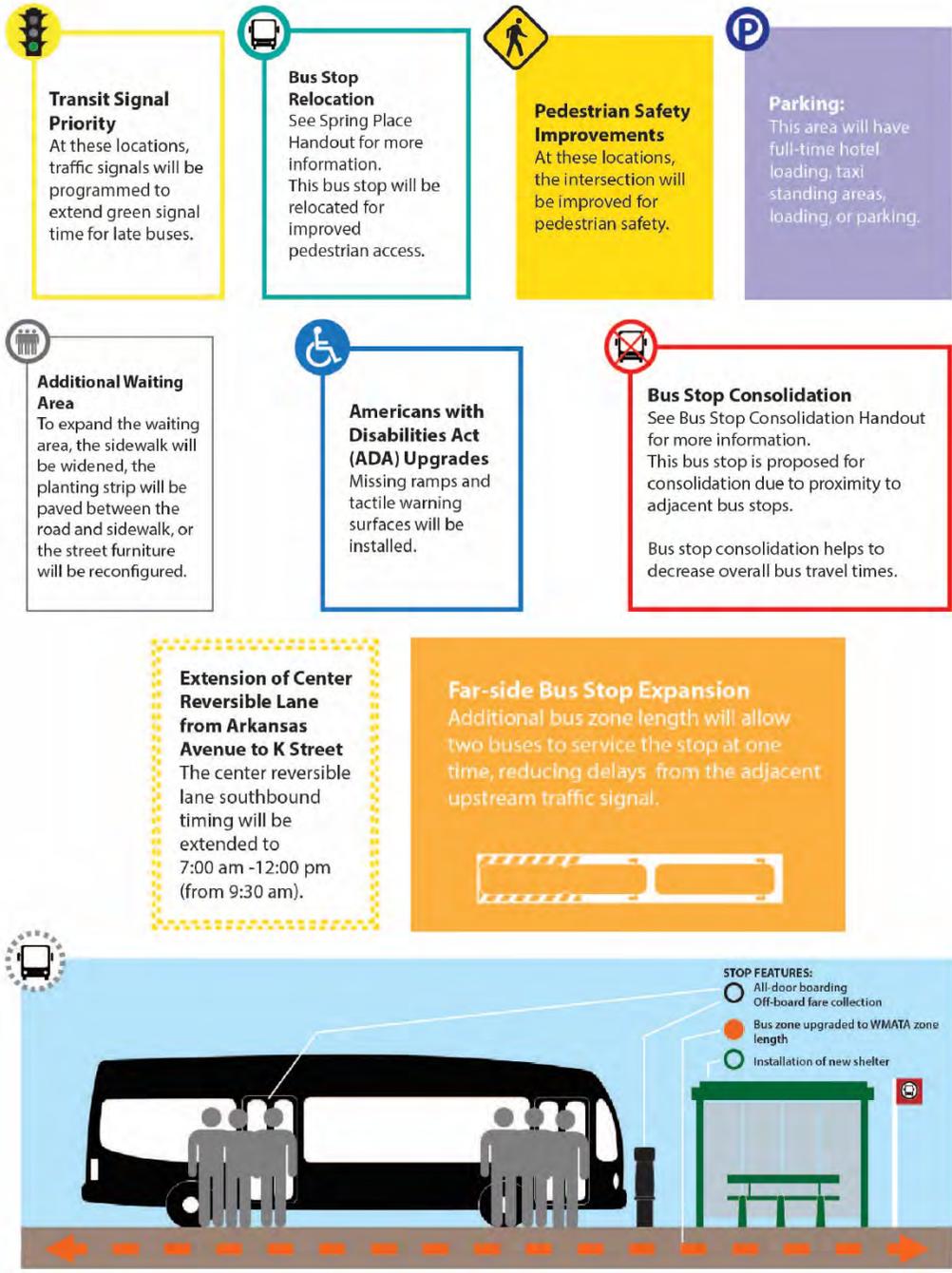


Figure B2 - Recommended Improvements – Arkansas Avenue NW to Oak Street NW

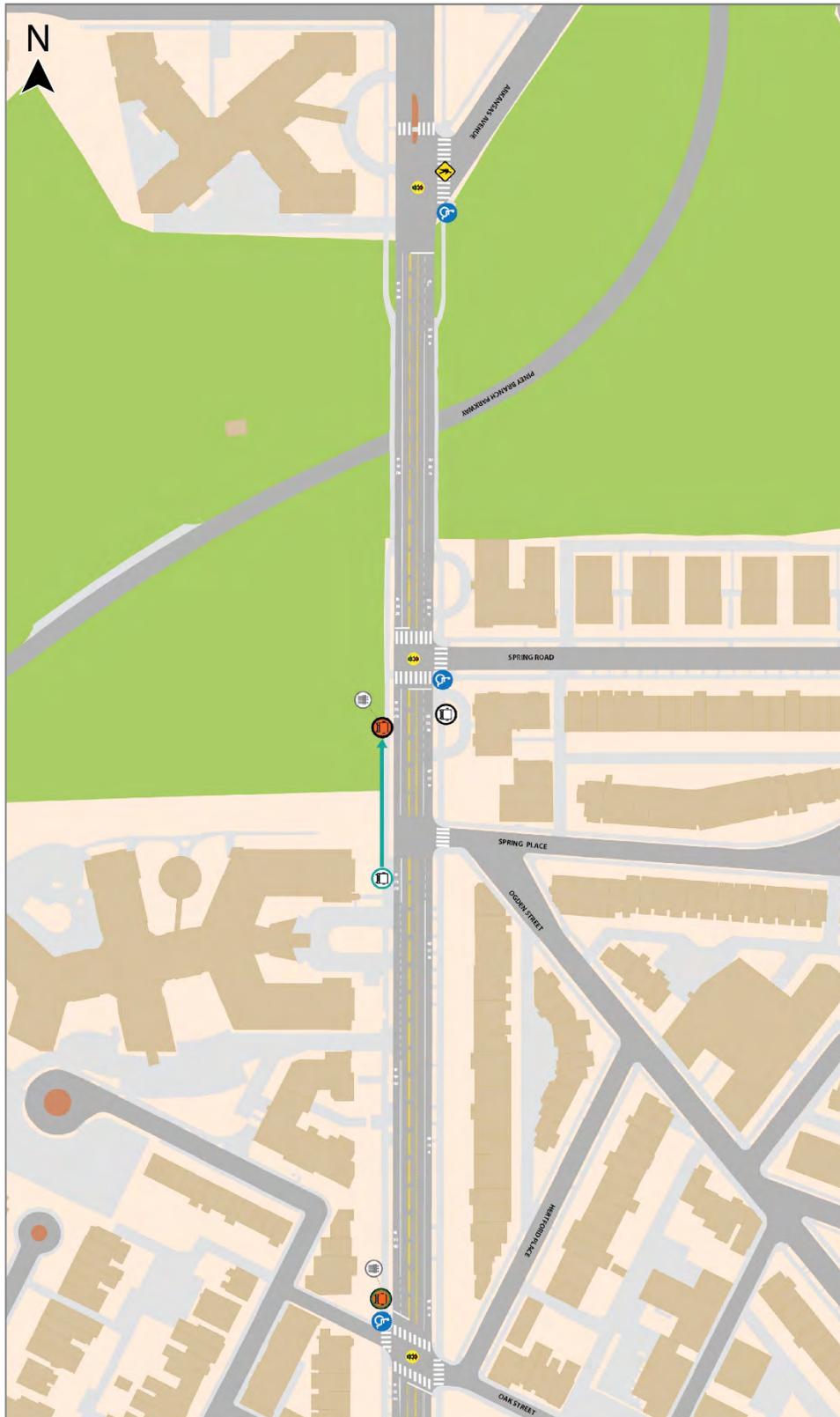


Figure B3 - Recommended Improvements – Oak Street NW to Lamont Street NW

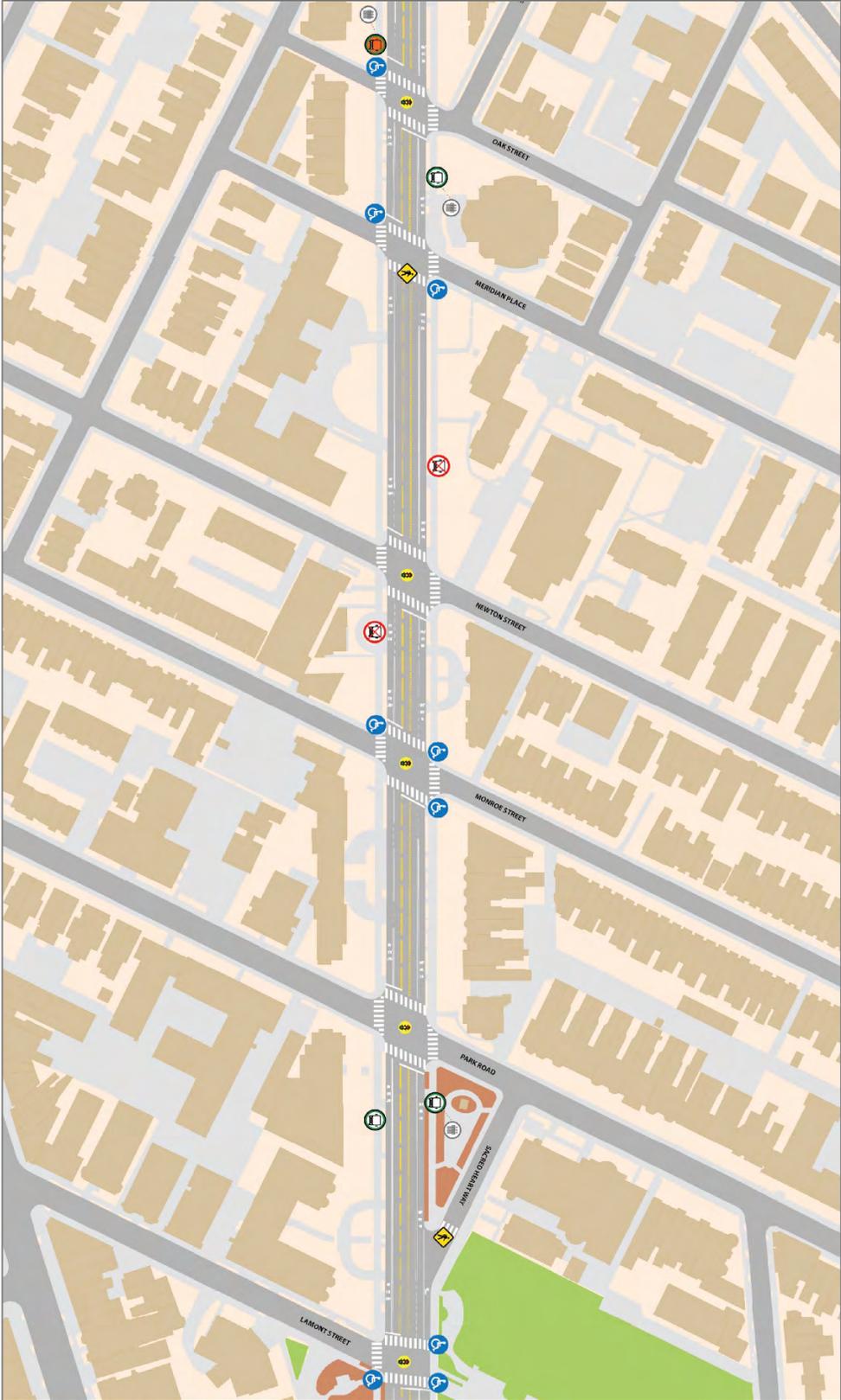


Figure B4 - Recommended Improvements – Lamont Street NW to Fuller Street NW

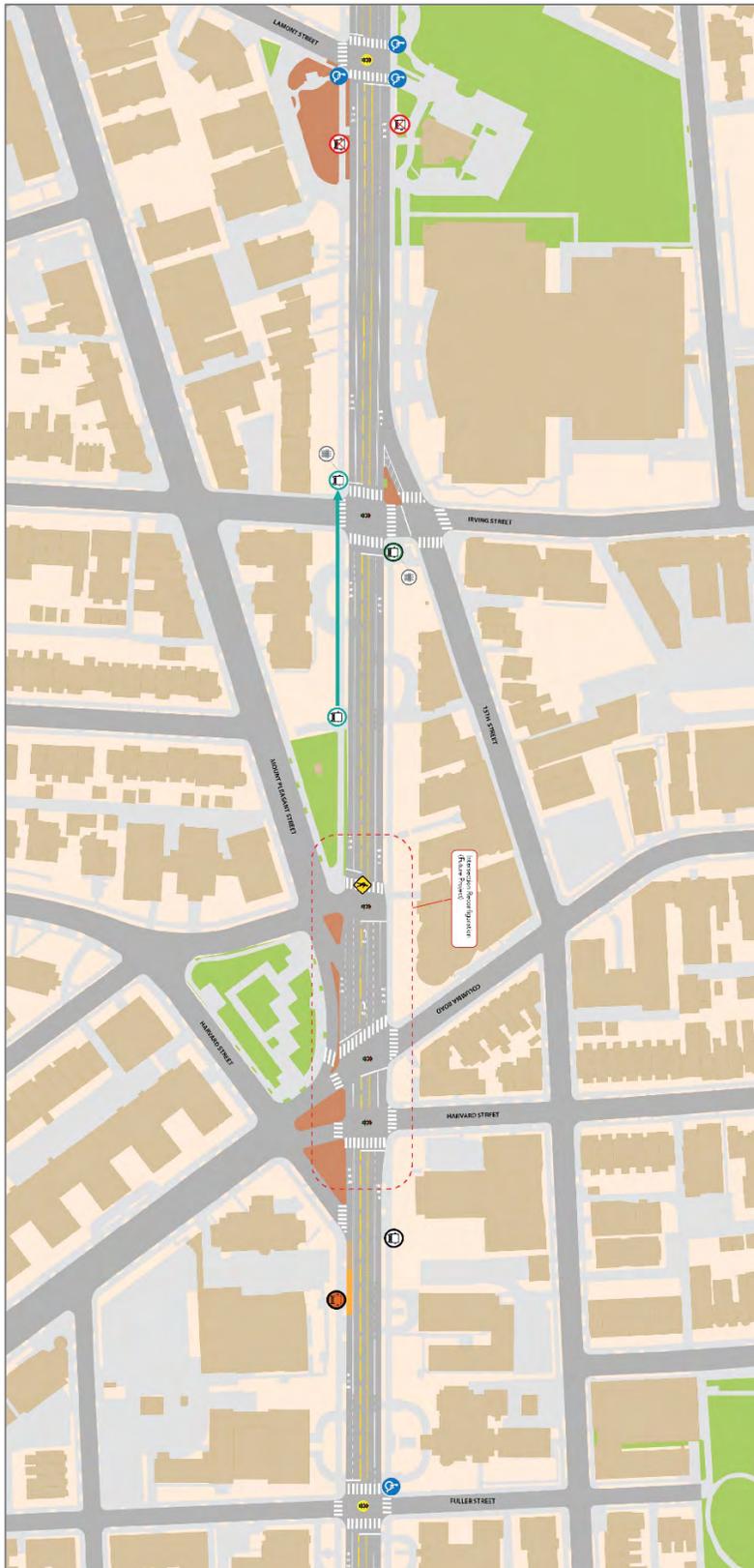


Figure B5 - Recommended Improvements – Fuller Street NW to W Street NW

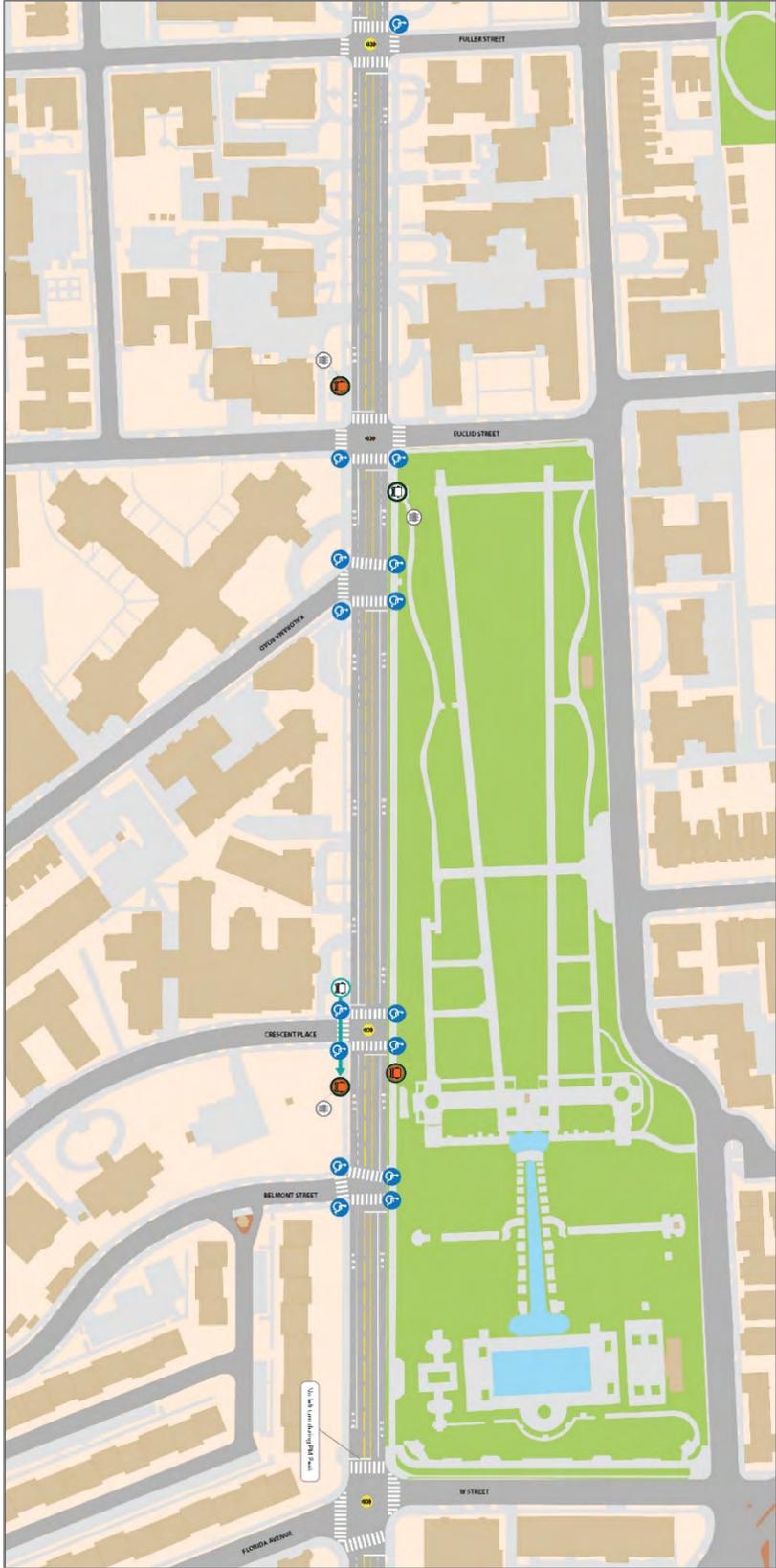


Figure B6 - Recommended Improvements – W Street NW to S Street NW

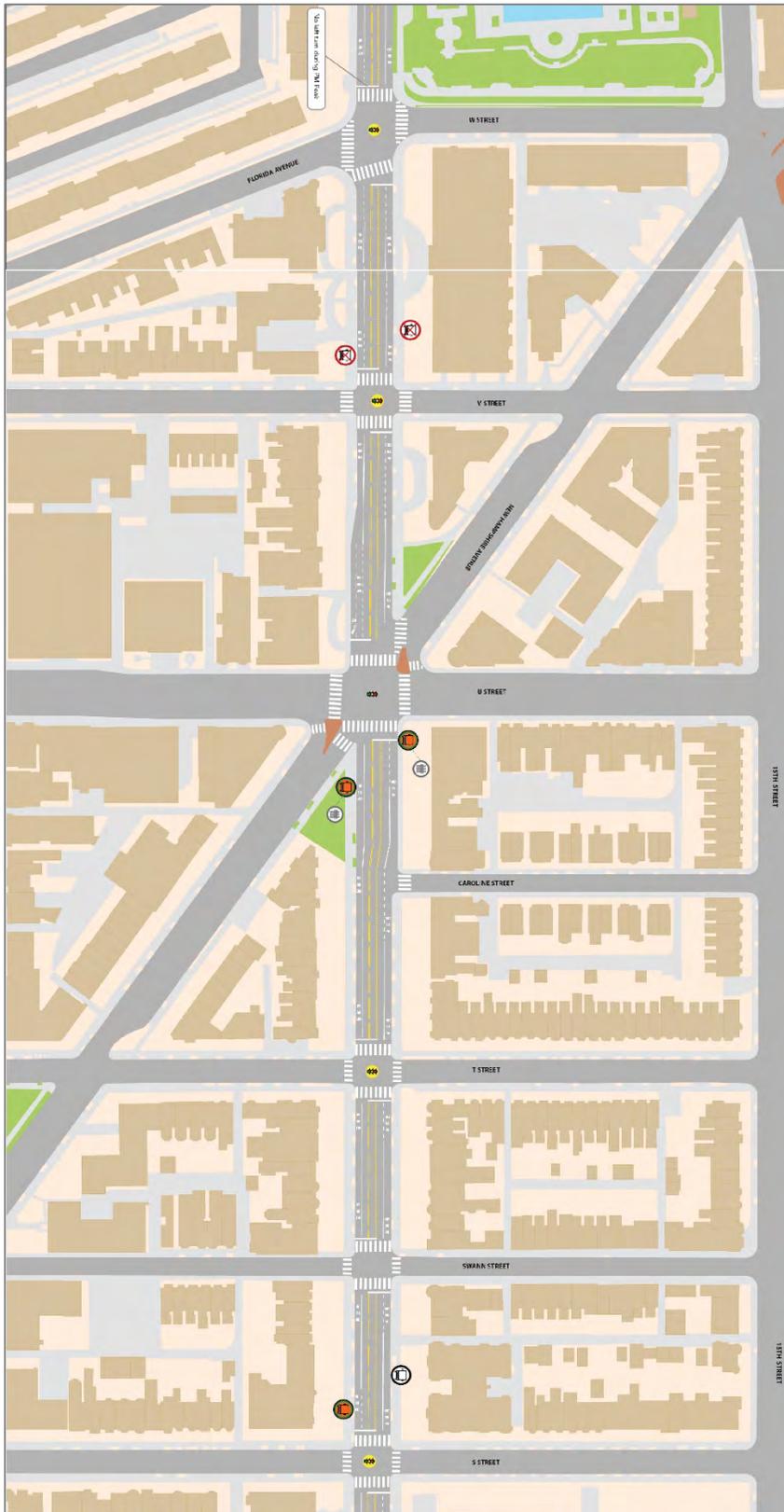


Figure B7 - Recommended Improvements – S Street NW to P Street NW

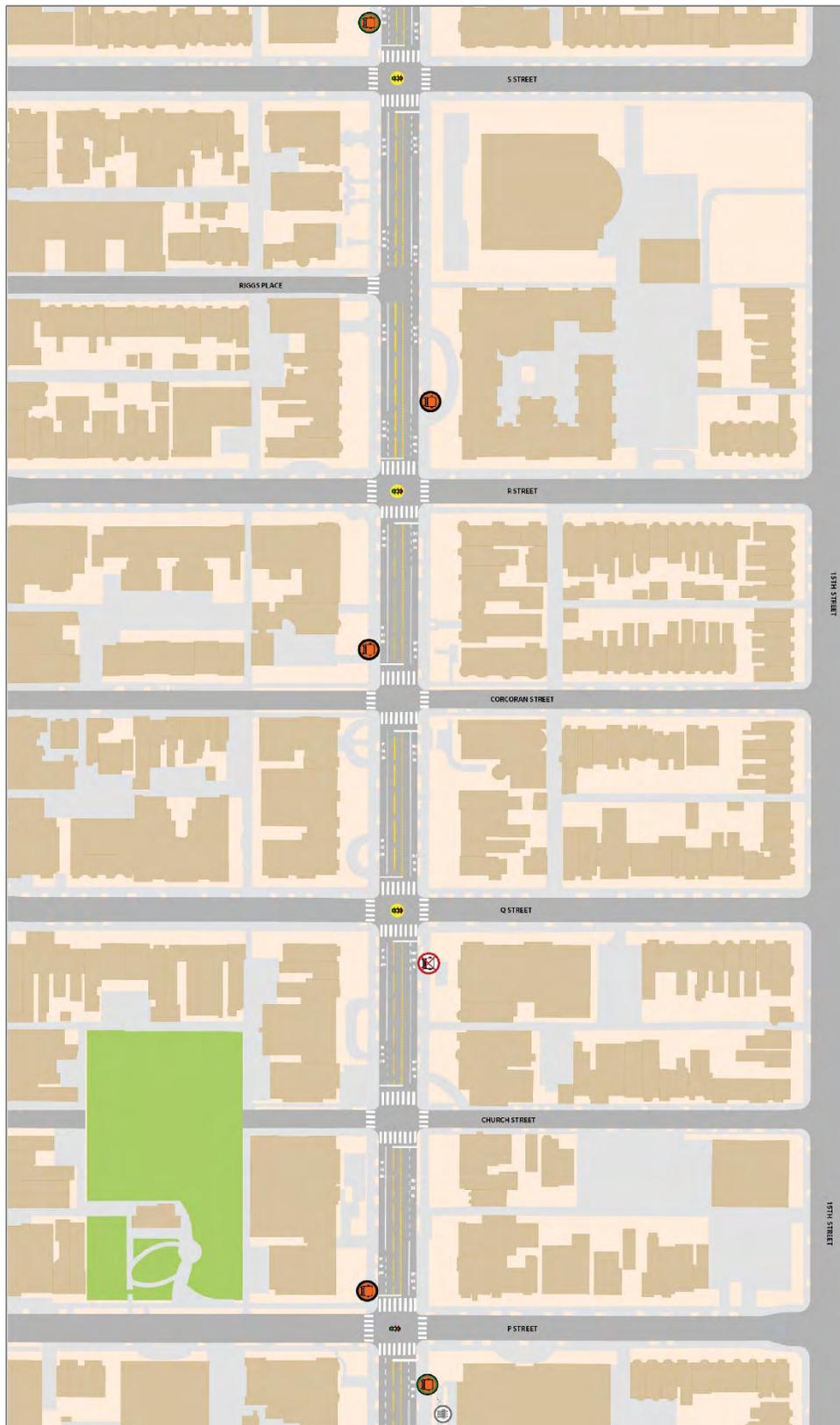
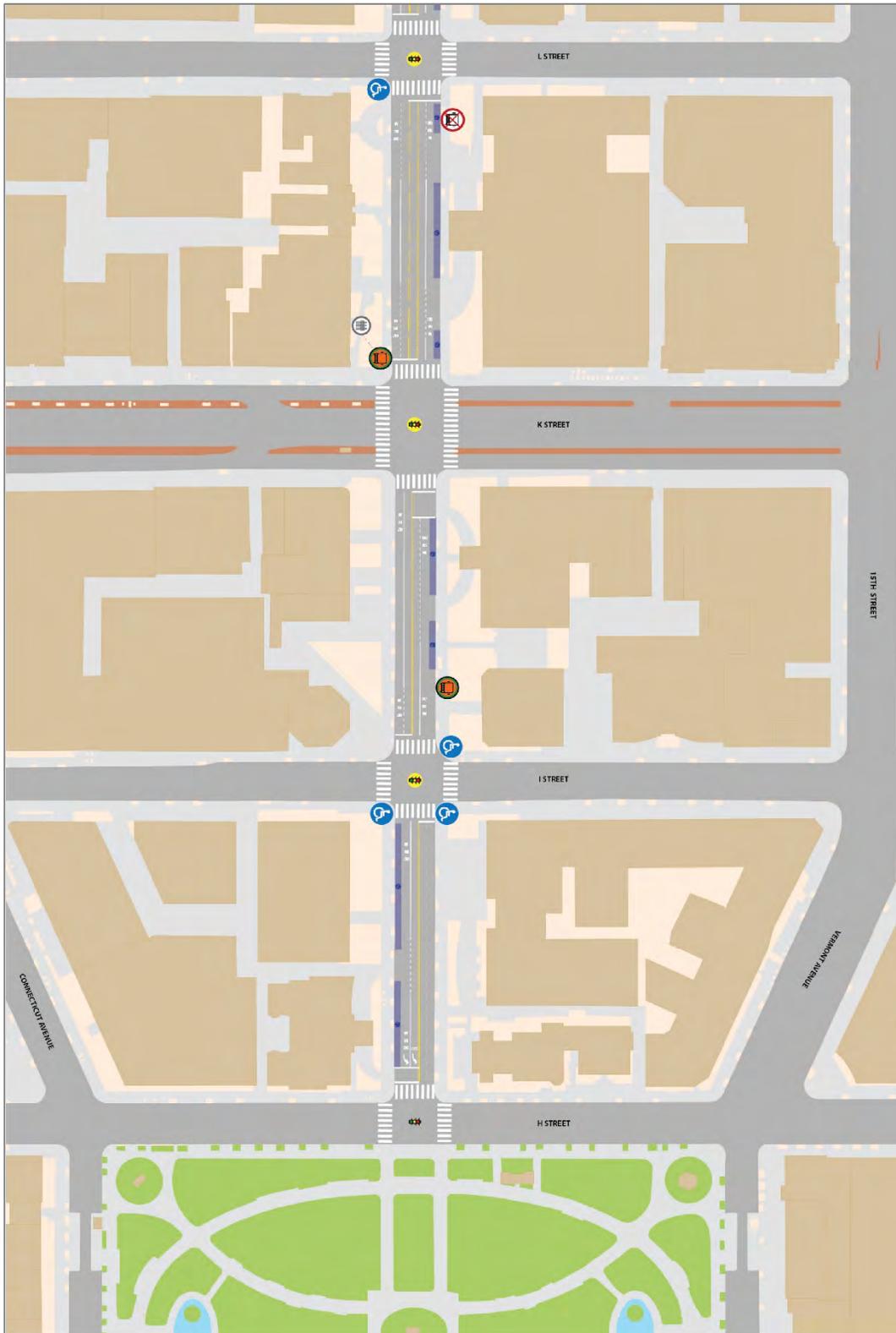


Figure B8 -Recommended Improvements – P Street NW to L Street NW



Figure B9 - Recommended Improvements – L Street NW to H Street NW



C. PARKING IMPACTS

Appendix C summarizes the existing number of on-street parking spaces available in the Primary Study Area, and the impacts the three Alternatives and the Recommended Alternative would have on the number of parking spaces.

Table C1 describes what the extension of the peak periods entails for each of the alternative, while Table C2 summarizes the impact to the number of on-street parking spaces under each alternative.

Table C1 - On-Street Parking Restrictions - Primary Study Area

	AM Peak	Midday	PM Peak	Evening
Existing Conditions	7–9:30 AM	9:30 AM–4 PM	4–6:30 PM	6:30 PM–7 AM
Draft Base Improvements	7–10 AM	10 AM–4 PM	4–7:30 PM	7:30 PM–7 AM
Draft Alternative 1	7–10 AM	10 AM–4 PM	4–7:30 PM	7:30 PM–7 AM
Draft Alternative 2	7–10 AM	10 AM–4 PM	4–10 PM	10 PM–7 AM
Draft Alternative 3	7–10 AM	10 AM–4 PM	4–7:30 PM	7:30 PM–7 AM
Recommended Alternative	7–10 AM	10 AM–4 PM	4–7:30 PM	7:30 PM–7 AM

Table C2 - On-Street Parking Spaces - Primary Study Area

	West Side of Street				East Side of Street				Total			
	AM Peak	Midday	PM Peak	Evening	AM Peak	Midday	PM Peak	Evening	AM Peak	Midday	PM Peak	Evening
Existing Conditions	0	235	120	235	120	300	10	300	120	535	130	535
Base Improvements	0	230	115	230	115	295	0	295	115	525	115	525
Alternative 1	0	0	115	230	115	0	0	295	115	0	115	525
Alternative 2	0	0	0	230	0	0	0	295	0	0	0	525
Alternative 3	0	230	0	230	0	295	0	295	0	525	0	525
Recommended Alternative	4	230	4	230	9	295	9	295	13	525	13	525

Notes:

1. Parking figures provided are planning-level estimates and are intended to serve as a tool for comparing alternatives.

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D. CAPITAL COST – RECOMMENDED ALTERNATIVE

D.1 INTRODUCTION

The following summarizes the preliminary capital cost estimates for the Recommended Alternative. The estimates reflect the conceptual level of design development and the potential for unknown existing conditions. During implementation of the Recommended Alternative, a more rigorous cost estimate, based on detailed design, will be developed to provide a reliable budget-level estimate.

The capital cost estimates, which reflect existing dollars, use cost data from recent transit projects in the Washington, DC area and unit costs provided by the District Department of Transportation. The preliminary capital cost estimates for all alternatives assume 10 percent for plans, specifications and estimates design (PS&E); 12 percent for maintenance of traffic; 15 percent for construction management; and 40 percent for contingency. The contingency level could be reduced as the design of the project progresses.

D.2 BASE IMPROVEMENTS

Table D1 presents the preliminary capital cost estimates for the Base improvements. These costs include bus stop removal/consolidation, bus stop amenities, transit signal priority, and pedestrian safety. The costs also include the relocation of tree boxes, shelters, bus stop signs, furniture, trash cans, and fire hydrants, as needed, for the implementation of the improvements listed above.

Table D1 – Capital Cost Estimates: Base Improvements (Existing Dollars)

Type of Improvement	Description	Total Cost
Bus Stop Removal/Consolidation	Remove shelter and furniture	\$4,740
Bus Stop and Amenity Improvements	Add shelter, expand boarding and alighting area, lengthen bus zones	\$420,407
Transit Signal Priority - Controller	L Street NW only	\$20,000
Transit Signal Priority - Transponders	All buses, all routes	\$195,000
Pedestrian Safety Improvements	Improve sidewalk surface, add Americans with Disabilities Act (ADA)-compliant ramps, add truncated domes to existing ramps, add crosswalk markings, add accessible pedestrian signals	\$172,600
Subtotal		\$812,747

D.3 RECOMMENDED ALTERNATIVE

Table D2 shows the preliminary capital cost estimates for the Recommended Alternative. These costs include the base improvements plus the cost associated with implementation of peak period/peak direction bus lanes; unit costs for bus lanes with bus-only lane signage, and lane striping and marking; and cameras for automated enforcement every two blocks in each direction and onboard the buses.

These preliminary cost estimates include lane striping and signals for shifting lanes between Irving Street NW and Mt. Pleasant Street NW, Columbia Road NW and O Street NW, and M Street NW and K Street NW; replacing parking signs to change parking restriction; and implementing off-board fare payment for all stops. In addition, the cost estimates include reconstruction of a traffic island at the Mount Pleasant Street intersection to accommodate the recommended lane configuration.

Table D2 - Capital Cost Estimates: Recommended Alternative (Existing Dollars)

Type of Improvement	Description	Total Cost
Base Improvements		\$812,747
Lane Shift Striping	Between Irving and Mt. Pleasant Streets NW, Columbia Road and O Street NW, and M and K Streets NW	\$19,752
Lane Shift - Signals	Between Irving and Mt. Pleasant Streets NW, Columbia Road and O Street NW, and M and K Streets NW Every two blocks in each direction	\$150,000
Changes in Parking Restrictions	Replacement of signs	\$37,375
Off-Board Fare Payment	All Stops	\$750,000
Automated Enforcement - Cameras	Every two blocks in each direction	\$1,760,000
Automated Enforcement - On-bus Cameras	65 buses to be retrofitted	\$650,000
Mt. Pleasant Street Traffic Island	Reconfiguration and relocation of traffic signal	\$27,550
Subtotal 1		\$4,207,424
PS&E Design (10%)		\$420,742
Maintenance of Traffic (12%)		\$504,891
Construction Management (15%)		\$631,114
Subtotal 2		\$5,762,170
Contingency (40%)		\$2,305,668
TOTAL (Subtotal 2 + Contingency)		\$8,067,838

E. CONCEPTUAL DESIGNS – ARKANSAS AVENUE NW AND SACRED HEART WAY NW

Appendix E presents the conceptual designs developed for the potential improvements at the 16th Street NW intersections with Arkansas Avenue NW (Figure E1) and Sacred Heart Way NW (Figure E2).

Figure E1 – Conceptual Design for Arkansas Avenue NW Intersection Improvement



Figure E2 – Conceptual Design for Sacred Heart Way NW Intersection Improvement



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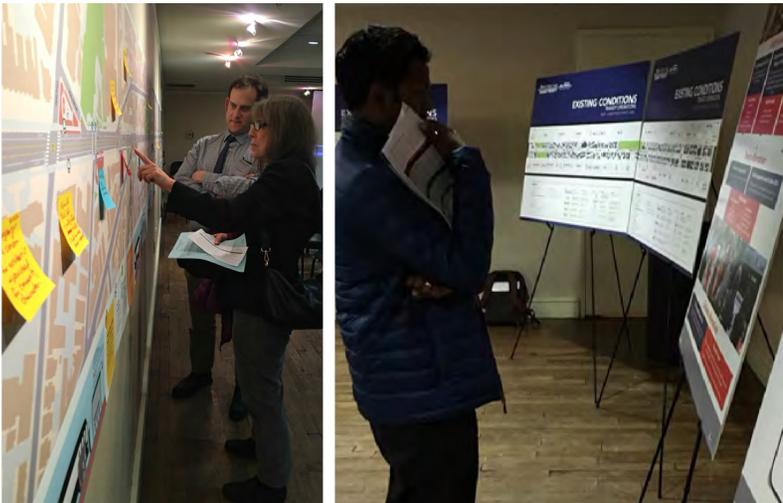
F. Final Planning Meeting Summary

16TH STREET NW TRANSIT PRIORITY



SUMMARY OF FINAL PLANNING STUDY PUBLIC MEETING

January 21, 2016



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On Thursday, January 21, 2016, the District Department of Transportation (DDOT) held the final public meeting of the 16th Street NW Transit Priority Planning Study. moveDC, the District’s Multimodal Long Range Transportation Plan, identified 16th Street NW, which runs through Wards 1, 2, and 4, as a priority corridor for transportation.

The purpose of the meeting was to provide an overview of the project, present the Recommended Alternative, discuss implementation and phasing, and gather feedback. The meeting was open-house style with two opportunities for participants to hear an overview presentation about the process and the Recommended Alternative.

MEETING QUICK STATS

Date

January 21, 2016

Location

Washington DC Jewish Community Center

Time

3:30 pm - 8:00 pm

Presentations at 4:00 pm and 7:00 pm

- ◆ 70 meeting attendees
- ◆ 34 Title VI respondents
- ◆ 400+ comments received

GETTING THE WORD OUT

Outreach efforts

- » Emails to over **3,500** subscribers to the listserv
- » Nearly **500** rack cards and posters, in English and Spanish, distributed along 16th Street corridor
- » Social Media blasts to **2,000** followers through Facebook and Twitter
- » All **10** Advisory Neighborhood Commissions within the study area notified
- » Public meeting announcement issued by DDOT to the press

**16th STREET NW
TRANSIT PRIORITY** Planning Study

moveDC, the District's multimodal transportation plan, identified 16th Street NW as a transit priority corridor. The District Department of Transportation (DDOT) and Washington Metropolitan Area Transit Authority (WMATA) conducted technical analyses to identify sources of bus delay. In addition, DDOT collaborated with the community, businesses, Metrobus riders, commuters, local and regional agencies, and other stakeholders to develop draft short-, mid-, and long-term solutions.

STUDY AREA

Primary Study Area
Secondary Study Area

Arkansas Avenue NW
Taylor Street NW
Irving Street NW
Columbia Road NW
U Street NW
R Street NW
H Street NW

18th Street NW
16th Street NW
14th Street NW
12th Street NW

STUDY PROCESS

Public and Interagency Involvement

Identify Issues and Collect Data

Develop Alternatives

Evaluate Alternatives

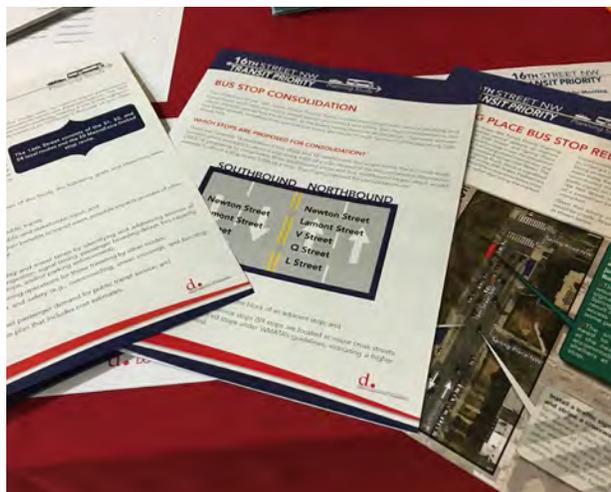
Select Preferred Alternative

RECOMMENDATIONS

move dc d. DC WE ADE GOVERNMENT OF THE DISTRICT OF COLUMBIA MURIEL BOWSER, MAYOR

MEETING MATERIALS

Handouts



Title	Description
Executive Summary	Overview of the study, goals and objectives, planning process, alternatives considered, and the Recommended Alternative
Bus Stop Consolidation	Description of the stops recommended for consolidation, including location, approximate distance to adjacent stops, and the benefits and impacts of implementation
Spring Place Bus Stop Relocation	Options examined to improve pedestrian safety at 16 th Street and Spring Place bus stop

Boards

Title	Description
Project Overview & Planning Process	Study goals, objectives, and planning process
Existing Conditions: Pedestrian Safety & Bus Facilities	Challenges to pedestrian safety and bus stop facilities including lack of crosswalk, non-ADA accessible bus stops, and bus stops without a bus shelter
Existing Conditions: Transit Operations	Challenges to operations including bus delay, congestion, and high boardings/alightings
What We Heard from You	Feedback from the public throughout the planning process
Recommended Alternative	Summary of proposed improvements
Plan for Implementation	Summary of implementation including phasing and responsible agency

Wall Map

A large wall map of the study area was presented to illustrate the recommended roadway configuration, bus stop improvements, and pedestrian safety and access improvements. Meeting attendees were able to submit comments on specific locations or improvements using sticky notes.



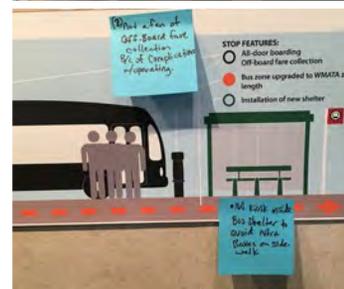
HOW WE HEARD

The project team provided different opportunities for the public to submit their ideas, concerns, and general comments during and after the meeting:

- » Sitcky notes to comment on a wall map of the 16th Street corridor, which identified improvements from the Recommended Alternative
- » Comment cards
- » Title VI comment section
- » One-on-one and group discussions
- » Emails before and after the meeting

During the meeting, attendees provided over 80 comments. By January 29th, the project team received:

- » 30+ emails
- » 130+ letters collected by the Coalition for Smarter Growth
- » 260+ signatures for a petition posted on Change.org (170+ online, 90+ hand delivered)

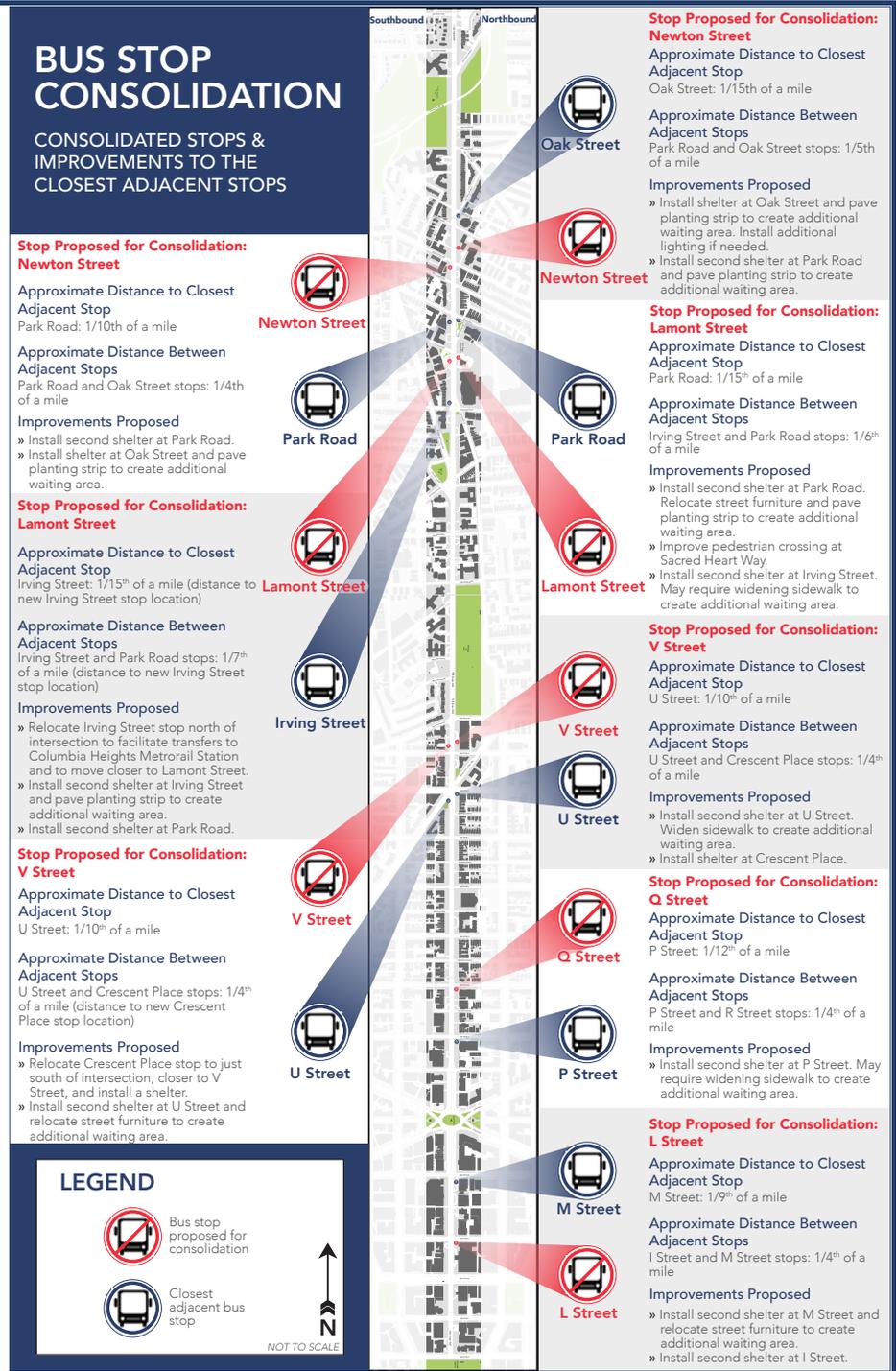


WHAT WE HEARD

The community expressed their support and concerns about the Recommended Alternative and suggested other improvements and considerations.

Many comments expressed general support for the project and Recommended Alternative, including bus lanes, off-board fare payment, and bus stop consolidation. However, bus stop consolidation was also an area of concern for many community members.

For the Newton Street stop, some commenters suggested consolidating the Oak Street stop instead of Newton Street, as Newton continues farther west through Mt. Pleasant. Another area of concern expressed by the community was the addition of a fifth center reversible lane between W and O Streets, including pedestrian safety at unsignalized crosswalks and narrow lane widths.



Other Suggestions

- » Consider that signage for reversible lane and large kiosks may detract from the historic viewshed.
- » Involve DC students in the design of kiosks to reflect the city's history and culture.
- » Put kiosks for fare payment inside of the shelters to avoid extra boxes on the sidewalk.
- » Organize a design competition for bus shelters.
- » Study congestion/obstruction caused by school bus off-loading at southbound Park Road.
- » Consider developments north of the study area to assess congestion in the future.
- » For reversible lanes, consider using lights on roadway rather than lighted signs on side of road. Imprint in lights "NB" or "N" for northbound in green and then switch to "SB" or "S" for southbound.
- » Improve signage at Columbia Road/Mt. Pleasant Street intersection for pedestrian safety.
- » Consider a study on the 14th Street bus service to alleviate crowds on 16th Street buses.



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APPENDIX

PARTICIPANT COMMENTS

Note: These are the raw comments that participants provided through comment cards, Title VI, sticky notes on map, emails, and letters through January 29, 2016.

Comment Card

1. No Loss of Bus Stops. Hardship for elderly, disabled. 1 ½ minute “alleged” time savings not worth the convenience. Seems like you are catering to commuters and not considering center city people who use those bus stops. It is a reduction in services.
2. NPO/ SHPO/ CFA will have issues on Impact on historic features. Need more bus stops not less. Snow days & many bus routes are not served/ what about changes.
3. I approve consolidation of Newton, Park, Lamont etc.
4. 16th Street is certainly extremely dangerous for bikes. (Could something be done for that. Improve pavement, calm car traffic, educate bus drivers)?
5. For reversible lanes, perhaps you can use lights on roadway rather than lighted signs on side of road. You could imprint in lights “NB” for Northbound or N in green and then switch to SB or S in lights on that road lane.
6. #1 Priority should be to alleviate the bunching –lights? #2 do not consolidate- most of the planned stops are used by hard working shift-folks #3 Involve DC students in design/coatings of any kiosks etc. to reflect the city/ history/ cultures #4concern about the trees – plant at least 1ft further back from the curbs.
7. Do not eliminate Newton Street stops, did not observe interpretation or materials available.
8. 1. Cars are not historic. It’s good to pay some attention to this issue, but I hope it doesn’t overtake common sense. 2.Seems thoughtful, but also seems like Newton Street should stay 3. Support bike lane- we need to adjust driver sense of reality & stop enabling them 4. Parking is not a right and it isn’t the government’s job to provide storage space – this should go to the bottom of the list of considerations.
9. Bus stop consolidation needs to be rethought. A slightly longer walk is not a problem for some but a BIG problem for others – parents with toddlers, aged & infirm, people carrying heavy items, people arriving or boarding at night and bad weather. You may end up with more people driving than not because you are making it harder to travel by bus. For example, the Q Street stop elimination would eliminate a convenient stop where many people live in the apartment buildings and is a vibrant area with the DC JC right next door or business on 17th Street
10. Thank you for all the work done to improve transit on S routes. I am very much in agreement with not truncating the S2/ S4 at McPherson because I would like to maximize transit to MLK library. I am concerned about the loss of the Lamont stop as it is the stop for Mount Pleasant library but if it is a trade-off for keeping Federal Triangle service it is acceptable.
11. Please leave V Street stop. Lots of people there at peak travel. 15-20-25 people not unusual. Why swap them all to V Street? DC Law should require motorists to yield to buses leaving a bus stop. This area has become a lot busier in the last few years and many more people board buses here than even in 10 years ago. Making people walk further and wait in long queues to board a bus doe not make for a more livable walkable city.
12. Possibility to improve data feeds to next bus and other systems. Buses appear/ disappear in apps all the time. Please please please don’t truncate S1 service. Stop consolidation is good option – thank you for proposing thoughtfully. Great jobs on the materials and presentation.
13. Addition of 5th lane using reversible lanes between W&O is a major concern for several reasons: 1.) This is an historic district, with a grand vista to the White House. Signage for reversible lane & large kiosks will detract from the historic viewshed 2.) This is a heavily populated section of 16th Street – all residential. Crossing @Swann, Church, Corcoran are un signaled; reversible lanes & more lanes will be a problem for pedestrians. The number of residents in this section of 16th Street & adjacent blocks is very high.
14. I support these bus lanes 100%. Please stay strong against those trying to water it down. Also hope you guys accelerate this project because two years seems way too long to wait. But, I am happy to see DDOT finally committing to this! Thank you!
15. How will a 5th lane fit between W.O & U.H.? Where does space come from sidewalks (which I’d oppose). Bus lanes should be wider than whatever is on 7th through Chinatown, which is often blocked by vehicles in the adjacent lanes. How will off board fares and all door boarding

- apply beyond the study area, particularly into MD?
16. How effective is auto enforcement? Will it require cameras every block? (If so, is this reflected in cost estimate, \$6M seems low) Have citations (in other jurisdictions) held up in court? Presentation should average travel time. What about standard deviations reliability?
 17. Love the proposed alternatives, 100% and 5.9 minutes a day in favor of proceeding!
 18. I am excited about the recommended alternative! If anything I wish it could happen sooner, 2-4 years is a long time. I am a little disappointed that the bus lanes are peak-hour only, esp. given the finding that off-peak trips are basically as slow or even slower right now. Also it may make enforcement harder, e.g. because of no paint. I also wish the TSP was for all buses, not just late ones, but understand the concerns.
 19. About recommended alternative... - strongly concur with 5th lane on 16th Street (O-W St) - strongly concur with automated bus lane enforcement - strongly concur with off-board payment – and on-board enforcement... fare payment - strongly concur with extended peak-period hours for bus lanes - in favor of bus-stop consolidation (for entire 16th Street corridor, please!), even though I am a user of the Q Street stop.
 20. The transition between the 5-lane cross-section and the 4/6-lane section through Scott Circle definitely merits further study from a safety POV. I would support further extension of parking restriction if that would improve bus reliability. My only hesitation is that the 7a-9:30a and 4-6:30 pm peak restrictions are pretty standard District-wide, and having one corridor with different hours would be confusing. Part-time parking lanes are already dangerous enough; I'd support an all-or-nothing approach to parking. I'd also support an aggressive program of bus stop consolidation. Walking an extra 2 min to the stop is not a reason to make all other riders continue to be inconvenienced.
 21. Please do not eliminate the Newton Street bus stop. Many riders live near the stop – including me. Here are some other reasons: 1) Elderly people need this stop; the walk to park will be a new significant burden on them -- & me I am 6. 2) The 5-9 already provides limited-stop service for folks in a hurry. Jim Wagner, 3426 16th St, illegible email.
 22. How is off-board payment enforced?
 23. Did you consider only allowing people to disembark at the back door? How did that compare to all door boardings (I just imagine the delay from people trying to get off the bus too).
 24. The # of public meetings is impressive. Great presentation. I support the recommended alternative. Well thought out. Will be interested in possible analysis of a headway system during peak times.
 25. Please send more buses more often to avoid overcrowding. I support dedicated bus lanes on 16th Street
 26. 16th & L Street NW – Last night about 8:15 PM – not in service busses went by & people were left standing for at least 20 minutes. I walked.
 27. Please keep the Q street stop. It is used heavily by very young children and senior citizens who attend programming at the DCJCC.
 28. You did not mention delivery needs to commercial business. How are you going to manage vehicle standing? 9' lanes are not federally compliant. LOS will increase.
 29. 1) No bus stop removal (and stop using the Orwellian term "consolidation), 2) All S2S & S4S to and from Federal Triangle (the S4 cutback was done with no notice), 3) DDOT needs to communicate with citizens, not "CAG"s, so that people can defend themselves from DDOT's bad ideas.
 30. I fully support the proposed changes, especially the peak hour bus lanes. I understand that lanes would impact car travel lanes, but I hope that they can become permanent someday. The addition of off-board fare collection and all-door boarding at some stops will also help keep the system efficient. I support these as well.
 31. To reiterate: 1) Newton Street is an access road to a large area of Mt. Pleasant: Ingleside, Oakwood, Nursing Home, Bancroft School, large apartment buildings, Street Stephan's church (8 social service agencies are based here) – all of this equals 100s of bus users – many more than Oak Street 2) Safety issue because of added walking distance in dark 3) ageing in place becomes much more difficult.
 32. Please don't remove the Q street stop. Bus drivers are sometimes very rude to customers and especially to tourists who ask questions Bus drivers don't know their routes and how to help customers get to their destination. I prefer "honor" system instead of bus big brother inspections.
 33. Please preserve the 16th Street & Newton bus stop for S busses. There are many large residential buildings there and the bus stop is always full in the morning. In addition, there are three churches at that intersection: St Stephens, Canaan Baptist, and one other. St Stephen's houses many youth groups and other programs for vulnerable populations. These are the citizens most in need of public transportation and removing the bus stop would make difficult for the needy to get to the churches.

Title VI Form

1. Well organized.
2. Support it 100%! Just hope you guys can speed up the project. Waiting two more years is frustrating.
3. See attached.
4. Restroom soap dispenser, all door not ADA compliant. No accommodations for blind or deaf. Materials not compliant. PowerPoint not visible at bottom. Poorly design. Room too dark to see posters. Poster set too high.
5. Please preserve 16th & Newton NW bus stop!!! Dedicated bus lane please.
6. Please do not eliminate the Newton....
7. Nice Maps.
8. Nice job!! Keep it up!!
9. I've attended all the meetings but can't stay until the 7pm presentation.
10. I really think your arguments for removing the bus stops are very weak and do not justify the hardship they will create.
11. I oppose consolidation of Newton Street stops.
12. How will 5 lanes affect street trees?
13. Great to see improvements like dedicated lanes and headway service - Very Exciting.
14. Great project, I love it, keep going.
15. Filled out comment card.
16. Concern for shift workers and lost stops.
17. Comments on project card.
18. Appreciate all the work that has been put into improving bus service.
19. "Please do not eliminate the Newton Street stop. Many riders use the stop - including me. Here are other reasons: 1 - Elderly people need this stop. The walk to park will be a new burden to them and me - I am 61. 2- The S9 already provides limited stops for folks in a hurry."
20. I came to voice opposition to bus stop elimination, but have a distinct feeling based on the speaker & the literature that you have already decided you are going to remove the stop.
21. I think the best would be to figure out how to reduce bunch up. "Real-time" sign in the shelters a help.
22. "I think that behavioral issues on the part of bus riders and nearby car drivers/taxi drivers have more of an impact on travel time than structural factors discussed such as off board payment kiosks. If the bus drivers announced or if these were automated announcements, telling young people to move back and leave seniors seats for seniors and handicapped, that would speed boarding and disboarding. If the buses had special honks or loud speakers to keep taxis and cars out of bus stops, that would help too."
23. There was a lot of info to digest and more (e.g. the outline on screen) would be better. As to the plan to consolidate stops, particularly eliminating the Q Street stop: you need to think more about pedestrian who use the buses. A ""slightly longer"" walk to a healthy walker, w/o toddlers in ton or significant baggage when there is no rai or snow and in daylight is not a problem. But any one of the above - age, disability, young children, bad weather, night time, makes any longer walk a big problem. Please give more consideration to this.
24. Comment: solve the congestion/obstruction caused by school bus off loading at southbound Park Road.
25. Challenge of right turning automobiles.
26. Love the boards, love the presentation, wouldn't necessarily open to question at the end as a grap, maybe close so one on one questions/ answers can occur. The meeting the audience questions were great, in general, can drag on.
27. Projection screen was a bit blurry and unclear.
28. For reversible lane perhaps we could imprint the reversible lane with the letters "NB" or "N" and then "SB" or "S" when we switch that reversible lane.
29. Developments north of the study area will affect riders south with crowded buses in the future.

Wall Map

1. Concern of canopy heights and buses.
2. Concern about lane widths for buses.
3. Concern of V Street Consolidation.
4. Support of V Street Consolidation.
5. Make a design competition for bus shelters.
6. Support for dedicated bus lanes for all of 16th street.
7. Newton Street.
8. Bus stop consolidation is tough for people trying to age in place.
9. Funerals on newton and 16th Street occur, what would they do with the bus lane.
10. Newton stop consolidation is concerning.
11. Lit signage and kiosks is a concern for the aesthetics and viewshed for community character.
12. School at Park Road has loading that affects traffic. This should be solved before implementation.
13. Long term idea- Build a metro line below 16th Street.
14. Build driver education for right-turns in front of buses- especially at Park Road.
15. Lamont Street stop consolidation is concerning.

16. 16th and Irving- Differentiated timing of traffic lights north and south makes this intersection very dangerous for pedestrians.
17. Concern for aesthetics of the off-board fare collection kiosks.
18. I like everything, do it all! Nice graphics.
19. 5 lane configuration at Swann, Corcoran, and Church- there is a concern about spacing.
20. Concern about Q Street consolidation.
21. Support removal of L Street stop.
22. Don't like off-board fare collections because of operating complications.
23. Put kiosks for fare payment inside of the shelters to avoid extra boxes on the sidewalk.

Emails & Phone Calls

1. I am a 16th Street resident writing to express concern regarding the 16th and Newton bus stop. This bus stop is very important to us, and removing it would cause much inconvenience for the residents of several dense multi-family condo and apartment buildings within a 1 1/2 block radius. The Newton Street stop is well located and its cover on the East side of the street is highly beneficial. By contrast, the stop at Oak Street has no cover and is a much less convenient and desirable stop. Oak Street is not as close to high-density buildings, and passengers getting off the bus at Oak Street must step into the foliage since the sidewalk is not properly landscaped for a bus stop at that location. I am against removing any bus stops because providing convenient bus access is the best way to reduce congestion on 16th Street. However, if a stop must be removed, please keep the 16th and Newton stop as-is and consider removing 16th and Oak instead."
2. When you say the route would truncate at McPherson Square -- where exactly do you mean? What intersection? I've actually never understood which routes are which from the timetable: 1) which routes go down to H but stop at 14th, 2) which routes go down to K and loop around Franklin Square as far east as 13th Street. I often take the bus from my home Southbound down to K, then on K Eastward to 13th, then on 13th Southward to I, then on I West Ward toward 14th. (the east entrance to McPherson). Is that the "truncated route" you are proposing all-day? OR would it be 16th to H, then Eastward on H to 14th and turning north on 14th ending just south of I. EITHER WAY: I feel like a transfer during rush hour is more feasible than midday. My gut feeling is to accept/support truncation of all routes during peak hours, but (at this time) I do not support truncation midday. BUT I am open to hearing other opinions. STOPS REMOVAL: Southbound: RIGGS HAS HAD ZERO BLOWBACK, I

SUPPORT NEWTON, I DO NOT (at this time) SUPPORT LAMONT OR V. Northbound: I SUPPORT L, LAMONT, AND NEWTON, I DO NOT (at this time) SUPPORT Q OR V, QUESTION: why did you recommend removing Q southbound BUT NOT removing Q northbound? Curious. There are stops at P and R in both directions..."

3. In the last three days, more than 200 people have signed either an online or paper petition to 1) oppose any removal of bus stops on 16th Street NW, and 2) support service to and from the Federal Triangle on all S2 and S4 trips It's clear that there is strong citizen opposition to DDOT's proposals on these two points. It is time for DDOT to drop the bus stop removal plan and restore service south of H Street NW for the S2 and S4. The online petition is here: <https://www.change.org/p/megan-kanagy-dc-gov-preserve-local-bus-service-on-16th-st-nw> The paper petitions will be presented at the meeting at the JCC meeting this afternoon. Cordially.
4. As a 16th Street homeowner and father of small children, I oppose eliminating stops for the S2 and S4 routes, for three main reasons: - BENEFITS SUBURBAN COMMUTERS OVER DC RESIDENTS: Eliminating stops on the local S-bus routes disadvantages DC residents and transit users, in favor of solo drivers -- many of whom reside and pay taxes outside the District. - IT WON'T WORK: 16th Street simply cannot accommodate all the cars that use it daily. Congestion will only be relieved when the S-buses get a dedicated lane, which will make bus service more reliable; then, more people will ride the bus and take their cars off the road. - VIOLATES "VISION ZERO:" If DC is serious about ending traffic deaths, then 16th Street needs a "road diet," not initiatives intended to speed up traffic. More specifically: Don't eliminate the stop at 16th and Newton Street NW. It is particularly well used stop, with a nice shelter, within 1.5 blocks of several multi-family buildings, including my home. If you must remove stops, eliminate the Oak Street stop (not as close to any multi-family dwellings; poorly maintained berm).
5. I attended the meeting this afternoon and greatly appreciated your clear and comprehensive review of the plans. I don't live along the 16th Street line but do use it occasionally (and have friends who use it regularly) so have some interest I left some general written comments, but afterwards remembered one other very specific concern I've had for awhile about the intersection where 16th, Columbia, and Mt. Pleasant come together. One of my ongoing concerns with DDOT's engineering is the failure, at a number of signalized intersections around the city, to place traffic signals where pedestrians can see the signal. 16th & Columbia is signalized but because Mt. Pleasant converges with 16th here, the crosswalk for pedestrians on the west side of the intersection

(i.e. for pedestrians who want to cross Columbia) comes in at an angle. That crosswalk also does not have pedestrian signals on either side and it is difficult to impossible for peds to see the vehicle signal on 16th because of the angle -- if they even realize they need to look for it. Streetview is here: <https://www.google.com/maps/@38.9265602,-77.0366536,3a,75y,180h,90t!/3m6!1e1!3m4!1st6AkJSeyOGNxMYGhnphgKw!2e0!7i13312!8i6656!6m1!1e1> . This seems dangerous and unfair to both pedestrians and drivers and this would be a good time to fix it. Is this issue on your radar?

6. I understand that this may have already been decided, but I wish to provide my support via email to ThriveDC's request that these bus stops not be removed as they are essential for some of their vulnerable clients to access their services. BeStreet
7. I hope this finds you both well. Due a work deadline I'm unable to make the public hearing this afternoon; however, I wanted to provide my thoughts on the proposed bus stop removals. I live on the corner of 16th and Newton Streets. I moved to the neighborhood a year ago as renter, and now own a home. I chose the location in part due to the close proximity to a bus stop. Due to the number of residences - homes and apartments - in and around Newton Street I believe considering the Newton stop for removal is ill advised. I understand there's congestion on 16th Street, but I would propose as an alternative the nearby Oak Street stop as it has fewer people waiting for the bus in the mornings and evenings. Even this morning after last night's snow, there were at least 20 people waiting for the bus to go downtown, and five of us heading northbound at the Newton Street stops, while no one was at Oak Street in either direction. I'm happy to speak with your further, and I appreciate the opportunity to provide my input into the process. WarmeStreet
8. Please see email below from Metro's Board regarding your proposal to remove bus stops in downtown, Dupont, and Columbia Heights. They write that your proposal [sic] "were recommended by DDOT" -- in past tense. If this is true, and you've already submitted your recommendation to them, then why are you leading us to believe you are still seeking public comment on this issue? I attended your meeting last night at the JCC, but honestly, it felt more like a presentation on what you've already decided than a true public meeting seeking input. You spent very little time on the subject of bus stop removal, and a glossy color handout of all the stops you want to remove left me feeling like it was a done deal, which Metro's email has confirmed. You said in your presentation that you estimated a (maximum) time savings of 90 seconds per trip by removing all the bus stops. That is so little time for the amount of inconvenience and bus-stop crowding you will be creating by removing stops in high-

density areas. Further, the time-saving argument may be relevant to express bus service, but local bus service should not be measured by the same yardstick. I also came away with the impression that your study is designed solely to appease rush-hour commuters. Your talk focused almost exclusively on reliability and travel time, as if you envision 16th Street as some high-speed commuter corridor. The concepts of "convenience" and "accessibility" -- important to those of us who live and shop here, as well as our elderly and disabled communities -- were never mentioned. While the needs of commuters are certainly important, they don't have to come at the expense of center city residents. There are many ways to improve travel time and reliability without removing bus stops.

9. Today I learned of a disturbing plan to remove the bus stop at 16th Street & Newton Street NE. While just a bus stop to most, this bus stop directly services St Stephen's and the Incarnation Church and thereby provides our most vulnerable residents with access to numerous desperately needed services. St Stephen's houses more than ten non-profits and offers meals seven days a week, including holidays -- one of the few places in DC who does so. One of these non-profits is Thrive DC. Years ago, I became familiar with Thrive DC while working with clients and staffing intake in an office space Thrive DC provides for the Washington Legal Clinic for the Homeless. Since then, I have been impressed by the breadth of work they engage in, their effectiveness, and their compassion. Thrive DC is a social services agency that provides services for people who are low income and/or homeless. Thrive DC offers numerous services including, but not limited to, an employment program, case management, meals, a computer lab, showers, laundry facilities, mail services, emergency groceries, and a safe, welcoming, space. Some of these offerings, such as showers and laundry facilities, are rarely offered in the District and help provide basic necessities and dignity. It is critical that those in need, including those with physical challenges, can reach these important, low-barrier services daily and the bus stop located at 16th Street & Newton Street NE provides this direct access and is more affordable than the Metro (and much closer). Removing this bus stop would significantly reduce access to Thrive DC and the life changing, and often life-saving, programs offered there. In short, removing the 16th Street & Newton Street NE bus stop will disproportionately harm the most vulnerable members of our community -- those we should be protecting -- children, the elderly, veterans, and all vulnerable individuals and families in need of help. As such, the bus stop at 16th Street & Newton Street NE should not be removed. I hope you understand the atrocious impact the remove of the 16th Street & Newton Street NE bus stop would have and advocate for the need and existence

of this bus stop. Please feel free to contact me if you have any questions.
BeStreet

10. I'm writing to you about the proposed elimination of bus stops along the S routes on 16th Street at Lamont and Newton. These stops have always appeared to be heavily utilized to me (going both south and north) by members of the community and people traveling to Columbia Heights and Mount Pleasant. Additionally, the Lamont Street stop is the closest bus stop to the Mount Pleasant Library--the only library in Ward One. It seems critical to me that community members are able to access the library and its resources via public transit. I am not able to attend the community meeting on this matter, but hope that you will consider the suggestions of the community and keep bus stops at these critical locations. BeStreet
11. I am a former service provider at Thrive DC, located at the corner of 16th and Newton Street NW. Thrive DC is a social services agency providing emergency and step-up services to the homeless and low income members of the Washington DC metropolitan community. I am writing to express my vehement opposition to the removal of bus stops located at 16th and Newton Street. These bus stops provide access to our services for some of our most vulnerable community members. Our clients travel from all over the city to get to us and the bus is their primary mode of transportation because it is most affordable and currently convenient. Because we serve individuals with physical challenges, economic challenges, and housing insecurity and because we provide critical, low barrier services daily such as hot meals, showers, laundry and mail service, emergency groceries among many other services, it is absolutely critical that our clients be able to reach us. Removing the bus stops in front of our facility will significantly reduce access to our often life saving programming for those who struggle in so many ways. Additionally, the 16th and Newton street bus stop provides access to St Stephen's and the Incarnation Church which houses over 10 non-profit organizations all dedicated to community improvement and support. In fact, St Stephen's offers one of the only locations in Washington DC metropolitan area that offers meals 7 days a week, including Federal Holidays, to anyone in need. I am sure that the rationale behind the possibility of removing these stops has to do with creating more convenience. But I am assuring you that the removal of this bus stop will eliminate convenience for some of our most vulnerable neighbors. Removal of these stops will absolutely inhibit access to vital services for the poor, for children, for families, for the ill, and homeless. I am confident that that is not the intention of the decision makers, however, it will indeed be the end result. I implore the decision makers in this process to consider the needs of individuals who utilize the services offered at Thrive DC and by the other groups housed at St Stephen's and the Incarnation. Please make a judgement that supports those that are most in need. Sincerely.
12. I am the Latino Missioner and a priest at St Stephen and the Incarnation at the corner of 16th and Newton Street I just found out that there is a possibility that the bust stop at 16th and Newton may be eliminated. I respectfully ask you and the Department of Transportation to reconsider this proposal. The bus stop is very important to the members of our Latino community who for the most part rely on public transportation. Our Spanish language service is on Sunday nights. Some of our members are elderly, others are families with children and the loss of the bus stop on our corner would be difficult for them. A two block at night for some people would be a hardship. St Stephens is considered a community resource. Diverse people of all walks of life pass through our doors on a daily basis to participate in our many programs. Many of these people are among the most vulnerable in our city. Easy public transportation is vital to them. Please reconsider the move to eliminate the bus stop at 16th and Newton. It is extremely important to our neighborhood. Sincerely.
13. I live on 16th street between V & Florida and take the 16th street buses twice a day, 5 days a week. I'm glad that the bus issues are being considered, but I do not believe eliminating stops will help. It will simply cause further crowding at neighboring stops. Adding buses at peak times in the morning and during inclement weather, on the other hand, would be extremely helpful. Thank you.
14. Please do not eliminate the bust stop at 16th and Newton. It's important that Thrive DC clients have access to public transportation.
15. I use the 16th and V street bus stops daily to McPherson and experience a good commute and do not want to see the elimination of the V street stop. I understand your Goal: Improve travel for persons using public transit. Objectives - Improve rider comfort and safety - Accommodate current unmet passenger demand for public transit service Elimination of the V Street stop would not accomplish these. Additionally, your objective should start with "Continue to meet current demand" don't take away from one group to give to another group. Find a way to also give to the unmet demand group. The V street stop is located by 4 densely populate apartment buildings including the Camden Roosevelt with 250 units and approximate 500 people many of whom use these stops. Elimination of the V stop will force people into travelling longer distances to reach a stop, clogging intersections and slowing traffic. Thank you.
16. We oppose DC DDOT's 16th Street Bus Stop consolidation plan that proposes to close the Newton Street and other bus stops.

The point of public transportation is to make it locally accessible as a necessary precondition for making public transportation possible. Reducing the number of bus stops, or bus routes, ultimately reduces public participation. WMATA and DDOT offer no evidence that they explored which populations this decision will impact and their dependence upon public transportation. Likewise, DDOT rejects a plan to reduce congestion in DC's major arteries by minimizing the number of commuter passenger and commercial vehicles. Its transportation policy views bringing every commuter vehicle in the region, every day, as a revenue bonanza. Welcome to Transportation Anarchy: a hell-for-leather jam of eighteen wheelers, buses, commercial and passenger vehicles, bikes, scooters, handicapped vehicles and skateboards on roads like minefields... so now they want to make public transportation less friendly? Living on Newton Street, NW, less than a block off of 16th Street we would make several observations: 1. The Newton Street bus stop riders — many of whom are seniors and parents with children — are residents and church-goers from the immediate neighborhood, workers from the Spanish Catholic Center, St Stephens Church, Stoddard Baptist Home and Bancroft Elementary school. 2. Removing the bus stop will not draw riders from a wider radius to an even more distant stop. 3. Reducing the gridlock of commuter traffic would be the best way to improve the speed of Metro buses. 4. Reducing the congestion, pollution, damage and danger of traffic should be DC's overarching transportation priority. We are willing to work with DDOT to reassess its decisions on Bus Stop Consolidation. Regards.

17. Following up on this thread, I want to share with DDOT the 133 letters of support for DDOT's preferred alternative of a bus lane on 16th that the Coalition for Smarter Growth collected from its supporters over the past few weeks. Especially given the (then-impending) Snowzilla, a lot of our supporters couldn't make the meeting in person (though I know several did), but wanted to formally voice their support for the bus lane. Please find attached the 133 letters of support we collected from DC residents, addressed to Director Dormsjo. Thanks so much!
18. (Phone Call) Wanted to know if we were widening the roadway through the Dupont section with the addition of a 5th lane. Confirmed that we are not widening the roadway but are striping a 5th lane.
19. I am writing to express my opposition to and concern about the proposal to remove the Newton Street bus stops for the S-Line on 16th Street. As a single woman living alone and on a limited nonprofit salary, I rely on the S-Line to get to and from work and as a "last mile" between the Columbia Heights station and my apartment building. The next nearest stop is at Park Road, a substantial 2 block walk away which requires

crossing busy Park Road. At night and in inclement weather, this is a significant distance. As it is, I don't bother with the S9 for this reason. The additional walking distance eliminates any benefit from a limited stop bus. At night or when I'm tired, I count on the S-bus to get me safely from Irving Street to Newton Street. Without the Newton Street stop, I will be forced to abandon metro in favor of taxis to ensure my personal safety and well-being. The present snow situation has reminded me of how important this bus stop is to me. Two additional blocks of snowy, icy, slushing walking makes a huge difference. Maybe you look at the map and it doesn't seem like a big deal to you to eliminate a stop there but those of us who live nearby rely on that bus stop. Please do not eliminate it. Sincerely.

20. I wanted to write an email expressing my concern about the potential removal of the 16th and Newton bus stop. This bus stop serves a number of larger apartment buildings and is also close to Bancroft elementary school, which is located at 18th and Newton. I urge you to consider keeping this bus stop as you move forward with your plan to improve the functioning of the 16th St. line. Thank you for your consideration.
21. I am writing you to oppose the removal of the S2/S4 bus stop at 16th and Newton. This stop services a large number of people not only from my condo building at 3420 16th St. but the people who live down Newton toward 17th St. as well. While I understand that it's right in front of a church where people don't live, it is located at a strategic location for many residents up and down the Newton St. corridor and back toward Bancroft elementary. I use the stop everyday to commute to and from work. I would also like to make sure that you are aware of the impact that additional riders boarding at 16th and Park. Going southbound on 16th St. there is a right turn that many cars take onto Park. As riders board at the stop, other buses going south begin to back up as they wait for standing buses loading passengers at the bus stop. Cars intending to turn right onto Park are prevented from turning which causes backups a block long at peak rush hour. It is quite reasonable to foresee backups becoming more pronounced as more people board at 16th and Park. I know this might be a bit difficult to explain over an e-mail, so I'd be happy to discuss it further over the phone if you want. As for bus stops that should be eliminated the 16th and Lamont stop going both south and north bound. Very few people (including high school students) ever use this stop to board or exist the bus. The other stop that seems to service few people is the V and 16th St stop going north. People will get on it going south in the mornings, but few people use it in the evenings going north (not quite sure why, but this is what

- I've noticed over the last 8 years using the S2/S4 lines). My preferred outcome, and speaking as a DC resident, would be a dedicated rush hour bus lane. And it would be a potential revenue generator to fine those commuters from Maryland who might drive in it. Kind regards.
22. I realize that much has been done to improve bus service and crowdedness on the 16th St. NW bus corridor. I believe that one thing may have been overlooked as to why the buses are so crowded. I live on Missouri Avenue just off 16th St., between 14th St. It is amazing how many people walk past the buses on 14th St. to ride the 16th St. buses. The 14th St. buses are much closer for these people. But, the bus service on upper 14th St is so poor, people don't depend on it. Thus, the 16th St. buses are more crowded. Perhaps, a study should be done on the 14th St. bus service levels. Thanks.
23. I was recently alerted to potential changes to the 16th St bus lines; I oppose two changes because I believe they would lead to decreased ridership and in some case (i.e. me) more cars on the road 1. Eliminating four stops in Mt Pleasant on either side of the Park Rd bus stop - this would be a huge issue during the morning rush hour. Three bus stops (Newton St, Park Rd and Lamont St) already have a significant number of riders waiting at any given time. Park Rd in particular. Adding more riders to this already overcrowded bus stop - how does that help? The large number of people isn't always orderly in boarding the bus, adding to this number will serve to increase the jostling for a place on already overcrowded buses. I can see that one of the proposals includes adding an additional bus shelter - this does nothing to reduce the crowding at this stop! 2. Terminating more S2/S4 at McPherson Square - this does a disservice to the many riders who commute to Federal Triangle. Terminating at McPherson Square means either walking (not easy for elderly or less able bodied) or waiting for a transfer. Transfers = adds at least five, if not fifteen or longer, waits before a connecting bus arrives. This is based on my experience of waiting for a transfer countless times, giving up and walking the remainder of my route. I am also curious to know what is meant (in the study) by "Left-Turn Restrictions - Southbound at Irving Street - Northbound at Mount Pleasant Street." Is this designed to further constrict access for citizens who need to travel east or west from 16th St? If you proceed in your plan to eliminate these much-needed and well-used bus stops, and truncating essential services then I recommend you initiate a trial period to see the effect of this on bus ridership, efficiency of transport and rider satisfaction. What looks good on paper doesn't always play out in the real world. Thank you for your consideration. Regards.
24. I apologize for sending this a few days after the posted deadline for comments on the 16th Street NW bus study, but I wanted to voice my approval of DDOT's preferred plan for improving bus service on the 16th Street NW corridor. This includes supporting DDOT's suggestion to eliminate a handful of bus stops on the corridor to improve efficiency and speed of service. As a daily rider of the S2 or S4 to McPherson Square or Federal Triangle, I'm eager to see the effects the proposed changes have on bus service in the corridor. Many thanks to you and your team for all of the hard work you put into this study and into including the community in the process. If I can be of any further assistance, please let me know. Sincerely,
25. Apologies for another email, but I wanted to send one clarification to my previous email. Although I generally support DDOT's preferred plan and its elimination of certain local stops, I don't believe all S2 and S4 service should terminate at 14th and I. It's unclear to me whether this change is part of DDOT's preferred plan. Is truncating all S2 or S4 service part of the "Transition to Simpler Patterns" improvement? Regardless, if eliminating service to Federal Triangle is part of DDOT's preferred alternative, DDOT should make that much clearer in its materials and should remove that element from its improvement plan. I take the S2 or S4 to Federal Triangle almost every day, but, on the days when I take the S2 or S4 only to McPherson Square (usually because the S2 or S4s going to Federal Triangle are too full to board by the time they reach 16th and U where I board), trying to transfer to a bus going to Federal Triangle at Lafayette Park adds a considerable amount of time to the commute. The wait times at Lafayette Park are also very inconsistent from day to day. Thanks again.
26. So I am concerned about the fifth lane being added at the end. It is not part of the 3 proposed alternatives. I think it is, for many reasons, not a desirable or viable alternative. As well, the no parking in rush hours was supposed to be extended for a half hour. Now I read in a report, that south bound will be no parking till noon. That as well, was not in the three alternatives. I am very concerned that these are being put in at what seems to be the end of the process. I am strongly opposed to both, and hope that these are not instituted without a lot of further discussion. Thanks.
27. (Voicemail) Express concern over the consolidation of the Newton Street bus stop.
28. Q Street, NW is among the bus stops planned for elimination. Please be aware that this stop is invaluable for people who come to the Jewish Community Center at 16th and Q. Some of the staff work after 10:00

pm when patrons leave Theater J after a play. Many are elderly and in wheelchairs. It's sad to say that those who make these elimination decisions do not have a need for bus conveniences. Eliminating the Q Street stop and others will be a huge inconvenience and will also cause safety issues. Please consider the vulnerability of the tax paying public. Thank you.

29. Thank you for signing up to receive updates on the 16th Street NW Transit Priority Planning Study. I have a very simple comment. Unless and until a dc agency prevents parking in the right lane, traffic will be impeded by the parking of their cars in the right lane. Making that happen will require swift towing of such cars. I assume that will require standby tow trucks and dc agencies prepared to issue tickets. If there is a problem of no room in the inn—no spaces for the towed vehicles, that should be dealt with by towing the miscreants to Carter Barron where they would be left with a large ticket, which would be followed up by dc agencies.
30. I attended your hearing at the DCJCC in January, the day before the big snowstorm. Between the storm and the re-scheduling it occasioned, I have not had time until now to ask a question I had about the proposed off board fare payment system. At first, I thought it referred only to persons wanting to add money to their SmarTrip cards, which does take time. But when you mentioned the new NYC system, I became concerned. I have been exposed to that system and I think you would be well advised not to adopt it totally. The NYC system, which right now is only used on some crosstown buses, does not allow for cash transactions including exact change. It also requires people getting on the bus to queue up at kiosks to buy the paper tix they use on the bus. This causes problems not only with people muscling into the lines to get their ticket, but also hurts people from out of town who may be eligible for special fares, like senior fares. Allowing exact change on our buses allows seniors to pay the fare they are entitled to, whether or not they are a local. Also, a local with a SmarTrip card takes no added time swiping the card on the bus. Between the proposed elimination of stops and a program to require all people to pay off board, I fear you will have a royal mess on your hands resulting in fewer people riding the buses not more. Please explain exactly what you are planning regarding off-board payment of bus fares. Thanks.
31. Thanks, Megan. Actually on the 86th Street crosstown bus in NYC they did not allow any cash payments even at the off-board kiosks They were still allowing coins on the buses going uptown or downtown. But this is knowledge from last October. So maybe they have straightened things out since then. The important thing for DDOT to do is to make sure

whatever system you use is user friendly for our people, both locals and tourists. Having lived in NYC for a number of years, I would say that people there are much more used to long lines and inconvenience than people here are. Not that they like it. Thanks for adding me to the list. I was on a rush hour S bus just yesterday morning and my friend who was also on that bus mentioned the bus lane project. He said the addition of the bus lanes still won't help with the lack of seats on the bus. Two buses had already told us they couldn't take us before we finally got on one that still didn't have seats. There's probably more work to be done there as well. Best.

130+ Coalition for Smarter Growth Letters

1. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. However, I do not agree with the proposed reorganization of stops between Park Road and Arkansas Ave. I use the 16th and Newton stops going both directions. There are three stops on this section. The proposal would maintain the northernmost 2 stops and eliminate the southernmost one. I assume traffic analysis justifies both Spring St. stops based on the large catchment on the E side of 16th. Makes sense to move the stop closer to the signal for pedestrian convenience and safety. But it seems more sensible to eliminate the Oak St stop on the southbound side and eliminate the Newton St. stop on the northbound side. Then the large number of southbound travelers on the west side of 16th can walk downhill to the Spring Street stop inbound and downhill from the Oak St. stop northbound, crossing at the signal on oak outbound. the Newton area outbound traffic would disembark at Park Road and walk north--no problem. But southbound we from the Columbia Heights side, as well as the many northern Mt. Pleasant residents who embark at Newton, would still have a convenient, non-overcrowded stop inbound. Also have you analyzed potential overcrowding and long queues at 16th and Park southbound if you eliminate Newton and concentrate S1 boarding at the same stop? Looks problematic given the popularity of S1 in the mornings. By the way, I support the left turn restrictions at Irving and Mt. Pleasant. Should do wonders to free up flow in the center lane! Good luck with the reforms and hope you get the infrastructure improvement money. Best.
2. I strongly support the DDOT's "draft preferred alternative" that would provide a rush hour bus lane on 16th St NW. The key features of the plan, off-board fare payment, all-door boarding, bus stop consolidation,

and the bus-only enforcement plan, together would make our city and region much more attractive to users of public transit. Not only the users themselves would benefit. Thousands of businesses and agencies in the District would also benefit from enhanced public access to all points along the backbone of the nation's capital as greater foot traffic and consumer demand would follow. As a transit user who has opted in recent years no longer to own a car, bus service in this region is important to me. I have never looked back and only hope more will join me in a new generation far better able to benefit from and enjoy what a city like DC has to offer - with a smaller carbon footprint (and no longer needing to hog scarce on-street parking space), to boot! Thank you.

3. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I live at 16th & V and take the bus every day to and from work. I also often take the bus on the weekends. This morning, Fri., Jan. 15, 2016, was not unusual. There were at least 12 people at the stop. There were no buses for over 10 minutes. Then, 3 buses came, including 1 of the new accordion buses, and all of them were too full to take on any more passengers. It is hard to know how long my commute will take. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you for working to make the 16th Street buses better.
4. When I lived near the 16th Street buses I found it was just as quick to walk all the way from Malcolm X park to Metro Center as to take the bus. That means the bus was SLOW! Action is needed. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
5. I commute daily on the 16th Street buses and have experienced firsthand the traffic slowdowns and "bus bunching" frustrations that come with that commute. That said, I strongly support DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I would like to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. As an urban planner myself, I know that these kind of upgrades can greatly improve the public transit experience for commuters (and may even increase ridership!) without having a significant impact on car traffic. Bus service in DC is very important to me, and I look forward to seeing this improvement become a reality. Thank you.
6. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. I live on Spring Road NW and am very pleased to see the stop will move towards the light. Daily, I see MD commuters nearly plow down DC residents as they try to run to a bus. The bus stop must move to make this safer for my neighbors to the south. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
7. I strongly supported DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. To ensure 16th St. has fast, efficient bus rapid transit, I urge DDOT to implement off-board fare payment, all-door boarding, eliminate frequent stops, and prepare a plan to enforce bus-only lanes. These changes are long overdue and essential to accommodate the 50% of commuters who travel on this corridor by bus. Buses are important to me. I recently participated in a NoMa Circulator focus group, and I look forward to continuing to support and offer feedback on DDOT proposals that will help create a 21st Century bus transportation system in our city. I look forward to riding buses on the new 16th street corridor once this plan becomes a reality. Thank you.
8. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. As you well know DC does not have room for street widening projects and anything to improve street transit performance will attract additional riders and therefore reduce congestion. Improved bus travel times also hold the promise of reducing cost per rider as the bus travels faster and reduce wear and tear due to less stop and go movements. Dedicated transit lanes are key to improving travel times; off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes will increase their effectiveness and further speed bus travel and enhance the rider experience. I am a regular bus rider and bus service in DC is important to me. I look forward to seeing this improvement become a reality, not only on 16th street but on all heavily traveled bus corridors in the future. Thank you.
9. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I live 2 blocks from 16th Street NW and I would use the bus there far more often if I knew they were going to come at more predictable times, be less bunched up, and be faster. As it is, I often wait up to 15 minutes in the morning for a

bus, with dozens of others outside the busy Woodner Building area near Spring Road NW. Instead I take Metro, which is just as crowded and less convenient to my home, but more predictably running on time. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me - I take many buses each week to get around and I think good bus service is terrific for taking pressure off Metro and cars off the road. I look forward to seeing this improvement become a reality. Thank you.

10. I have heard so many complaints over the years about the growing problem of the 16th Street buses as the neighborhoods that they serve have become more popular places to live and play. Keeping a dedicated bus lane is a logical solution. This allows everyone to move more efficiently rather than buses having to negotiate traffic and slow their rides and those of cars around them. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
11. Over 15 years of riding the S bus up and down 16th St., I've seen a lot of improvements from Metro, including the S9 and the "short" S2 in the mornings. These changes have helped a great deal, but the S bus line still can't keep up with the demand. Now is the right time for DDOT to make the major improvement of adding a rush-hour bus lane. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
12. I'm a homeowner, ten-year resident, architectural designer, and urban planner who lives in Ward 1. I am writing to express my strongest urging for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, a/l-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. This is not just good for residents - who want faster more reliable service - but also for DDOT and metro - which will benefit with increased usage. I urge the district to enact all this and then test its possible usage in other high frequency corridors. Bus service in DC is important to me, and I look

forward to seeing this improvement become a reality. Thank you.

13. DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW is a much better idea than sliced bread. I strongly support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is an important resource for people throughout the city and beyond. The idea that extricating buses from the gridlock of private vehicles can make rush hour buses attractive to more commuters is a promising one. The draft preferred alternative for 16th St is the opportunity for proof of concept. With luck, it will be a success that can be replicated over other major commuter routes. Let's do it. Thank you.
14. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. I live in ward 1 and commute downtown - the high-frequency bus corridors on 14th and 16th (and Georgia Ave) are services I use regularly and are one of the reasons I find it possible to live in DC without a car. I look forward to seeing this improvement on 16th become a reality, because I know it will positively impact me, my co-workers, and many many other people in the city. Thank you.
15. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. As I sat on an S9 express bus heading up 16th street on Monday night- and progressing at a rate that was anything but "express"- I couldn't help but think on how important this change will be for thousands of transit riders in the city. I support the draft preferred alternative. I want to see bus stop consolidation and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
16. I'm writing in regards to DDOT's 16th Street Transit Priority Planning study. I am in support of the "draft preferred alternative" for a one-direction bus lane on 16th St NW. Although a full-day bus lane would be preferable, I understand this was not considered feasible at this time. In addition, I like the ideas to have off-board fare payment, all-door boarding, bus stop consolidation (even though I live near one of the affected stops north of Irving), and a plan for effective enforcement of the bus lanes. Bus service in DC is important to me, my household and neighbors. I commend DDOT for moving forward with these improvements. Thank you.

17. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Efficient bus service is critical to movement of people along the busy 16th St. corridor, which is not well-served by Metrorail. The current service is often slow and the buses frequently get stuck in traffic. A dedicated rush-hour bus lane would bring needed improvement to mobility on 16th Street. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
18. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. Honestly, I don't think the rush-hour lane goes far enough ... we really need a full-time bus lane. But that shouldn't stand in the way of implementing the rush-hour lane. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
19. I'm writing in support of DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I hope the preferred alternative will also allow for off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. As a frequent commuter via 16th street bus lines, I am convinced that implementing these modern transit best practices will bring benefits to riders as well as ease congestion. They have worked in other cities and it's wonderful to see DDOT give serious consideration to these same technical and policy strategies. Thank you.
20. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. For a street with so much transit use, we must do what we can to prioritize the speedy travel of the vehicles that carry the most. I support every piece of the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. This last piece is so important, as we've seen with H Street parking. If people think they can get away with driving in the lanes, they will. • Other cities have great models to follow with automated cameras. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you for moving this project forward.
21. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
22. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. As a long-time resident of the 16th Street corridor I regularly travel the S line. While I think it is immensely beneficial I'm also frustrated by the regular boarding and travel delays. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
23. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. As someone who used to live along this route and wait as bus after bus has passed with no room, I know how heavily used this route is. And worse, the S buses moved incredibly slowly because they were stuck in traffic behind single-passenger vehicles. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
24. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. Over the past year in particular, commenting on the S-lines has become a major hassle and this would go a long way to making it a positive experience again. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
25. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is

important to me, and I look forward to seeing this improvement become a reality. And I hope this approach is just the beginning. Please turn your attention to Wisconsin Avenue. Thank you.

26. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes. Bus service in DC is important; I look forward to seeing this improvement become a reality. Thank you.
27. As a first, small step to improving transit on 16th St. NW, I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane. Although I am concerned that temporary bus lanes for rush hour will be properly obeyed or enforced enough to result in a significant improvement, I believe it is a step in the right direction and I support it as a pilot and compromise. If we try it, it just might work! Thank you.
28. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. In addition to dedicated bus lanes, I would like to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. And my hope is that in the long term, these improvements will spread elsewhere into the city. Thank you.
29. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush-hour bus lane on 16th St NW. I support the draft preferred alternative. Bus riders deserve off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. DC should be encouraging bus travel, not discouraging it by trapping riders in traffic. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.
30. I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. I am also a cyclist and the 16th street corridor could use a bike lane if that is possible. At a minimum would love to see parked cars off the street earlier-like after 6am? thanks so much.
31. I'm writing to express my support for DDOT's "draft preferred

alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see a solid bus-only enforcement plan for the lanes come to fruition in the corridor. I would also like to see enforcement of the rule against bicycles on sidewalks on 16th Street. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.

32. (Letter sent by 100 people) I'm writing to express my support for DDOT's "draft preferred alternative" for a rush hour bus lane on 16th St NW. I support the draft preferred alternative. I want to see off-board fare payment, all-door boarding, bus stop consolidation, and a solid bus-only enforcement plan for the lanes come to fruition in the corridor. Bus service in DC is important to me, and I look forward to seeing this improvement become a reality. Thank you.

260+ Signatures on Change.org Petition

Petition: Preserve Local Bus Service on 16th Street NW. We oppose the elimination of any bus stops along the route of the S2 and S4, specifically the ones at L, Q, V, Lamont and Newton Street NW. We support having all S2 and S4 trips serve Metro Center and Federal Triangle, arriving and departing from the terminus at 10th Street and Pennsylvania Ave. NW. 16th Street already has an express line, the S9, for riders who prefer faster trips with fewer stops. In addition, the time saving that DDOT projects from eliminating bus stops is minimal (1= to 1.3 minutes), while the inconvenience for older and disabled riders would be significant. Forcing riders to transfer to make a short trip between downtown and Dupont Circle, Adams Morgan or Mt. Pleasant would also be a major inconvenience, and will reduce ridership, increase the Metro subsidy and put more cars on the road, thus increasing air pollution and traffic congestion.

G. Level of Service

The level of service at key intersections and approaches throughout the Primary Study Area was analyzed for the Existing Condition and for each of the Final Alternatives. The LOS for each intersection is provided in Table G1 to Table G4.

G.1 2015

Table G1 - Intersection Level of Service (LOS) 2015

CROSSING STREET(S)	AM PEAK LOS					PM PEAK LOS					MIDDAY LOS				
	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*
H Street NW	C	C	C	C	C	C	C	C	C	C	C	C	C	C	C
I Street NW	C	C	C	C	C	C	C	C	D	D	B	B	C	C	B
K Street NW	C	C	C	C	C	C	C	C	C	B	C	C	C	C	C
L Street NW	C	C	C	C	C	D	D	D	D	D	C	C	C	C	C
M Street NW	C	C	D	D	D	C	C	D	D	C	B	B	C	C	C
P Street NW	C	C	C	D	B	C	B	C	B	B	B	B	B	C	B
Q Street NW	A	B	C	C	A	B	B	B	B	B	B	B	B	B	B
R Street NW	B	B	C	C	B	B	B	C	B	B	B	B	B	B	B
S Street NW	B	B	C	B	B	B	B	B	B	B	B	A	B	B	B
T Street NW	B	B	D	B	A	B	B	B	B	B	A	A	C	B	B
U Street and New Hampshire Avenue NW	C	C	D	C	C	C	C	C	C	C	C	C	C	C	C
V Street NW	C	D	E	C	B	B	A	A	A	A	A	A	A	A	A
W Street NW	D	C	D	C	B	C	B	C	B	B	B	B	A	A	A
Crescent Place NW	C	A	D	C	A	A	A	C	A	A	A	A	A	A	A
Euclid Street NW	B	B	E	C	B	B	B	F	B	B	B	B	B	B	B
Fuller Street NW	B	B	E	C	A	A	A	E	A	A	A	A	A	A	B
Harvard Street NW	C	D	E	D	D	C	C	F	D	D	C	C	C	C	C
Mt. Pleasant Street NW	B	N/A	N/A	C	C	B	N/A	E	C	B	C	N/A	B	B	B
Irving Street NW	C	C	C	B	C	C	B	F	C	C	C	C	C	B	B
Lamont Street NW	A	A	D	A	A	A	A	F	C	D	A	A	B	A	A
Park Road NW	C	C	D	C	C	B	B	E	C	C	C	C	C	B	B
Monroe Street NW	A	A	C	B	B	A	A	E	B	B	A	A	A	A	A
Newton Street NW	A	A	D	C	C	A	A	E	B	B	A	A	A	A	A
Oak Street NW	B	A	D	C	C	A	A	D	A	A	A	A	A	A	A
Spring Road NW	A	B	D	D	D	A	A	D	A	A	A	A	A	A	B
Arkansas Avenue NW	B	B	E	D	D	B	B	F	B	B	C	B	C	B	B

* Recommended Alternative

Table G2 – Intersection Approaches Level of Service (LOS) 2015

CROSSING STREET(S)	AM PEAK SB LOS					AM PEAK NB LOS					PM PEAK SB LOS					PM PEAK NB LOS					MIDDAY SB LOS					MIDDAY NB LOS							
	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*	Existing	Alt 1	Alt 2	Alt 3	Rec. Alt.*			
H Street NW	A	A	B	B	B	N/A	N/A	N/A	N/A	N/A	C	C	D	C	C	N/A	N/A	N/A	N/A	N/A	C	B	C	C	C	N/A	N/A	N/A	N/A	N/A			
I Street NW	C	D	C	D	C	A	A	A	A	A	E	D	D	E	E	A	C	D	C	B	C	C	E	C	C	B	B	B	B	A	A		
K Street NW	C	B	C	B	C	D	D	D	D	D	D	C	C	A	B	D	C	E	D	C	D	C	D	B	B	D	D	D	D	D	D		
L Street NW	A	A	B	A	A	C	C	D	D	C	D	D	D	D	D	E	D	D	D	D	B	B	B	A	A	C	B	C	C	C	C		
M Street NW	D	D	D	D	D	A	A	B	C	A	C	C	C	C	C	C	C	E	C	C	B	B	B	D	D	B	A	B	B	B	B		
P Street NW	A	A	A	A	A	B	B	D	F	B	B	B	C	C	A	B	B	A	B	B	A	A	A	A	A	B	B	A	B	B	B		
Q Street NW	A	A	A	A	A	B	B	D	E	B	B	B	C	C	B	A	A	A	A	A	B	B	A	B	A	A	A	A	A	A	B	B	
R Street NW	A	A	B	A	A	C	C	E	D	B	B	B	B	D	B	A	A	A	B	A	A	A	A	A	A	B	A	B	B	C	C		
S Street NW	A	A	A	A	A	B	B	F	C	B	B	A	B	C	B	A	A	A	A	A	B	A	B	A	A	B	A	B	B	B	B		
T Street NW	A	A	A	A	A	B	B	F	C	A	B	A	A	B	C	A	A	A	A	A	A	A	A	A	A	A	A	A	D	B	B	B	
U Street and New Hampshire Avenue NW	C	C	C	B	B	C	C	F	E	C	D	C	B	D	D	C	C	C	C	C	B	C	C	B	B	C	C	E	C	D	D		
V Street NW	C	C	D	C	B	B	B	F	D	A	B	B	B	B	A	A	A	A	D	A	A	A	A	B	A	A	A	A	B	B	B	B	
W Street NW	E	B	D	D	B	B	D	E	B	B	C	B	D	E	B	A	A	A	D	A	A	A	A	A	A	C	B	B	B	B	B		
Crescent Place NW	D	A	E	D	A	A	A	C	A	A	A	A	F	F	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	A	A	A	
Euclid Street NW	B	B	E	C	A	B	B	C	B	B	B	B	F	F	C	A	B	B	A	A	A	A	B	A	A	B	A	A	B	B	B		
Fuller Street NW	B	B	E	C	A	A	A	E	B	A	A	A	F	E	A	A	A	D	A	A	B	A	B	B	A	A	A	A	A	A	A	A	
Harvard Street NW	B	C	C	B	B	C	C	C	E	D	B	A	F	B	B	B	B	F	B	B	B	B	C	B	B	C	C	B	B	B	B		
Mt. Pleasant Street NW	B	N/A	N/A	C	C	A	N/A	N/A	A	A	B	N/A	N/A	D	C	A	N/A	N/A	A	A	D	N/A	N/A	C	C	A	N/A	N/A	A	A	A	A	
Irving Street NW	A	A	A	A	A	C	D	D	C	D	A	A	D	B	A	C	B	E	B	C	A	A	A	A	A	C	D	C	B	B	B		
Lamont Street NW	A	A	B	A	A	A	A	F	A	A	A	A	E	C	A	A	A	E	B	D	A	A	A	A	A	B	A	C	A	A	A	A	
Park Road NW	B	C	C	B	C	C	B	D	B	B	C	C	F	C	D	B	A	D	C	C	C	C	C	A	A	B	B	C	B	B	B		
Monroe Street NW	A	A	C	B	B	A	A	A	A	A	A	B	F	C	C	A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	
Newton Street NW	A	A	D	C	C	A	A	A	A	A	B	B	F	C	B	A	A	C	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Oak Street NW	A	A	E	D	D	A	A	A	A	A	A	A	F	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A
Spring Road NW	A	A	D	D	D	A	A	A	B	B	A	A	F	A	A	A	A	A	A	A	A	A	A	A	A	A	A	A	B	B	B	B	
Arkansas Avenue NW	B	B	F	D	E	B	B	B	A	A	B	B	F	B	B	A	A	B	A	B	C	B	B	B	B	B	B	C	B	B	B	B	

G.2 RECOMMENDED ALTERNATIVE 2015 VS. 2040

Table G3 - Intersection LOS Recommended Alternative 2015 vs. 2040

CROSSING STREET(S)	AM PEAK LOS		PM PEAK LOS		MIDDAY LOS	
	2015	2040	2015	2040	2015	2040
H Street NW	C	C	C	C	C	C
I Street NW	C	C	D	D	B	C
K Street NW	C	C	B	C	C	C
L Street NW	C	C	D	D	C	C
M Street NW	D	D	C	C	C	C
P Street NW	B	B	B	C	B	B
Q Street NW	A	B	B	B	B	B
R Street NW	B	B	B	B	B	B
S Street NW	B	B	B	B	B	B
T Street NW	A	A	B	C	B	B
U Street and New Hampshire Avenue NW	C	C	C	C	C	C
V Street NW	B	B	A	A	A	A
W Street NW	B	C	B	C	A	B
Crescent Place NW	A	C	A	A	A	A
Euclid Street NW	B	C	B	C	B	B
Fuller Street NW	A	B	A	A	B	B
Harvard Street NW	D	E	D	D	C	C
Mt. Pleasant Street NW	C	C	B	B	B	B
Irving Street NW	C	C	C	C	B	B
Lamont Street NW	A	A	D	D	A	A
Park Road NW	C	C	C	D	B	C
Monroe Street NW	B	B	B	C	A	A
Newton Street NW	C	C	B	C	A	A
Oak Street NW	C	D	A	A	A	A
Spring Road NW	D	D	A	A	B	B
Arkansas Avenue NW	D	D	B	B	B	B

Table G4 – Intersection Approaches LOS Recommended Alternative 2015 vs. 2040

CROSSING STREET(S)	AM PEAK SB LOS		AM PEAK NB LOS		PM PEAK SB LOS		PM PEAK NB LOS		MIDDAY SB LOS		MIDDAY NB LOS	
	2015	2040	2015	2040	2015	2040	2015	2040	2015	2040	2015	2040
H Street NW	B	B	N/A	N/A	C	C	N/A	N/A	C	C	N/A	N/A
I Street NW	C	D	A	A	E	E	B	B	C	C	A	A
K Street NW	C	D	D	D	B	B	C	C	B	B	D	D
L Street NW	A	C	C	C	D	D	D	D	A	A	C	C
M Street NW	D	D	A	B	C	C	C	D	D	D	B	B
P Street NW	A	A	B	B	A	B	B	B	A	A	B	B
Q Street NW	A	A	B	A	B	C	A	A	A	A	B	B
R Street NW	A	A	B	B	B	B	A	A	A	A	C	C
S Street NW	A	A	B	B	B	B	A	A	A	A	B	B
T Street NW	A	A	A	A	C	C	A	A	A	A	B	B
U Street and New Hampshire Avenue NW	B	B	C	C	D	D	C	C	B	C	D	D
V Street NW	B	B	A	A	A	A	A	A	A	A	B	B
W Street NW	B	C	B	B	B	B	A	B	A	A	B	B
Crescent Place NW	A	C	A	A	A	A	A	A	A	A	A	A
Euclid Street NW	A	B	B	B	C	C	A	B	A	A	B	B
Fuller Street NW	A	B	A	B	A	A	A	A	B	B	A	A
Harvard Street NW	B	B	D	E	B	B	B	B	B	B	B	B
Mt. Pleasant Street NW	C	C	A	A	C	C	A	A	C	C	A	B
Irving Street NW	A	A	D	D	A	A	C	D	A	A	B	B
Lamont Street NW	A	A	A	A	A	A	D	D	A	A	A	A
Park Road NW	C	C	B	B	D	D	C	C	A	B	B	B
Monroe Street NW	B	B	A	A	C	D	A	A	A	A	A	A
Newton Street NW	C	C	A	A	B	C	A	A	A	A	A	A
Oak Street NW	D	D	A	A	A	A	A	A	A	A	A	A
Spring Road NW	D	D	B	B	A	A	A	A	A	A	B	B
Arkansas Avenue NW	E	F	A	B	B	B	B	B	B	B	B	B