# BENNING ROAD & BRIDGES TRANSPORTATION IMPROVEMENTS

## COST ESTIMATES

FINAL SEPTEMBER 2020



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# Table of Contents



# List of Tables

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# 1.0 Introduction

## 1.1 Proposed Action Overview

The District Department of Transportation (DDOT), in conjunction with the Federal Highway Administration (FHWA), prepared this Section 106 evaluation to support Final Environmental Assessment (EA) for the proposed Benning Road and Bridges Transportation Improvements project (the proposed action) in northeast Washington, DC. The proposed action would: provide safety improvements; extend the H/Benning Streetcar service to the Benning Road Metrorail Station; and improve pedestrian and bicycle facilities along Benning Road between Oklahoma Avenue and the Benning Road Metrorail Station. FHWA is the lead federal agency for the EA, with DDOT (the Applicant) as the local sponsor. The Federal Transit Administration (FTA), the National Capital Planning Commission (NCPC), and the National Park Service (NPS) are cooperating agencies.

The proposed action qualifies as an eligible project for Federal-aid funding under 23 CFR § 810.102 Eligible projects. FHWA concurred with mass transit use of the Benning Road ROW in a letter to DDOT dated April 18, 2013. The proposed action is included in the National Capital Region Transportation Planning Board's adopted Transportation Improvement Program (TIP) and the 2016 Financially Constrained Long-Range Plan for the National Capital Region (CLRP).

This EA is a Federal document and was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508), FHWA's Environmental Impact and Related Procedures (23 CFR 771), FHWA's Technical Advisory Guidance for Preparing and Processing Environmental and Section 4(f) Documents (T6640.8A), FHWA's 2006 SAFETEA-LU Environmental Review Process: Final Guidance, Appendix A of 23 CFR part 450 titled Linking Transportation Planning and NEPA Processes, FTA's 2006 Transit Noise and Vibration Impact Assessment guidance, FHWA's Noise Regulations (23 CFR 772), and DDOT's Environmental Process Manual.

## 1.2 Purpose of the Memorandum

This memorandum was prepared to present and document the cost projections prepared as part of the Benning Road and Bridges Transportation Improvements Environmental Assessment (EA). These projections include both capital and operational costs for each of the Build Alternatives. There are also projections for both of the propulsion systems (wired and wireless), the streetcar vehicles, as well as the professional services that will be needed during future phases of project development.

## 1.3 Selection of DDOT's Preferred Alternative

The Draft EA was released for a 30-day public comment period on May 4, 2016 and a public hearing was held on May 19, 2016. The public and agencies were given the opportunity to review

and comment on the EA until June 2, 2016. Public and agency coordination efforts have continued since the Draft EA and public hearing. DDOT held an Open House for the EA on November 15, 2017. After thorough consideration of input received from the public and agencies after publication of the Draft EA and based on technical analyses and the evaluation of alternatives, DDOT has selected Build Alternative 2-Median Streetcar Alignment with wired propulsion as the Preferred Alternative.

# 2.0 Methodology

Preliminary budget-level cost estimates were prepared for each Build Alternative. These estimates include capital costs of roadway, bridge and streetcar elements/infrastructure, as well as the operating and maintenance (O&M) costs of streetcar service, and contingencies for design and construction management and inspection. Costs were based on available DDOT construction pricing, similar projects and engineering judgment. To ensure accuracy, quantities were derived directly from the conceptual designs for Build Alternative 1 and the Preferred Alternative.

Costs associated with utility impacts and relocation are not included in the estimate. Similarly, cost for right-of-way and support facilities have not been calculated and are not included in the cost estimate.

This report has been divided into three main sections:

1. Roadway and Bridge/Structural Improvement Capital Costs
2. Streetcar Capital Costs, using FTA Standard Cost Category (SCC) Format
3. Operating and Maintenance Cost

A summary of these costs[1] are listed below in **Table 1**.

**Table 1: Cost Estimate Summary – Build Alternative 1 and the Preferred Alternative**

| Item | Build Alternative 1 | | Preferred Alternative | |
|---|---|---|---|---|
| | (wired) | (wireless) | (wired) | (wireless) |
| Roadway and Bridge Capital Costs | $115,947,500 | $115,947,500 | $118,275,100 | $118,275,100 |
| Streetcar Capital Costs | $62,215,900 | $60,970,400 | $59,810,400 | $59,803,000 |
| **Total Capital Costs*** | **$178,163,400** | **$176,917,900** | **$178,085,500** | **$178,078,200** |
| | | | | |
| **Annual Operating and Maintenance Cost**** | **$4,584,600** | **$4,584,600** | **$4,584,600** | **$4,584,600** |

Notes:
* Capital costs are one time expenditures for project construction and implementation
** Operating and maintenance costs are ongoing expenditures to provide service

[1] Capital Cost and Operating and Maintenance Cost estimates are preliminary and subject to change as project design is refined.

# 3.0 Roadway and Bridge/Structural Improvements

**Table 2** and **Table 3** detail the budget-level cost estimates for roadway and bridge capital costs for Build Alternative 1 and the Preferred Alternative, respectively.

Items associated with roadway improvements include pavement removal, roadway, sidewalk, streetscape, and traffic signals. Appropriate percentage factors were used to account for drainage, signing and striping, and non-streetcar related electrical and lighting. These improvements also include replacement of all bus stops, Americans with Disabilities Act (ADA) improvements and a pedestrian crossing at Kingman Island. Full depth pavement is assumed for entire project area. Roadside planting strip assumes one tree every fifty feet and the median landscape assumes use of perennials as opposed to woody/shrub treatment.

To facilitate streetcar infrastructure and improve pedestrian facilities, the bridges and structures within the project corridor require repair and/or replacement. Costs include retaining wall work, modifications to Bridge No. 52 (over Anacostia River) and Bridge No. 77 (over Kingman Lake), and full replacement of the Lorrain H. Whitlock Memorial Bridge over the CSX Railroad and DC-295 (Bridge No. 503). The cost for full replacement includes demolition and new substructure and superstructure.

These estimates include factors for engineering and construction management/construction inspection (CMI).

To account for construction contingencies and maintenance of traffic, appropriate percentage factors were used based on the project subtotal for roadway and bridge construction. These costs were applied to compute mobilization. Mobilization is calculated only for the roadway and bridge construction items using the DDOT formula for a project greater than one million dollars. Costs for design fee and construction management and inspection are computed using the construction subtotal inclusive of mobilization.

**Table 2: Build Alternative 1 Roadway and Structures Cost Estimate**

| Item | Description | Unit | Quantity | Unit Price | Total |
|---|---|---|---|---|---|
| 1 | Hard Surface Removal | SY | 65,923 | $45 | $2,966,525 |
| 2 | Median Removal | SF | 23,537 | $20 | $470,740 |
| 3 | Curb Removal | LF | 22,852 | $15 | $342,780 |
| 4 | Sidewalk Removal | SF | 89,940 | $20 | $1,798,800 |
| 5 | Full Depth Pavement | SY | 50,524 | $150 | $7,578,567 |
| 6 | Median Curb | LF | 8,398 | $30 | $251,940 |
| 7 | Curb & Gutter | LF | 18,907 | $30 | $567,210 |
| 8 | Curb Ramps | EA | 41 | $500 | $20,500 |
| 9 | Proposed Sidewalk | SY | 12,916 | $45 | $581,215 |
| 10 | Driveway/Parking Lots Entrances | EA | 64 | $1,500 | $96,000 |
| 11 | Bus Stops | EA | 22 | $10,000 | $220,000 |
| 12 | New Traffic Signals Major | EA | 2 | $250,000 | $500,000 |
| 13 | New Traffic Signals Minor | EA | 1 | $150,000 | $150,000 |
| 14 | Existing Traffic Signal Reconfiguration | LS | 1 | $1,394,000 | $1,394,000 |
| 15 | Pedestrian Crossing at Kingman Island | EA | 1 | $30,000 | $30,000 |
| 16 | Roadside Plant Strips | SF | 33,771 | $10 | $337,710 |
| 17 | Misc. Public Realm Improvements | LS | 1 | N/A | $50,000 |
| 18 | Median Landscaped | SY | 3,735 | $20 | $74,700 |
| 19 | Drainage (20% of roadway subtotal) | LS | 1 | N/A | $3,486,137 |
| 20 | Signing & Striping (5% of roadway subtotal) | LS | 1 | N/A | $871,534 |
| 21 | Electrical/Lighting (10% of roadway subtotal) | LS | 1 | N/A | $1,743,069 |
| | **TOTAL ROADWAY CONSTRUCTION COST** | | | | **$23,531,427** |
| 22 | **STRUCTURES** | | | | |
| | **Retaining Wall** | LS | 1 | $500,000 | $500,000 |
| | **Bridge No. 52 (over Anacostia River)** | LS | 1 | $1,600,000 | $1,600,000 |
| | **Bridge No. 77 (over Kingman Lake)** | LS | 1 | $200,000 | $200,000 |
| | **Bridge No. 503 (Full Replacement)** | SF | 44,555 | $630 | $28,069,753 |
| | **TOTAL STRUCTURES CONSTRUCTION COST** | | | | **$30,369,753** |
| | **SUBTOTAL CONSTRUCTION COST** | | | | **$53,901,180** |
| 23 | **CONSTR. AND ENG. CONTINGENCY** | | | | |
| | **MOT** | 30% of Items 1-22 | | | $16,170,354 |
| | **Contingency** | 30% of Items 1-22 | | | $16,170,354 |
| | **Mobilization** | DDOT Formula | | | $4,342,094 |
| | **TOTAL CONSTRUCTION COST** | | | | **$90,583,983** |
| 24 | **ENGINEERING** | | | | |
| | **Preliminary Engineering** | 5% of Items 1-23 | | | $4,529,199 |
| | **Final Engineering** | 8% of Items 1-23 | | | $7,246,719 |
| | **Construction Engineering** | 15% of Items 1-23 | | | $13,587,597 |
| | **TOTAL ENGINEERING COST** | | | | **$25,363,515** |
| | **TOTAL ROADWAY & BRIDGE COST** | | | | **$115,947,498** |

**Table 3: Preferred Alternative Roadway and Structures Cost Estimate**

| Item | Description | Unit | Quantity | Unit Price | Total |
|---|---|---|---|---|---|
| 1 | Hard Surface Removal | SY | 65,923 | $45 | $2,966,525 |
| 2 | Median Removal | SF | 23,537 | $20 | $470,740 |
| 3 | Curb Removal | LF | 22,852 | $15 | $342,780 |
| 4 | Sidewalk Removal | SF | 89,940 | $20 | $1,798,800 |
| 5 | Full Depth Pavement | SY | 55,358 | $150 | $8,303,733 |
| 6 | Median Curb | LF | 7,541 | $30 | $226,230 |
| 7 | Curb & Gutter | LF | 18,917 | $30 | $567,510 |
| 8 | Curb Ramps | EA | 41 | $500 | $20,500 |
| 9 | Proposed Sidewalk | SY | 12,764 | $45 | $574,365 |
| 10 | Driveway/Parking Lots Entrances | EA | 64 | $1,500 | $96,000 |
| 11 | Bus Stops | EA | 22 | $10,000 | $220,000 |
| 12 | New Traffic Signals Major | EA | 1 | $250,000 | $250,000 |
| 13 | New Traffic Signals Minor | EA | 0 | $150,000 | $0 |
| 14 | Existing Traffic Signal Reconfiguration | LS | 1 | $1,394,000 | $1,394,000 |
| 15 | Pedestrian Crossing at Kingman Island | EA | 1 | $30,000 | $30,000 |
| 16 | Roadside Plant Strips | SF | 38,094 | $10 | $380,940 |
| 17 | Misc. Public Realm Improvements | LS | 1 | N/A | $50,000 |
| 18 | Median Landscaped | SY | 2,841 | $20 | $56,813 |
| 19 | Drainage (20% of roadway subtotal) | LS | 1 | N/A | $3,549,787 |
| 20 | Signing & Striping (5% of roadway subtotal) | LS | 1 | N/A | $887,447 |
| 21 | Electrical/Lighting (10% of roadway subtotal) | LS | 1 | N/A | $1,774,894 |
| **TOTAL ROADWAY CONSTRUCTION COST** | | | | | **$23,961,064** |
| 22 | **STRUCTURES** | | | | |
| | **Retaining Wall** | LS | 1 | $500,000 | $500,000 |
| | **Bridge No. 52 (over Anacostia River)** | LS | 1 | $1,600,000 | $1,600,000 |
| | **Bridge No. 77 (over Kingman Lake)** | LS | 1 | $200,000 | $200,000 |
| | **Bridge No. 503 (Full Replacement)** | SF | 45,591 | $630 | $28,722,538 |
| **TOTAL STRUCTURES CONSTRUCTION COST** | | | | | **$31,022,538** |
| **SUBTOTAL CONSTRUCTION COST** | | | | | **$54,983,602** |
| 23 | **CONSTR. AND ENG. CONTINGENCY** | | | | |
| | **MOT** | 30% of Items 1-22 | | | $16,495,080. |
| | **Contingency** | 30% of Items 1-22 | | | $16,495,080. |
| | **Mobilization** | DDOT Formula | | | $4,428,688. |
| **TOTAL CONSTRUCTION COST** | | | | | **$92,402,451** |
| 24 | **ENGINEERING** | | | | |
| | **Preliminary Engineering** | 5% of Items 1-23 | | | $4,620,123 |
| | **Final Engineering** | 8% of Items 1-23 | | | $7,392,196 |
| | **Construction Engineering** | 15% of Items 1-23 | | | $13,860,368 |
| | **TOTAL ENGINEERING COST** | | | | **$25,872,686** |
| **TOTAL ROADWAY & BRIDGE COST** | | | | | **$118,275,137** |

# 4.0 Streetcar Capital Costs

Capital cost estimates for the streetcar were determined based on quantities associated with each Build Alternative and are presented in Federal Transit Administration (FTA) Standard Cost Category (SCC) Format. These costs are summarized in **Table 4** for wired and wireless options.

The estimate assumed purchase of three new streetcar vehicles to account for the service extension to the Benning Road Metrorail Station. Other items associated with streetcar costs are platforms (including fare collection), trackwork for both normal and special segments, propulsion system allowance, and miscellaneous infrastructure.

## 4.1 Category 10 – Guideways and Track Elements

This category includes the trackwork and slab for the streetcar. Values were used per linear foot based on the system wide streetcar studies. Items included: Single Track Feet Curbside Running, Single Track Feet Median Running, Single Track Feet on Aerial Structure, Single Track Feet (CBTC) -Dedicated Guideway, 25 Meter Turnout, 20 Meter Turnout, and Track Diamond.

## 4.2 Category 20 – Stops

This category includes side and center platforms and message boards for each platform type. Cost for fare collection is included in the platform cost.

## 4.3 Category 30 – Yard and Shop (Maintenance Facilities)

A battery shop would be needed for a wireless option. The DC Streetcar Car Barn Training Center yard may accommodate the facility. Assumed costs for engineering, construction, equipment, hazard material handling, testing and training, compliance, etc. would be at least $1 million.

## 4.4 Category 40 – Sitework and special conditions

This category only includes maintenance of traffic and contractor mobilization associated with streetcar infrastructure construction. Construction costs for roadway and sitework, as well as bridge reconstruction, is accounted in separate cost estimates. Construction costs for utility relocations are not included in this cost estimate.

## 4.5 Category 50 – Systems

This category includes a lump sum cost for propulsion system, including traction power substations (TPSS), overhead elements for power and charging, and accommodation for miscellaneous streetcar infrastructure.

**Table 4: Streetcar Capital Costs**

| FTA Standard Cost Categories (SCC) | Build Alternative 1 | | Preferred Alternative | |
|---|---|---|---|---|
| | (wired) | (wireless) | (wired) | (wireless) |
| **10 GUIDEWAY & TRACK ELEMENTS** | $10,550,500 | $10,550,500 | $10,567,000 | $10,567,000 |
| 10.02 Guideway: At-grade semi-exclusive (allows cross-traffic) curb | $8,310,000 | $8,310,000 | $0 | $0 |
| 10.02 Guideway: At-grade semi-exclusive (allows cross-traffic) median | $377,500 | $377,500 | $8,684,000 | $8,684,000 |
| 10.04 Guideway: Aerial structure | $835,500 | $835,500 | $835,500 | $835,500 |
| 10.01 Guideway: At-grade exclusive right-of-way | $302,500 | $302,500 | $302,500 | $302,500 |
| 10.12 Track: Special (switches, 25 m turnouts) | $0.00 | $0.00 | $170,000 | $170,000 |
| 10.12 Track: Special (switches, 20 m turnouts) | $600,000 | $600,000 | $450,000 | $450,000 |
| 10.12 Track: Special (track diamond) | $125,000 | $125,000 | $125,000 | $125,000 |
| **20 STATIONS, STOPS, TERMINALS, INTERMODAL** | $2,255,000 | $2,255,000 | $1,475,000 | $1,475,000 |
| 20.01 At-grade stop – side platform | $1,880,000 | $1,880,000 | $0 | $0 |
| 20.01 At-grade stop – center platform | $285,000 | $285,000 | $1,425,000 | $1,425,000 |
| 20.01 At-grade stop – message board equipment side platform | $80,000 | $80,000 | $0 | $0 |
| 20.01 At-grade stop – message board equipment center platform | $10,000 | $10,000 | $50,000 | $50,000 |
| **30 SUPPORT FACILITIES: YARDS, SHOPS, ADMIN. BLDGS** | $0 | $1,000,000 | $0 | $1,000,000 |
| 30.04 Storage Building - battery shop | | $1,000,000 | | $1,000,000 |
| **40 SITEWORK & SPECIAL CONDITIONS (MOT and Mobilization)*** | $10,000,000 | $10,000,000 | $10,000,000 | $10,000,000 |
| 40.08 Temporary Facilities and other indirect costs during construction | $10,000,000 | $10,000,000 | $10,000,000 | $10,000,000 |
| **50 SYSTEMS** | $9,252,000 | $4,200,000 | $8,442,210 | $4,200,000 |
| 50.03 Traction power supply: substations | $4,000,000 | $4,000,000 | $4,000,000 | $4,000,000 |
| 50.04 Traction power distribution: OCS - curb | $5,052,000 | | | |
| 50.04 Traction power distribution: OCS - median | | | $4,242,210 | |
| 50.06 System equipment | $200,000 | $200,000 | $200,000 | $200,000 |
| **Construction Subtotal (10-50)**** | **$32,057,500** | **$28,005,500** | **$30,484,210** | **$27,242,000** |
| **60 ROW, LAND, EXISTING IMPROVEMENTS** | $0 (Not included) | $0 (Not included) | $0 (Not included) | $0 (Not included) |
| **70 VEHICLES (3)** | $12,000,000 | $16,500,000 | $12,000,000 | $16,500,000 |
| 70.01 Light Rail (streetcar) | $12,000,000 | | $12,000,000 | |
| 70.01 Light Rail (hybrid streetcar) | | $16,500,000 | | $16,500,000 |

| | | | | |
|---|---|---|---|---|
| **80 PROFESSIONAL SERVICES (applies to Cats. 10-50)** | $12,502,425 | $10,922,145 | $11,888,842 | $10,624,380 |
| 80.01 Project Development | $2,244,025 | $1,960,385 | $2,133,895 | $1,906,940 |
| 80.02 Engineering | $2,564,600 | $2,240,440 | $2,438,737 | $2,179,360 |
| 80.03 Project Management for Design and Construction | $1,282,300 | $1,120,220 | $1,219,368 | $1,089,680 |
| 80.04 Construction Administration & Management | $4,808,625 | $4,200,825 | $4,572,632 | $4,086,300 |
| 80.05 - 80.08 Other Soft Costs | $1,602,875 | $1,400,275 | $1,524,211 | $1,362,100 |
| **Subtotal (10-80)** | $56,559,925 | $55,427,645 | $54,373,052 | $54,366,380 |
| **90 UNALLOCATED CONTINGENCY** | $5,655,993 | $5,542,765 | $5,437,305 | $5,436,638 |
| **TOTAL PROJECT COST (10-90)** | **$62,215,918** | **$60,970,410** | **$59,810,357** | **$59,803,018** |

**Notes:**

* Costs shown for Category 40 are only for MOT and mobilization related to streetcar costs. Please refer to separate Roadway and Bridge cost estimates for these sitework associated costs.

** Utility relocation costs are NOT included in estimate

## 4.6 Category 60 – Right-of-way

At this time, no costs have been included for right-of-way as the design intent is to remain within public space. However, limited right-of-way may be required and will be determined in subsequent project phases.

## 4.7 Category 70 – Vehicles

For streetcars, a lump sum of $4 million per vehicle in 2014 dollars was used for the wired option and $5.5 million for the wireless option assuming a hybrid vehicle.

## 4.8 Category 80 – Professional Services

The following percentages of Category 10-50 costs (including contingencies) are used:

- PE and Planning – 7%
- Final Design – 8%
- Program Management – 4%
- Construction Administration and Management – 15%
- Other soft costs – 5%

This totals 39%; the percentage being used in the system wide streetcar studies.

## 4.9 Category 90 –Unallocated Contingency

An unallocated contingency of 10% is used for Categories 10-80.

# 5.0 Operating and Maintenance Cost

The methodology used to compute Operating and Maintenance (O&M) costs is based on annualized cost per revenue hour and mile. As provided by DDOT, the 2009 cost per mile was $5.23 and the 2010 cost per hour was $216.81; both were escalated at 3% to 2017 values of $6.63 and $266.65, respectively. The total revenue hours for the streetcar extension are determined based on the number of streetcars, round trip (cycle) time divided by headway, required by period, multiplied by the hours per period and then annualized. The revenue miles are determined in an analogous manner. These hour and mile-based costs are summed to determine total annualized O&M cost.

The same methodology is used for wired and wireless operation. An O&M cost variance was not assumed for wireless operation associated with vehicle maintenance, energy storage equipment (batteries and supercapacitors) and charging catenary.

The following guidelines were used to determine operating costs for Build Alternative 1 and the Preferred Alternative:

- Headway:
  - Service at 10 minute headways during all hours of streetcar operation.
- Hours of Operation:
  - Monday-Thursday 6 AM to 12 AM
  - Friday 6 AM to 2 AM
  - Saturday 8 AM to 2 AM
  - Sunday 8 AM to 10 PM
- Annualization basis (364 operating days):
  - 204 weekdays
  - 52 Fridays
  - 52 Saturdays
  - 56 Sundays

Annual operating and maintenance costs for the two Build Alternatives are summarized in **Table 5**.

**Table 5: Annual Operating & Maintenance Cost Estimate**

| | Build Alternative 1 | Preferred Alternative |
|---|---|---|
| Annual Revenue Miles | 172,800 | 172,800 |
| Unit Cost per Revenue Mile | $6.63 | $6.63 |
| **Mileage Based Annual Cost** | **$1,144,800** | **$1,144,800** |
| Annual Revenue Hours | 12,900 | 12,900 |
| Unit Cost per Revenue Hour | $266.65 | $266.65 |
| **Hourly Based Annual Cost** | **$3,439,800** | **$3,439,800** |
| **Total Annual O&M Costs 2017 dollars** | **$4,584,600** | **$4,584,600** |

# BENNING ROAD & BRIDGES TRANSPORTATION IMPROVEMENTS

## MAINTENANCE OF TRAFFIC CONCEPT PLAN

FINAL SEPTEMBER 2020



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# Table of Contents



## LIST OF TABLES



## LIST OF FIGURES

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# 1.0 INTRODUCTION

## 1.1 Proposed Action Overview

The District Department of Transportation (DDOT) in conjunction with the Federal Highway Administration (FHWA), prepared this Maintenance of Traffic Concept Plan to support the Final Environmental Assessment (EA) for the proposed Benning Road and Bridges Transportation Improvements project (the proposed action) in northeast Washington, DC. The proposed action would:

- provide infrastructure and safety improvements;
- extend the H/Benning Streetcar service to the Benning Road Metrorail Station; and
- improve pedestrian and bicycle facilities along Benning Road between Oklahoma Avenue and the Benning Road Metrorail Station.

FHWA is the lead federal agency for the EA, with DDOT (the applicant) as the local sponsor. The Federal Transit Administration (FTA), the National Capital Planning Commission (NCPC), and the National Park Service (NPS) are cooperating agencies.

The proposed action qualifies as an eligible project for Federal-aid funding under 23 CFR § 810.102 Eligible projects. FHWA concurred with mass transit use of the Benning Road ROW in a letter to DDOT dated April 18, 2013. The proposed action is included in the National Capital Region Transportation Planning Board's adopted Transportation Improvement Program (TIP) and the 2016 Financially Constrained Long-Range Plan (CLRP) for the National Capital Region.

This EA is prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508), FHWA's Environmental Impact and Related Procedures (23 CFR 771), FHWA's Technical Advisory Guidance for Preparing and Processing Environmental and Section 4(f) Documents (T6640.8A), FHWA's 2006 SAFETEA-LU Environmental Review Process: Final Guidance, Appendix A of 23 CFR part 450 titled Linking Transportation Planning and NEPA Processes, FTA's 2006 Transit Noise and Vibration Impact Assessment guidance, FHWA's Noise Regulations (23 CFR 772), and DDOT's Environmental Process Manual.

## 1.2 Purpose of the Memorandum

This memorandum identifies the temporary traffic control measures DDOT is planning to use to maintain the movement of traffic during the construction of the improvements presented in the Benning Road and Bridges Transportation Improvements EA. The MOT Concept Plan describes key strategies and factors to facilitate traffic flow and safety through and around work zones for the Preferred Alternative. Temporary traffic impacts due to the construction of DDOT's Preferred Alternative include: extended travel times, reduced speed limits, temporary elimination of on-

street parking. Lane closures are also anticipated due to the replacement of the Lorraine H. Whitlock Memorial Bridges (Whitlock Bridge), track construction and intersection improvements.

The MOT Concept Plan provides details on how all modes (automobiles, transit, pedestrians, and bicycles) would be accommodated in each phase and address how access, parking, and loading/unloading operations would be provided or maintained. The Plan also discusses demolition actions, which provide a basis for determining the staging areas for the contractor of the major infrastructure elements. Staging is defined as the positioning of equipment and materials during construction. Phasing is defined as the sequencing of construction activities to complete the project. The following topics are the basis of the MOT Concept Plan:

- Traffic simulation methods;
- Staging areas;
- work hour limitations/restrictions;
- coordination with local churches;
- traffic operations at the intersection of Minnesota Avenue and Benning Road
- pedestrian safety and access;
- project coordination; and
- potential alternative routes.

DDOT is in the process of planning modifications of the Benning Road and DC-295 interchange via a separate Interchange Modification Report (IMR) process. The proposed interchange modifications would introduce a new ramp system that would increase safety and vehicular access to Benning Road and DC-295. It is expected that the proposed improvements will affect the construction and the overall traffic patterns on the Benning Road in the vicinity of DC-295 interchange. Therefore, this appendix includes construction sequencing and MOT measures for the Preferred Alternative, as well as those associated with the Benning Road and DC-295 Interchange project.

## 1.3 Selection of DDOT's Preferred Alternative

The project team released a Draft EA for a 30-day public comment period on May 4, 2016 and held a public hearing on May 19, 2016. The public and agencies were given the opportunity to review and comment on the EA until June 2, 2016. Public and agency coordination efforts have continued since the Draft EA and public hearing. DDOT held an Open House for the EA on November 15, 2017. After thorough consideration of input received from the public and agencies after publication of the Draft EA and based on technical analyses and the evaluation of alternatives, DDOT has selected Build Alternative 2, the median streetcar alignment with wired propulsion, as its Preferred Alternative.

# 2.0 Methodology

## 2.1 Key Modeling Assumptions

The traffic simulations presented in the MOT Concept Plan assume a 36-month construction period with no phasing. **Table D-1** presents the changes in roadway capacity expected to occur during this period. The future (2025) traffic volumes were developed using the MWCOG travel demand model (version 2.3.75), which was also used in the preparation of the Interchange Modification Report (IMR). Highway Capacity Software (HCS7) was used to analyze traffic conditions on freeways, ramps, and limited access arterial facilities. Synchro 10 was used to analyze arterial intersection traffic operations. In addition to capacity reductions within the project limits, the traffic simulations also account for changes in traffic volumes in surrounding areas as motorists attempt to bypass construction zones. The most prevalent alternate routes for traffic diversion are presented in **Attachment A**.

**Table D-1. Capacity Reductions by Facility**

| Construction Location | Construction Impact to Existing Street Network | Duration of Impact |
|---|---|---|
| Benning Road (26th Street to 36th Street) | 6/8 lanes to 4 lanes | Full duration (36 months) |
| Benning Road (36th Street to Minnesota Avenue) | 4 lanes to 2 lanes | Full duration (36 months) |
| Benning Road (Minnesota Avenue to East Capitol Street) | 4 lanes to 2 lanes | Full duration (36 months) |
| Northbound DC-295 (East Capitol Street interchange to Nannie Helen Burroughs Avenue interchange)[1] | 3 lanes to 2 lanes | Full duration (36 months) |
| Southbound DC-295 (Nannie Helen Burroughs Avenue interchange to East Capitol Street interchange) | Remain 3 lanes | Full duration (36 months) |
| Ramp from Northbound DC-295 to westbound Benning Road | Closed | Full duration (36 months) |
| Ramp from Southbound Kenilworth Avenue to Northbound DC-295 | Closed | Full duration (36 months) |
| Ramp from Eastbound Benning Road to Northbound DC-295 | Remains 1 lane with short term closure | Full duration (36 months) |
| Ramp from Eastbound Benning Road to Southbound DC-295 | Remains 1 lane with short term closure | Full duration (36 months) |

*[1] The lane reduction on northbound DC-295 is required for reconstructing the Whitlock Bridge (#503) and the exact limits of lane closure will be determined in the design phase of the project. The assumption for the MOT traffic analysis represents a conservative approach.*

## 2.2 Freeway Operations

Highway Capacity Software (HCS7) was used to analyze traffic conditions on freeways, ramps, and limited access arterial facilities. Traffic analyses were conducted using the Freeway Facilities methodology found in the 6th Edition of the Highway Capacity Manual (HCM) for both

directions of DC-295 between East Capitol Street and Nannie Helen Burroughs Avenue NE and the segment of East Capitol Street between C Street NE/Independence Avenue SE and Minnesota Avenue NE.

## 2.3 Arterial Operations

Traffic analyses were conducted using Synchro 10 to evaluate the anticipated construction impacts and proposed mitigations to the arterial network within MOT influence area. For the purposes of this analysis, the Synchro results for 30 signalized and unsignalized intersections were evaluated; these intersections are located along the following road segments:

- Benning Road NE (26th St NE to East Capitol St)
- Minnesota Avenue NE (Dix St NE to Nannie Helen Burroughs Ave NE)
- Nannie Helen Burroughs Ave NE/Deane Avenue NE (Lee St NE to 44th St NE)
- Kenilworth Avenue NE (Deane Ave NE to Foote St NE)
- Oklahoma Avenue NE (Benning Rd NE to C St NE)
- C Street NE (17th St NE to 21st St NE)
- East Capitol Street (19th St NE to 22nd St NE and Texas Ave SE to Benning Rd NE)
- 19th Street NE (Independence Ave SE to C St NE)

## 2.4 22nd Street NE (East Capitol St to C St NE)Staging Areas

To minimize the disruption caused by construction vehicles and equipment, the staging areas would be identified close to the road or structure that is under construction. Identifying appropriate locations is challenging due to the dense urban setting. Near Oklahoma Avenue, the site where the Capitol Grand Prix was held in Anacostia Park Section F, could be used for staging or storage. Additionally, open private land to the north of Benning Road near 42nd Street could be used through a negotiated agreement for temporary construction staging.

## 2.5 Work Hour Limitations/Restrictions

Although a construction schedule has not been developed, the proposed action would likely limit nighttime construction activities along certain sections of the project area, particularly in residential areas. However, night work may be necessary for girder erection and other activities that would otherwise require daytime lane closures, which would impact higher volumes of traffic compared to nighttime volumes. Provisions to allow night work could also shorten construction duration and limit overall inconvenience to the community.

## 2.6 Coordination with Local Churches

In consideration of active religious congregations within the project area, DDOT will coordinate with churches to avoid or minimize impacts to church activities. During initial public outreach, concern was raised that construction activities would impact several churches along Benning Road and funeral processions that use Benning Road for hearse loading and unloading. DDOT

will undertake an assessment of potential construction effects on churches and businesses during project design and construction planning to avoid or minimize impacts.

## 2.7 Minnesota Avenue Intersection Operations

Bridge reconstruction and track work installation near and through the intersection is expected to make certain turning movements temporarily inaccessible during construction. Likewise, utility relocations would also impact vehicular movements. Alternative routes would be established and clearly marked to minimize delay. Alternative routes have been identified and are described in **Section 4.0** of this document.

## 2.8 Pedestrian and Bicycle Safety and Access

Throughout construction, safe pedestrian access will be maintained. The south side of Benning Road supports a moderate amount of pedestrian traffic west of Minnesota Avenue. Both the north and south sides of Benning Road support pedestrian movement east of Minnesota Avenue. When the proposed action moves forward into design, DDOT will develop safety and access elements into the final design and construction requirements to prevent unmonitored pedestrian access. Safety fencing, signing, temporary curb ramps, and well-delineated, well-lit pedestrian paths will be provided as needed to safely accommodate pedestrian and bicycle traffic in the project area.

## 2.9 Maintenance of Access Plan

DDOT will develop and implement a Maintenance of Access (MOA) Plan to maintain pedestrian and vehicular access to residences, businesses, and other properties during construction. Bus stop access will be maintained during construction and will be addressed as part of the MOA Plan.

# 3.0 Summary of Construction Impacts & Mitigation

The construction of DDOT's Preferred Alternative is expected to increase congestion within the study area. This increase is primarily driven by two elements of the MOT plan:

- The reduction of capacity on both directions of Benning Road NE corridor and along northbound DC-295; and
- The ramp closure at the Benning Road NE and DC-295 interchange.

As noted earlier, these changes are expected to create an incentive for motorists to utilize alternative routes (see **Attachment A**). The impact summaries which follow incorporate these changes in traffic patterns.

## 3.1 Freeway Operations

### 3.1.1 DC 295

#### *3.1.1.1.1.1 Southbound – AM & PM Peak*

Traffic volumes on southbound DC-295 are forecasted to increase by fewer than 100 vehicles on all segments during the AM peak hour and decrease by up to 150 vehicles between Benning Road NE and East Capitol Street during the PM peak hour due to travel pattern shifts associated with construction impact. For example, lane reductions on Benning Road NE are projected to divert traffic away from Benning Road NE west of DC-295 in the westbound and eastbound direction during AM and PM peak, respectively. Accordingly, speed and density differ minimally under 2025 No-Build and MOT volumes. As such, impacts to operations on southbound DC-295 during construction are likely to be negligible.

#### *3.1.1.1.1.2 Northbound – AM Peak*

Traffic volumes on northbound DC-295 are forecasted to decrease by nearly 200 vehicles south of the Benning Road NE interchange during the AM peak hour due to travel pattern shifts associated with construction impacts (e.g., lane reduction on Benning Road NE and closure of the northbound DC-295 off-ramp to Benning Road). However, with the closure of the northbound DC-295 offramp to westbound Benning Road, traffic volumes north of the interchange are expected to increase by up to 100 vehicles as a result of diverted trips. Given the closure of one northbound through lane on DC-295, operations are expected to deteriorate within and upstream of the two-lane section between East Capitol Street and Benning Road. The merge area associated with the on-ramp from Benning Road is likely to produce more turbulence in the traffic stream under the proposed lane closure configuration. Where the freeway currently operates at LOS C with near free flow speeds during the AM peak hour, speeds are expected to decrease to less than 30 mph with densities of approximately 55 passenger cars per mile per lane. The HCS software estimates that these congested conditions may extend upstream of the East Capitol Street interchange. It should be noted that the limits of NB DC-295 lane closure (from three lanes to two lanes) will be determined in the 65% and final design phase of the project; the limits of lane closures assumed in the MOT analysis is conservative and the segment impacts could be shorter (*e.g.*, just upstream and downstream of Benning Road NE and DC-295 interchange).

#### *3.1.1.1.1.3 Northbound – PM Peak*

Traffic volumes on northbound DC-295 are expected to decrease by 400-500 vehicles across all segments during the PM peak hour, primarily driven by diverted trips to alternative routes. The diversion of trips is based on the MWCOG model results. Despite this large decrease in volume, operations under 2025 MOT conditions within and upstream of the proposed freeway lane closure are likely to be impacted substantially. On segments where the freeway currently operates with speeds less than 15 mph and densities greater than 100 passenger cars per mile per lane—largely due to downstream oversaturated conditions—both measures (i.e., speed and density) are expected to improve slightly over the 2025 No-Build conditions. However, the increase in speeds and decrease in density north of the Benning Road interchange are a result of metered traffic flow

through the work zone; the formation of a new bottleneck at the freeway lane closure is expected to propagate congestion upstream of the East Capitol Street interchange.

## 3.2 Arterial Operations

The Synchro analysis of arterial operations indicates that the reduction of one lane on Benning Road will result in significant delay and congestion compared to the 2025 No-Build conditions. **Table D-2** lists the intersection where delay is expected to change substantially.

**Table D-2. Intersections with Significant Change in Synchro Intersection Delay [sec]**

| Intersection | Change in Intersection Delay Relative to the 2025 No-Build | |
|---|---|---|
| | AM | PM |
| Anacostia Avenue NE at Benning Road NE | +56 | -- |
| 34th Street NE at Benning Road NE | +27 | -- |
| Minnesota Avenue NE at Benning Road NE | -- | +21 |
| 42nd Street NE at Benning Road NE | +38 | +83 |
| 44th Street NE at Benning Road NE | +171 | +22 |
| East Capitol Street at Benning Road NE | +31 | +50 |
| Kenilworth Terrace NE at Deane Avenue NE | +40 | -- |
| 17th Street NE at C Street NE | +25 | -- |
| 19th Street NE at Independence Avenue SE | -- | +23 |

*Note: Positive change in delay indicates wait times will worsen under the MOT Build condition. Negative change (--) indicates a relative reduction.*

## 3.3 Recommended Mitigation

### 3.3.1 Segment Breakdown and Phasing

The traffic simulations prepared in support of this plan assume that all the MOT measures required to accommodate construction will occur simultaneously. As a result, the modeled impacts represent worst-case conditions. One of the principal ways DDOT will reduce the severity of these impacts is to phase the construction process. Since the scope of the construction process varies across project area, the phasing scheme is organized based on project segments (see **Figure D-1**).

Segment A includes the section of Benning Road between 26th Street and 36th Street. In this area, Phase 1 involves constructing: the raised median; the streetcar tracks; and the proposed roadway improvements. During this period, two lanes of traffic will be maintained in both travel directions, as well as a sidewalk outside on existing roadway. Phase 2E and Phase 2W will include the remaining eastside and westside work. Phase 3 will include the work required to finish the raised median and streetcar stop, pavement markings, and signage.

**Figure D-1. Project Area Segments**


Segment B includes the section of Benning Road between 36th Street and Minnesota Avenue, as well as approximately 3,700 ft of DC 295 (2,400 ft south of Benning Road and 1,300 ft to the north). In this area, Phase 1 involves constructing the eastbound (EB) portion of the Whitlock Bridge. During this process, the existing westbound (WB) structure will be modified to support two-way traffic (one lane each). Pedestrian access will be maintained on the EB structure. Phase 2 includes constructing the WB structure. While this is occurring, vehicular traffic will be shifted to the newly constructed EB structure. During this period, EB and WB traffic will each be provided one lane. Northside roadway approaches and retaining walls will be constructed along with the WB bridge. Phase 3 will include constructing: the raised median, pavement markings, and signage. Work along DC-295 will be completed as apart of Segment B, see **Figure D-2** for an illustration of how this work will be competed. For more information on these improvements please see **Appendix M** of the *Benning Roads and Bridges Transportation Improvements Final EA*.

Segment C includes the section of Benning Road from Minnesota Avenue to East Capitol Street. In this area, Phase 1 involves completing the proposed improvements to the EB portion of Benning Road. Two-way traffic (one-lane each) would be maintained on the remaining portion of Benning Road. Phase 2 involves shifting traffic to the southside of Benning Road and completing the proposed improvements to the road's WB section. Phase 3 will include constructing: the raised median, streetcar stops, pavement markings, and signage.

**Figure D-2. DC 295 – Benning Road Interchange Improvements Phasing Diagram**


### 3.3.2 Freeway Operations

For DC-295, it is recommended that at the minimum the merge from eastbound Benning Road on-ramp to northbound DC 295 be extended to meet AASHTO design standard. To further mitigate the impact to northbound DC 295 traffic during MOT, the freeway lane schematics can be temporarily laid out in a way that the merge from Benning Road on-ramp becomes an add-lane to join the two-lane northbound DC 295 mainline. This may be implemented after the completion of construction phasing of the Whitlock Bridge.

### 3.3.3 Arterial Operations

Based on the current traffic simulation, the following actions are recommended to mitigate the predicted increase in arterial congestion:

- East Capitol Street and Benning Road: provide a dedicated eastbound left-turn lane
- 44th Street and Benning Road: provide a dedicated eastbound left-turn lane
- 42nd Street and Benning Road: provide dedicated eastbound and westbound left turn lanes
- 40th Street and Benning Road: provide a dedicated westbound left-turn lane
- Minnesota Avenue and Benning Road: maintain current eastbound left-turn lane; improve signal operations as part of a corridor-wide signal timing adjustment
- 34th Street and Benning Road: maintain current eastbound / westbound left-turn lanes; improve signal operations as part of a corridor-wide signal timing adjustment

- Anacostia Avenue and Benning Road: provide dedicated eastbound and westbound left-turn lanes

# 4.0 Project Coordination

As described above, DDOT will develop and implement coordination, sequencing, and scheduling elements of the construction plan for the proposed action to avoid or minimize motorist delay and impacts on potentially affected businesses and communities. Coordination with non-highway transportation facilities including transit will also be part of the plan. Construction over a long period (36 months) would result in congestion and reduced access to residences and businesses in the vicinity of the project during that period. Emergency services (fire, ambulance, and police services) and bus services (school buses, WMATA buses, and handicapped and elderly transportation) could experience detours and slower travel during construction where access to or passage through existing roads might be restricted.

In accordance with DDOT's standard operating procedures, the construction contractor will develop a Construction Management Plan  defining measures to minimize construction impacts on traffic. To the extent practicable, access to businesses and residences will always be maintained and at least a lane will be kept open to traffic unless alternative routes are provided. DDOT will provide advance notifications of proposed construction activities in the area via various media like internet, social media, boards etc. Advanced information that describes construction activities and provides alternative transportation routes will be made available to the public.

Even with the implementation of the MOT plan, traffic congestion will increase in the short term around the construction area. Lane closures will be short-term and limited to the closures that will be specified in the MOT plan as approved by DDOT before the start of construction. DDOT and the contractor will coordinate with emergency service providers such as fire protection, police and ambulance service, and other community facilities before and throughout the construction to ensure that access for their vehicles is maintained.

# 5.0 Attachment A

**List of Attachments**

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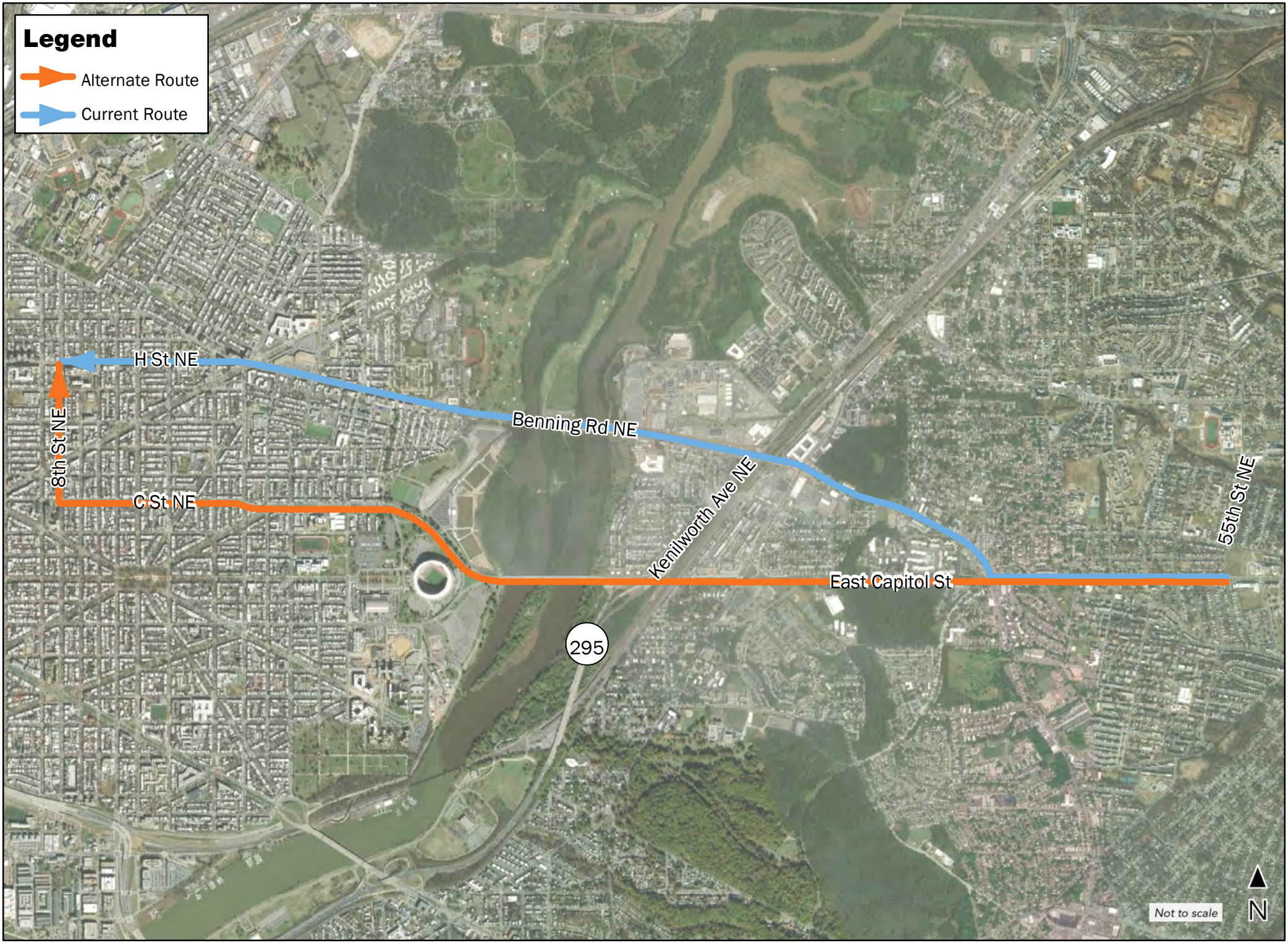
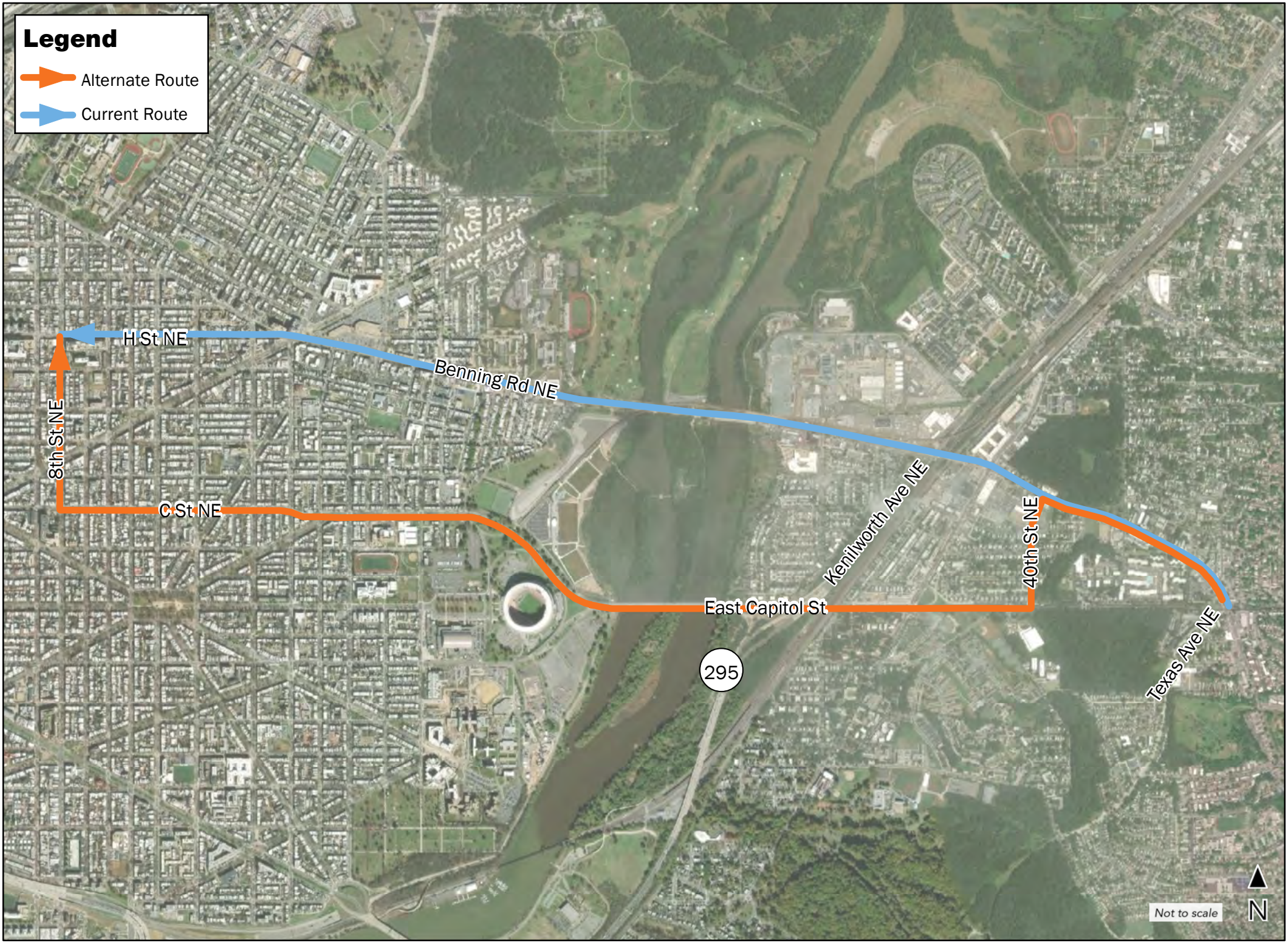
Attachment A. Alternate Routes

Figure A-1: AM-1



Attachment A. Alternate Routes

Figure A-2: AM-2



Attachment A. Alternate Routes

Figure A-3: AM-3

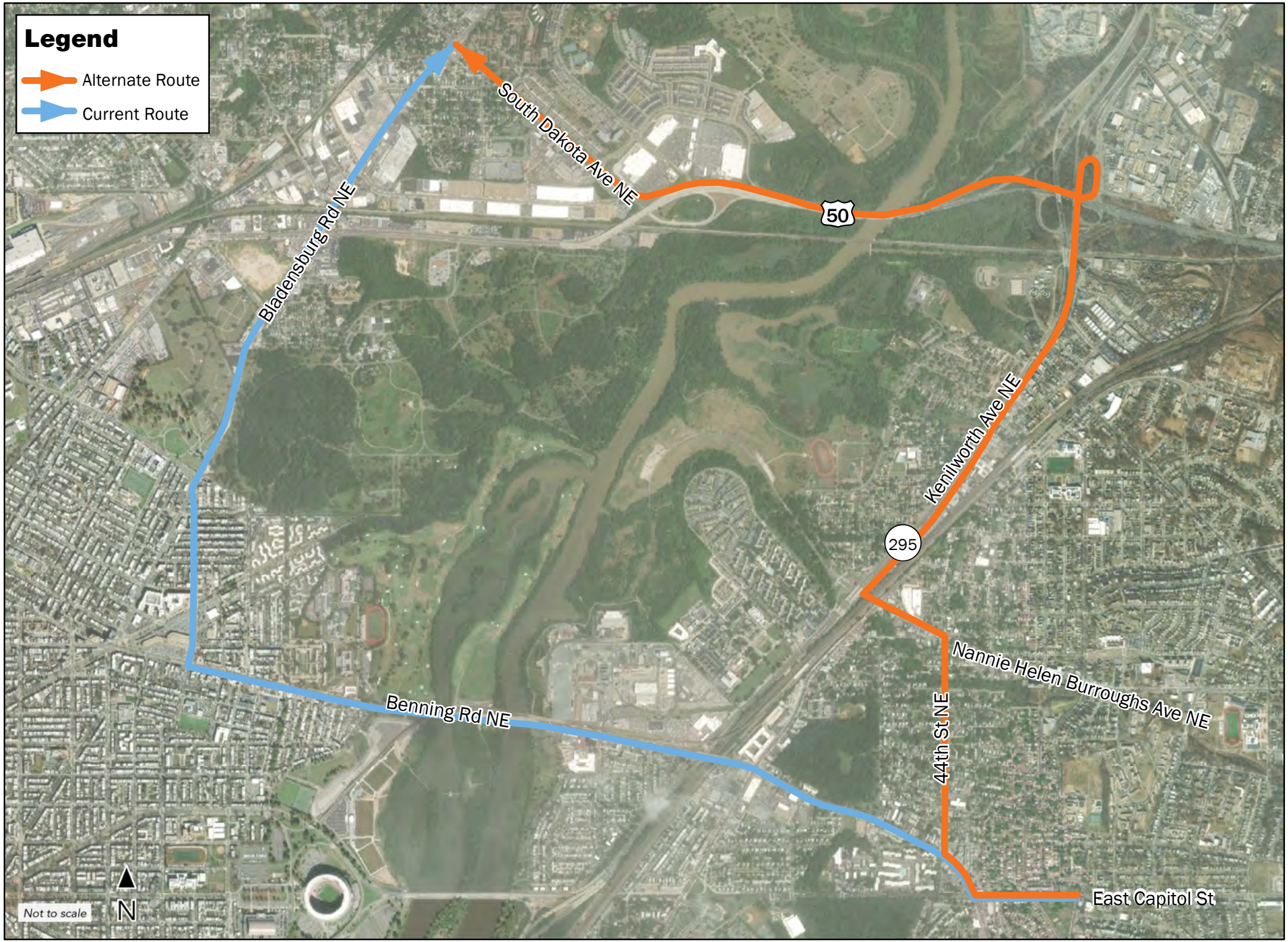


Figure A-4: PM-1

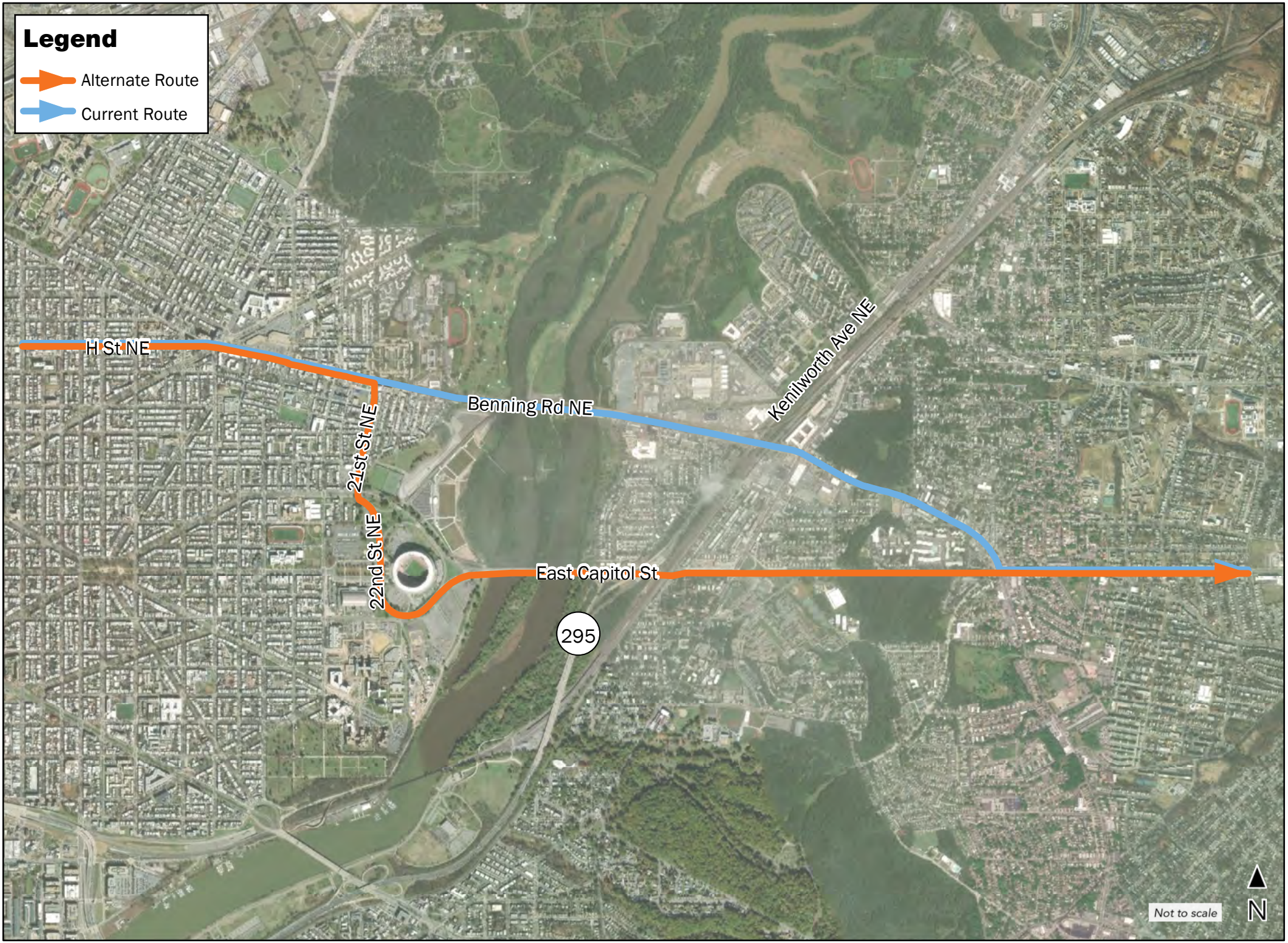
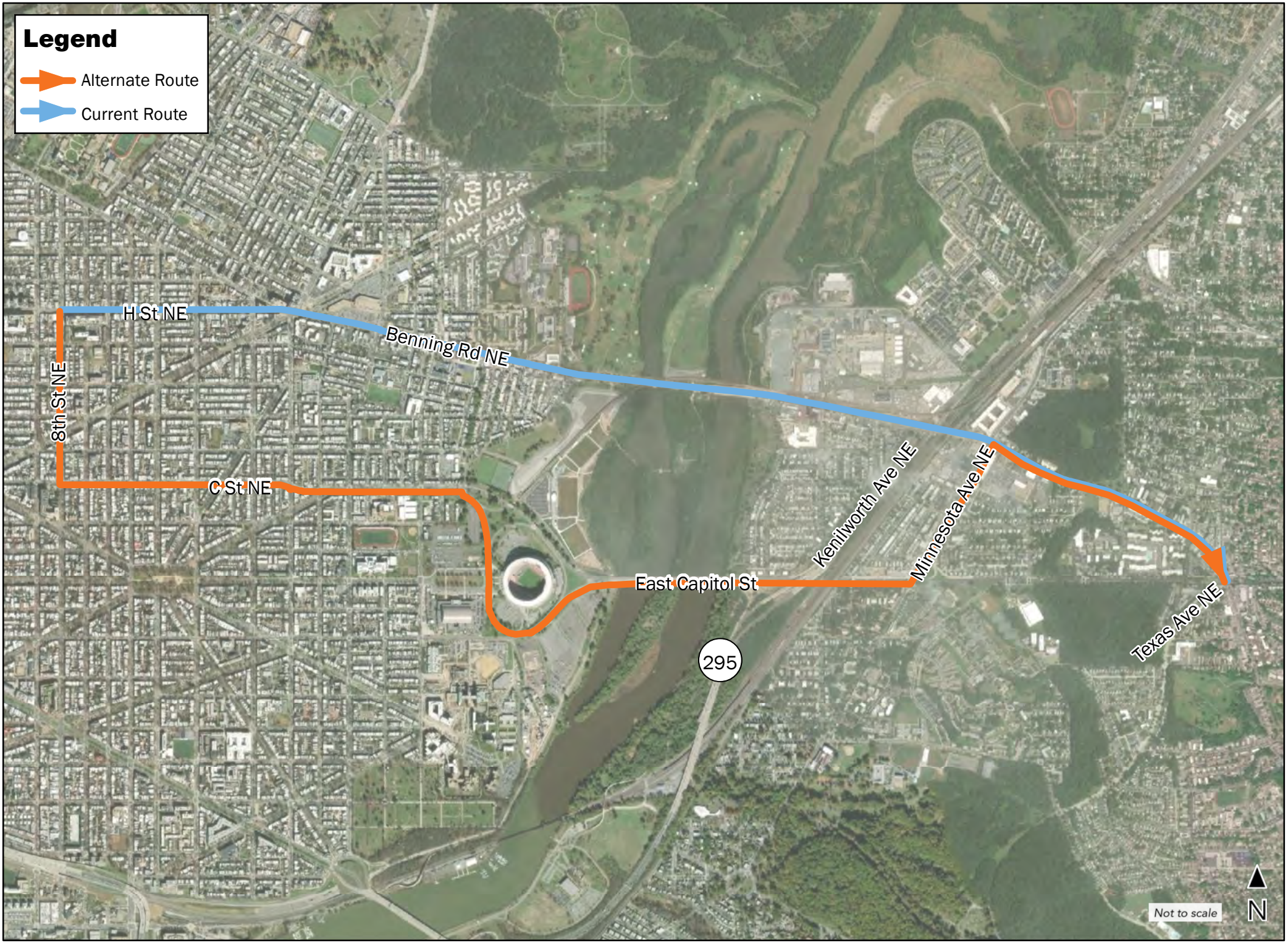
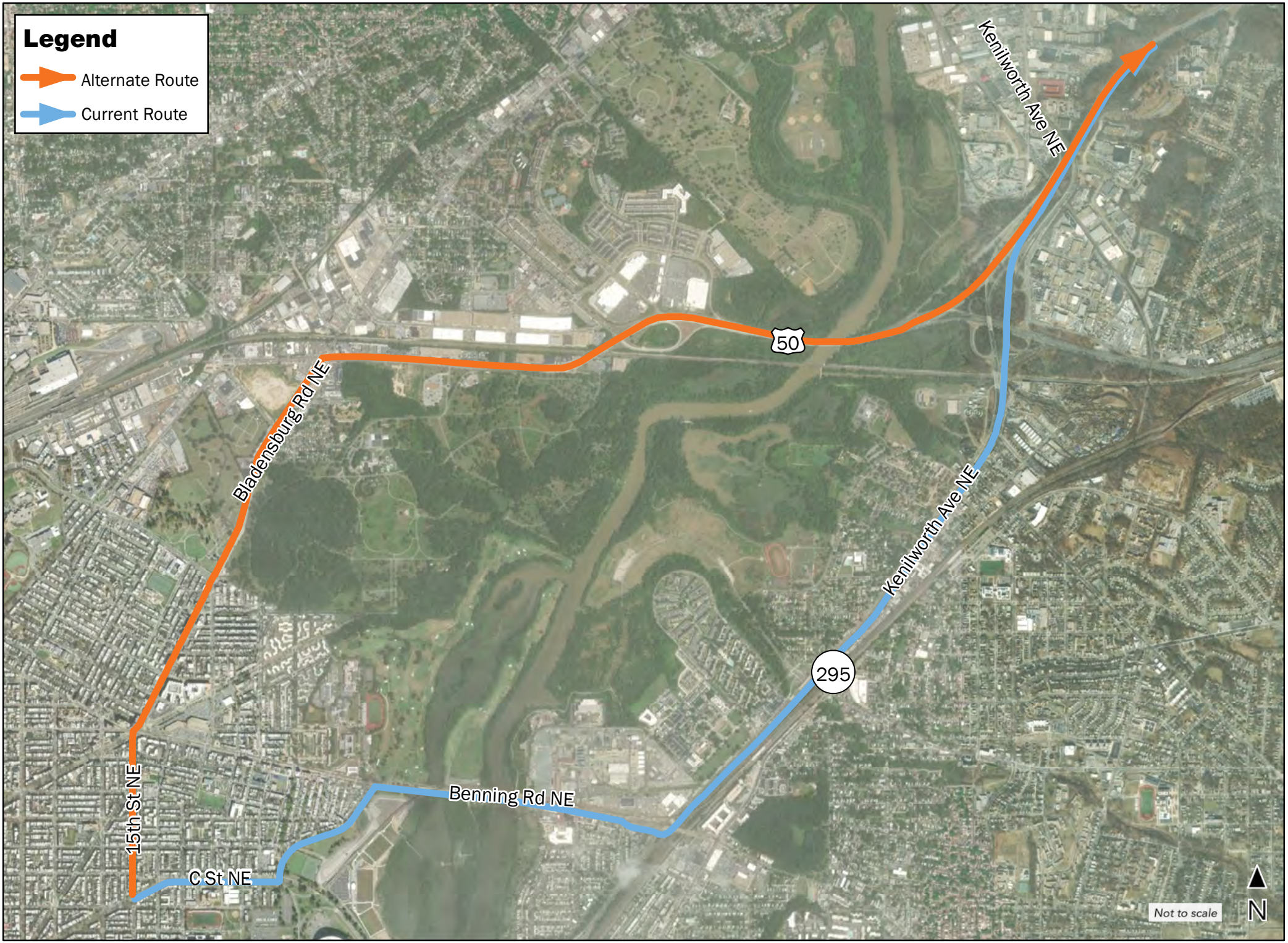


Figure A-5: PM-2



Attachment A. Alternate Routes

Figure A-6: PM-3



Attachment A. Alternate Routes

Figure A-7: PM-4

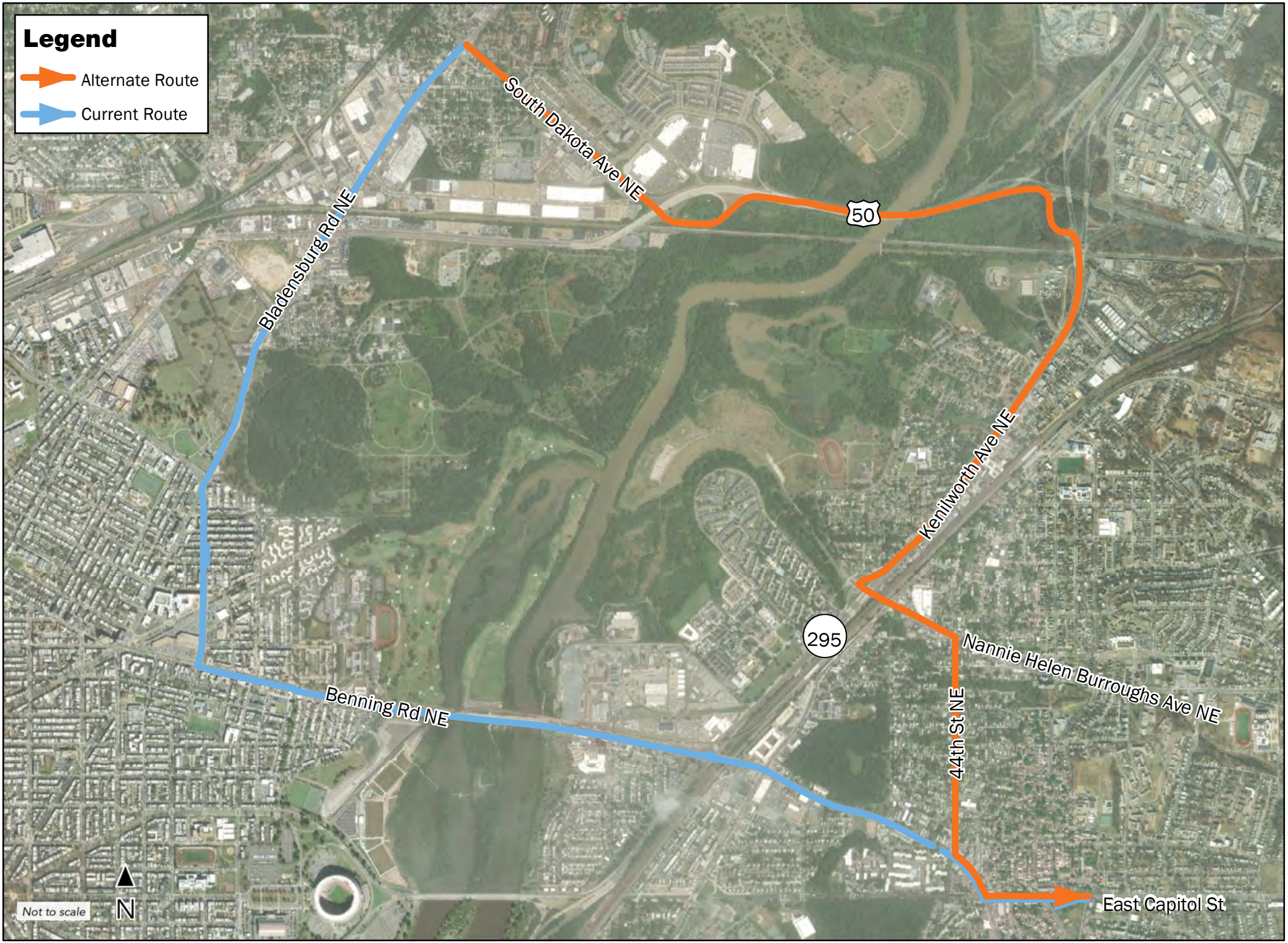


Figure A-8: PM-5

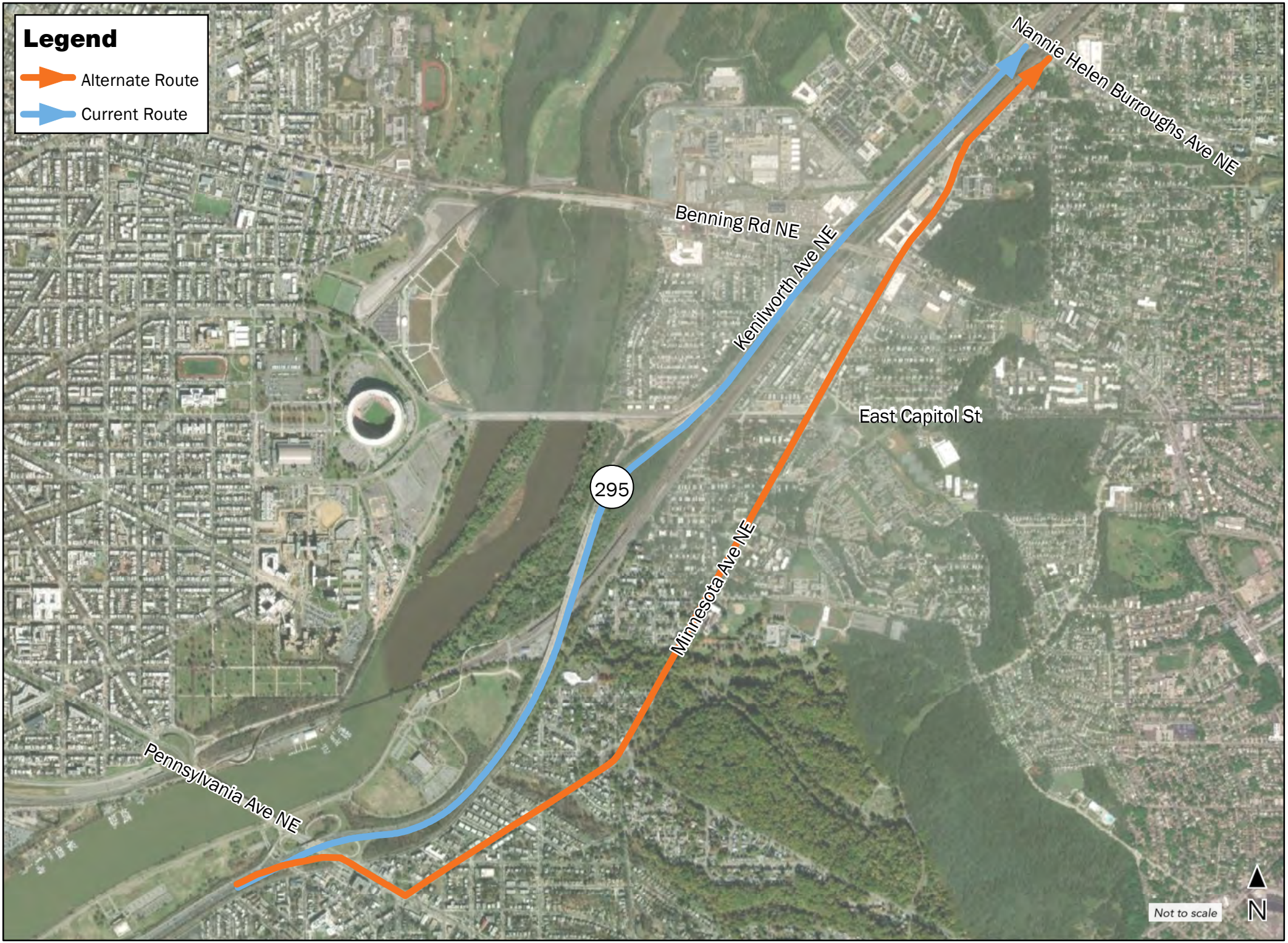
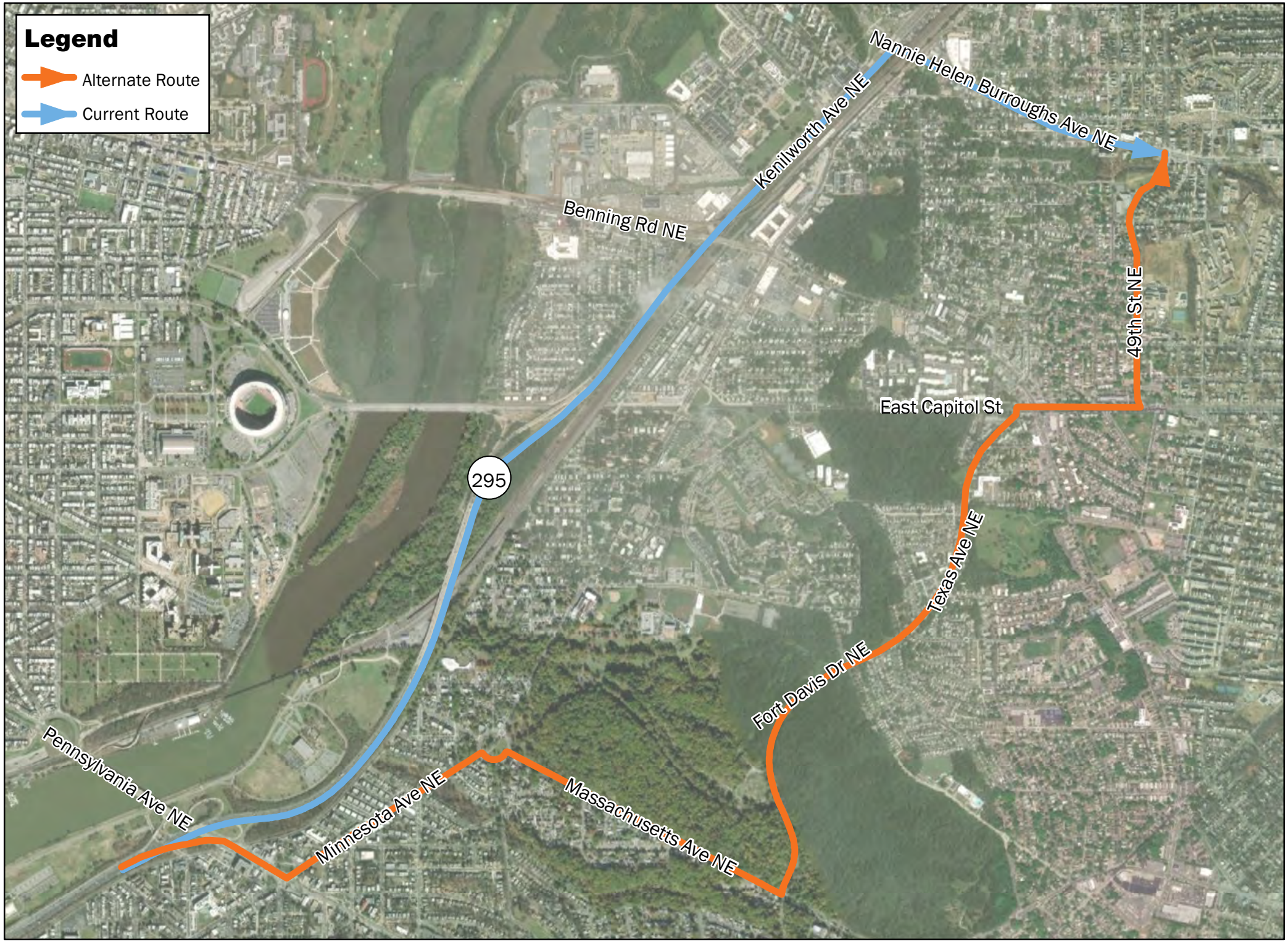


Figure A-9: PM-6



# BENNING ROAD & BRIDGES TRANSPORTATION IMPROVEMENTS

## FINAL TRANSPORTATION TECHNICAL MEMORANDUM

FINAL SEPTEMBER 2020



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# Executive Summary

The project team performed analyses for the existing condition year 2019, opening year 2025 and design year 2045 on the No Build and build Alternative 2 - Median Streetcar Alignment with wired propulsion scenarios. Alternative 2 was chosen to be the Preferred Alternative.

The freeway portion of the study network includes approximately three miles of DC-295, from just north of Pennsylvania Avenue SE to just south of US 50, and three interchanges – Nannie Helen Burroughs Avenue NE, Benning Road NE, and East Capitol Street. The arterial portion of the study network includes shorter segments of Deane Avenue NE, Nannie Helen Burroughs Avenue NE, Minnesota Avenue NE, and East Capitol Street, with a focus on the segment of Benning Road NE from 26th Street NE to East Capitol Street. In all, 18 signalized intersections and seven unsignalized intersections were included in the analysis.

Future scenarios include all the transportation improvement projects programmed in MWCOG's CLRP within the study area. To enhance the traffic forecasting accuracy using the MWCOG model, VISUM was used as a supplemental tool to assign traffic and develop forecasts with greater detail of the traffic analysis zones and street network. The two major inputs in the modeling process used in this analysis are land use data and transportation networks. The VISUM model was validated against peak period counts for freeways and arterials, specifically 6:00 to 9:00 AM and 3:00 to 7:00 PM, which is consistent with the peak periods of the MWCOG model. A network-wide representative peak hour was determined for the AM peak (7:45 AM to 8:45 AM) and PM peak (5:00 PM to 6:00 PM) using the traffic count data as well as the travel time data for the Benning Road corridor.

Some measures of performance considered when comparing the 2025 and 2045 build scenario to the 2025 and 2045 No-Build scenario were: LOS; Streetcar Ridership; and Bus Ridership along the entirety of the routes considered.

***LOS***

For the 2025 begin year, of the eight critical intersections (LOS E or F) considered, the build scenario decreased the number of LOS E intersections by one and increased the number of LOS F intersections by one, indicating that the build condition was slightly worse than the No-Build condition. For the 2045 design year, however, of the 12 critical intersections (LOS E or F) considered, the build scenario increased the number of LOS E intersections by two and decreased the number of LOS F intersections by two, indicating that the build condition was slightly better than the No-Build condition.

***Streetcar Ridership***

For the 2025 begin year, models project that the build scenario ridership will increase by 105% over the No-Build scenario, whereas in the 2045 design year, models project that the build

scenario ridership will increase by 112% over the No-Build scenario. The introduction of additional proposed stops account for over half of the ridership increase in both years.

***Bus Ridership***

For the 2025 begin year, models project that the build scenario ridership will decrease by approximately 4% compared to the No-Build scenario, whereas in the 2045 design year, models project that the build scenario ridership will decrease by approximately 6% compared to the No-Build scenario. This decrease is likely due to the introduction of the faster, more frequent Streetcar service, particularly during the off-peak periods because the Streetcar would operate with the same 10-minute headway during both the peak and off-peak, thereby reducing passenger waiting time between the Benning Road Metrorail Station and Union Station.

# Table of Contents

## List of Figures

## List of Tables

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# 1.0 Introduction

## 1.1 Proposed Action Overview

The District Department of Transportation (DDOT), in conjunction with the Federal Highway Administration (FHWA), prepared this Section 106 evaluation to support Final Environmental Assessment (EA) for the proposed Benning Road and Bridges Transportation Improvements project (the proposed action) in northeast Washington, DC. The proposed action would: provide safety improvements; extend the H/Benning Streetcar service to the Benning Road Metrorail Station; and improve pedestrian and bicycle facilities along Benning Road between Oklahoma Avenue and the Benning Road Metrorail Station. FHWA is the lead federal agency for the EA, with DDOT (the Applicant) as the local sponsor. The Federal Transit Administration (FTA), the National Capital Planning Commission (NCPC), and the National Park Service (NPS) are cooperating agencies.

The proposed action qualifies as an eligible project for Federal-aid funding under 23 CFR § 810.102 Eligible projects. FHWA concurred with mass transit use of the Benning Road ROW in a letter to DDOT dated April 18, 2013. The proposed action is included in the National Capital Region Transportation Planning Board's adopted Transportation Improvement Program (TIP) and the 2016 Financially Constrained Long-Range Plan for the National Capital Region (CLRP).

This EA is a Federal document and was prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations (40 CFR 1500-1508), FHWA's Environmental Impact and Related Procedures (23 CFR 771), FHWA's Technical Advisory Guidance for Preparing and Processing Environmental and Section 4(f) Documents (T6640.8A), FHWA's 2006 SAFETEA-LU Environmental Review Process: Final Guidance, Appendix A of 23 CFR part 450 titled Linking Transportation Planning and NEPA Processes, FTA's 2006 Transit Noise and Vibration Impact Assessment guidance, FHWA's Noise Regulations (23 CFR 772), and DDOT's Environmental Process Manual.

## 1.2 Purpose of the Memorandum

This technical memorandum provides an overview of transportation analyses conducted for the Benning Road and Bridges Transportation Improvements Environmental Assessment (EA). This technical memorandum describes the technical methodologies and presents results of the traffic analysis, including the ridership projections for the proposed action. The rest of this technical memorandum is organized as follows:

- Methodology
- Existing Conditions
- Opening Year 2025 Conditions

- Design Year 2045 Conditions

## 1.3 Selection of DDOT's Preferred Alternative

The Draft EA was released for a 30-day public comment period on May 4, 2016 and a public hearing was held on May 19, 2016. The public and agencies were given the opportunity to review and comment on the EA until June 2, 2016. Public and agency coordination efforts have continued since the Draft EA and public hearing. DDOT held an Open House for the EA on November 15, 2017. After thorough consideration of input received from the public and agencies after publication of the Draft EA and based on technical analyses and the evaluation of alternatives, DDOT has selected Build Alternative 2 - Median Streetcar Alignment with wired propulsion as the Preferred Alternative. As a result of this selection, the traffic analyses of the curbside alternative (Alternative 1) were not updated to reflect the revised opening year (2025), design year (2045), or the most recent regional travel demand forecasts from MWCOG. They are included in this document for informational purposes only.

# 2.0 Methodology

This section summarizes the study area, key data, and modeling/ analysis methodology used in travel demand forecasting and traffic modelling for this project.

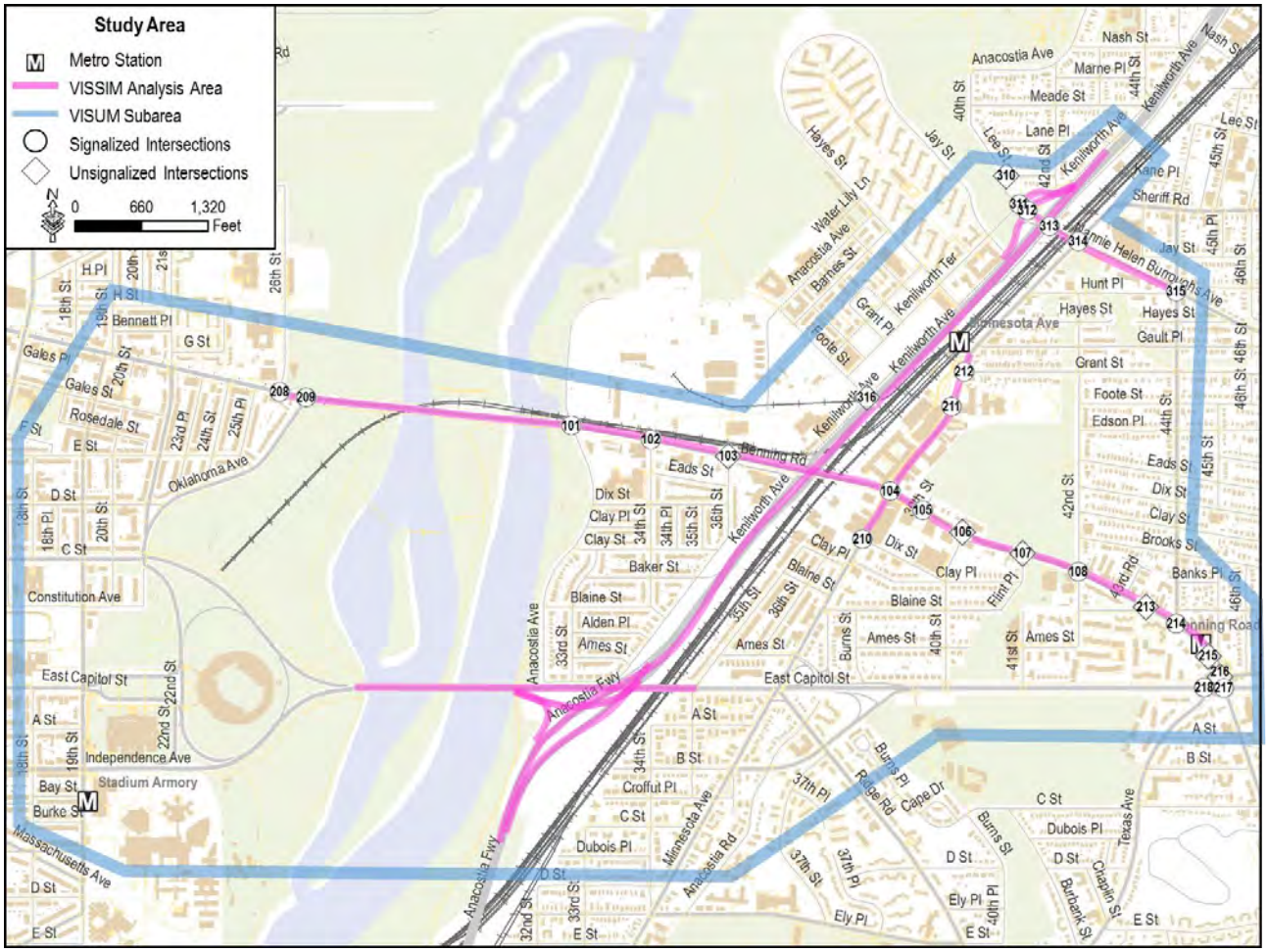
## 2.1 Study Area Boundary

Error! Reference source not found. shows the project scope and analysis corridors and intersections. The freeway portion of the study network includes approximately three miles of DC-295, from just north of Pennsylvania Avenue SE to just south of US 50, and three interchanges – Nannie Helen Burroughs Avenue NE, Benning Road NE, and East Capitol Street. The arterial portion of the study network includes shorter segments of Deane Avenue NE, Nannie Helen Burroughs Avenue NE, Minnesota Avenue NE, and East Capitol Street, with a focus on the segment of Benning Road NE from 26th Street NE to East Capitol Street. In all, 18 signalized intersections and seven unsignalized intersections were included in the analysis. This should address the transit and traffic operation resulting from the design of the proposed streetcar extension and reconstruction of Benning Road, including pedestrian and bicycle facilities.

Future scenarios include all the transportation improvement projects programmed in MWCOG's CLRP within the study area. Note that the DC-295 interchange with Benning Road NE project is currently not in the CLRP; therefore, it has not been included in the future scenarios of this analysis. The DC-295 interchange with Benning Road NE represents one of the only few roadway crossings of the Anacostia River connecting the east and west of Washington, D.C. The limited number of waterway crossings, as well as the limited connections at the crossings and between them, results in substantial pressure on the Benning Road NE interchange to accommodate heavy traffic demands and creates significant congestion. Modifications are planned on the Benning

Road/ DC-295 interchange to improve connectivity, to eliminate unsafe conditions, and to manage traffic demands. The interchange improvement project would mainly include: correcting turning radius deficiencies on existing ramps; lengthen merge and weave areas; increase deceleration/acceleration distance for on/off-ramps; provide safe pedestrian/bicycle crossing; maintain structural integrity of bridges 104 and 104-1 that span over Kenilworth Ave; and increase number of movements at the interchange to provide connectivity to the communities located at the east of DC-295. DDOT is assessing the referenced Benning Road/DC-295 interchange improvements through a separate Interchange Modification Report (IMR) process. Alternative analysis is currently ongoing for the IMR. Development of No Build and Build traffic scenarios will follow once the Preferred Alternative for the IMR is finalized. It is expected that the proposed improvements will result in permanent changes to the overall traffic patterns on the Benning Road NE in the vicinity of DC-295 interchange. Therefore, in order to provide a full assessment of traffic scenarios in the study area, DDOT will prepare traffic analysis and Maintenance of Traffic (MOT) document which will evaluate Benning Road infrastructure improvements proposed in this EA, and DC-295 interchange improvements together in the IMR. Please note that this analysis only considers traffic impacts under the no-build and build conditions for the Benning Road infrastructure improvements only.

**Figure 1: Transportation Study Area**



The study area includes the following intersections:

- I-101: Benning Road NE at Anacostia Avenue NE
- I-102: Benning Road NE at 34th Street NE
- I-103: Benning Road NE Ramp to DC-295 at 36th Street NE
- I-104: Benning Road NE at Minnesota Avenue NE
- I-105: Benning Road NE at 39th Street NE/Driveway
- I-106: Benning Road NE at 40th Street NE
- I-107: Benning Road NE at 41st Street NE
- I-108. Benning Road NE at 42nd Street NE
- I-208. Benning Road NE at 26th Street NE
- I-209. Benning Road NE at Oklahoma Avenue NE
- I-210: Minnesota Avenue NE at Dix Street NE
- I-211: Minnesota Avenue NE at Bus Exit South
- I-212: Minnesota Avenue NE at Grant Street NE and Bus Entrance North
- I-213: Benning Road NE at Blaine Street NE
- I-214: Benning Road NE at 44th Street NE
- I-215: Benning Road NE at 45th Street NE
- I-216: Benning Road NE at Central Avenue NE
- I-217: Benning Road NE at East Capitol Street SE
- I-218: East Capitol Street SE at Texas Avenue SE
- I-310: Deane Avenue NE at Lee St NE
- I-311: Deane Avenue NE at Kenilworth Terrace NE
- I-312: Deane Avenue NE at Kenilworth Avenue NE
- I-313: Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC-295 U-Turns
- I-314: Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE
- I-315: Nannie Helen Burroughs Avenue NE at 44th Street NE and Hunt Place NE
- I-316: Kenilworth Avenue NE at Foote Street NE

## 2.2 Data Collection and Process

The data used for traffic forecasting and analysis included the following:

- Traffic volumes (intersections, freeway/arterial mainlines, ramps)
- Streetlight O-D data
- Travel time data (field collected and Google crowdsourced data)
- Observed queue data
- Multimodal data (pedestrian/bicycle volumes, transit operations)

### 2.2.1 Existing Traffic count data collection locations

Traffic count data was collected Tuesday through Thursday over the course of two weeks, from April 2nd - 4th and April 9th - 11th, 2019. The traffic count data collected included peak period intersection turning movement counts (TMCs) and 72-hour classification counts for arterial

segments, DC-295 ramps, and DC-295 mainline segments. **Figure 2** shows the intersection TMC and arterial classification count locations. **Figure 3** shows the freeway mainline and ramp classification count locations.

**Figure 2: TMC and Arterial Count Locations**

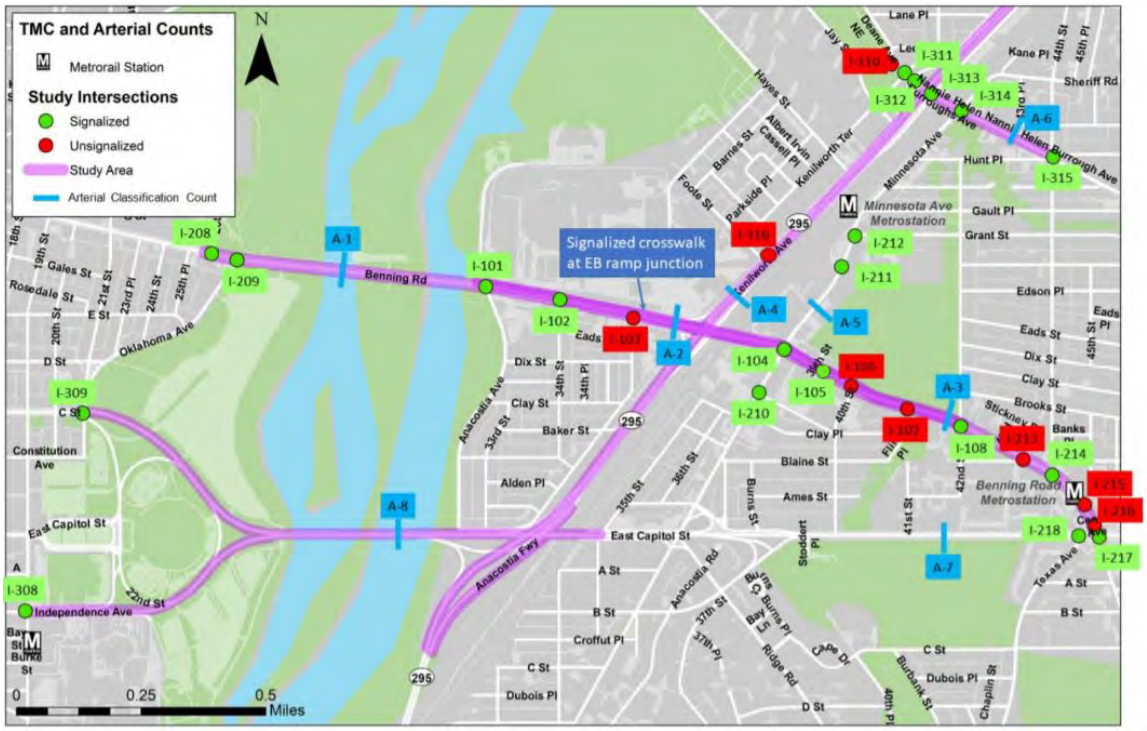
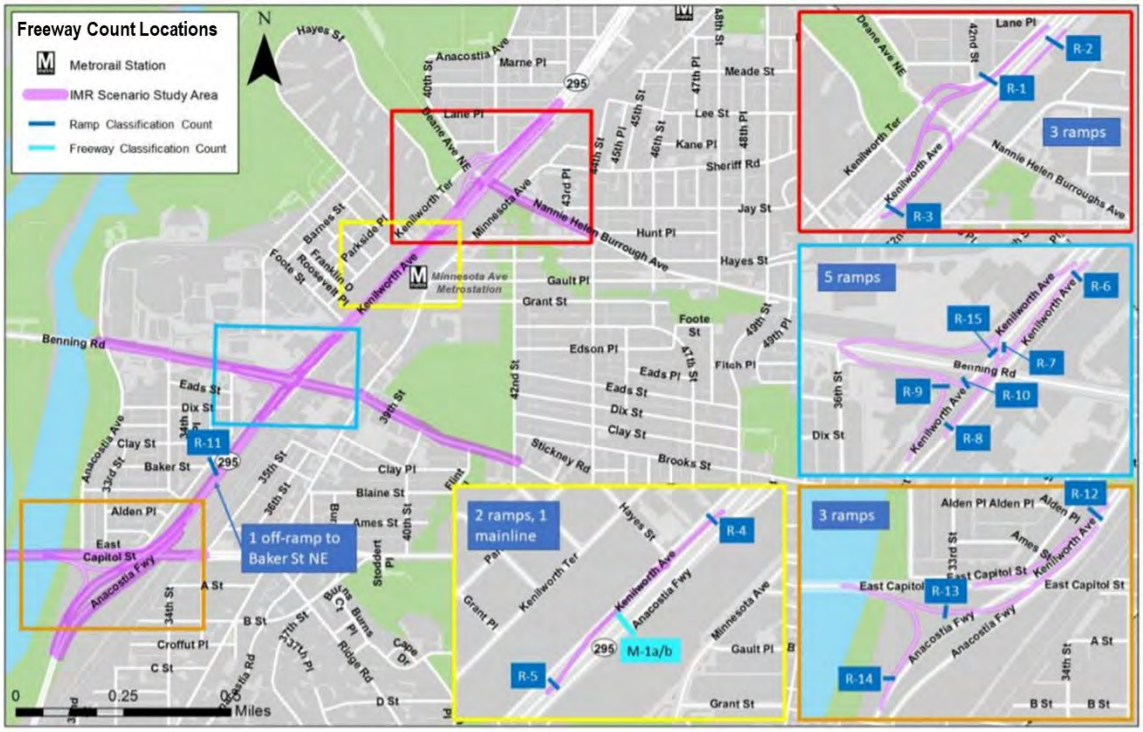


**Figure 3: Freeway Count Locations**




## 2.3 Modeling Methodology

MWCOG Regional Travel demand forecasts were prepared for the project area that reflect both the regional context and localized land use and transportation characteristics. These forecasts are used to test the general capacity and connectivity of the existing and planned transportation networks and serve as inputs to the detailed traffic simulation model. Detailed information regarding travel demand forecasting and traffic analysis is provided in the following sections.

### 2.3.1 Travel Demand Forecast

#### 2.3.1.1 MWCOG Regional Travel Demand Model and VISUM Subarea Model

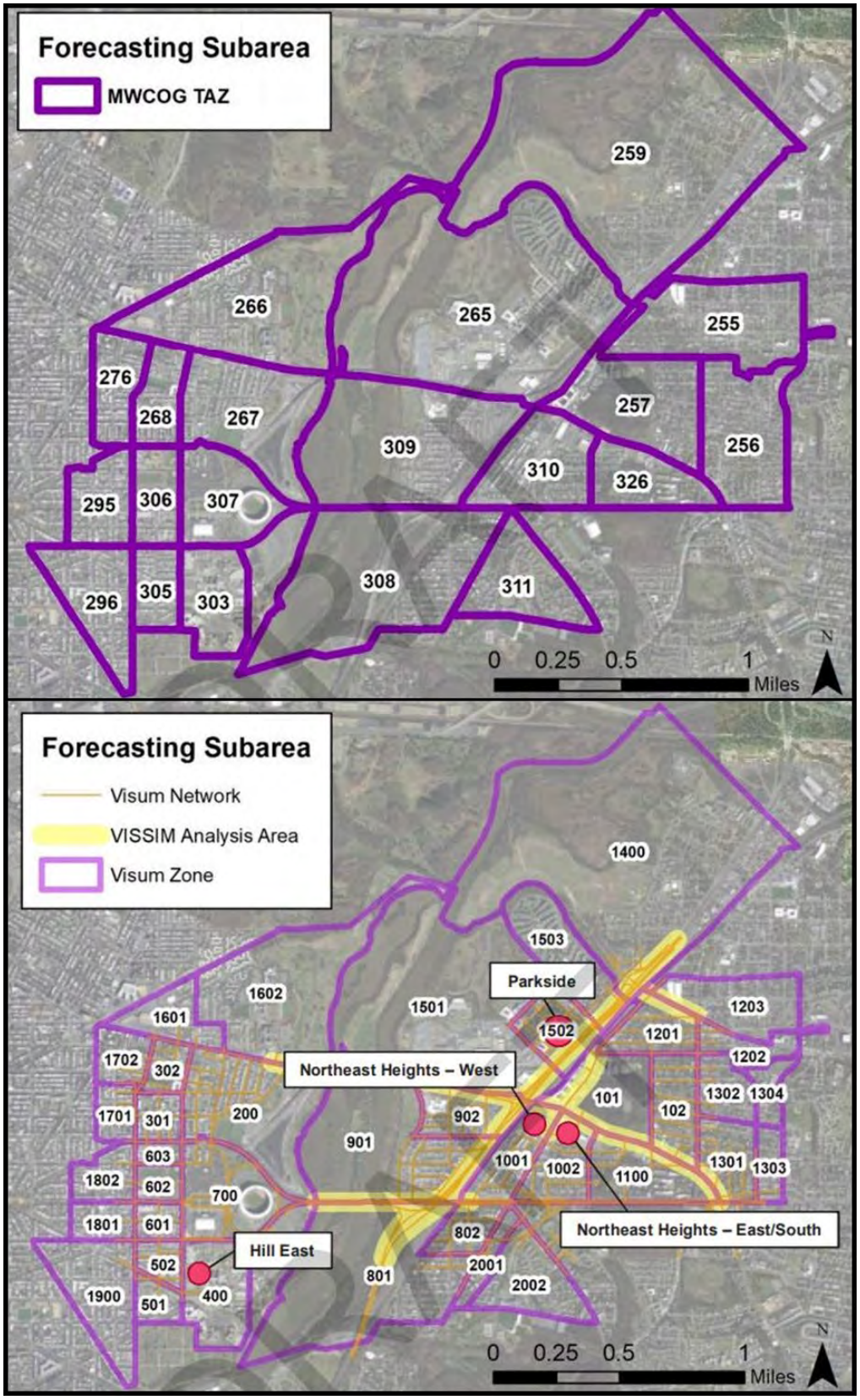
The travel demand forecasting process used the most currently adopted version of the travel demand model (Version 2.3.75) produced and distributed by Metropolitan Washington Council of Governments (MWCOG) and extracted a subarea model in VISUM (Version 18). At a high level, the MWCOG model was the source of traffic analysis zone (TAZ) land use inputs, growth rates, and a seeding O-D trip table that was refined in VISUM. The MWCOG model was calibrated to reflect travel conditions at a regional level. As such, the MWCOG model was validated to daily volumes using cut lines as opposed to roadway links following the requirements outlined in the FHWA Travel Model Validation and Reasonability Checking Manual Second Edition. To enhance the traffic forecasting accuracy using the MWCOG model, VISUM was used as a supplemental tool to assign traffic and develop forecasts with greater detail of the TAZs and street network. VISUM was used for subarea model development and validation, evaluating traffic diversion, and

forecasting future volumes. The subarea model was used for existing (2019) and future year (2025 and 2045) no-build and build scenarios.

A subarea model from the MWCOG model was extracted that encompasses the major roadway network surrounding the study area (see Figure 1). The subarea model was imported into VISUM, at which point the network, TAZ structure, and peak period trip tables were refined. The TAZs and associated trips were split based on census block groups to provide a greater level of detail and more accurate trip loading and assignment to the network. Data such as population and employment were used as the basis for proportioning trips into subdivided TAZs. A comparison of MWCOG and subarea travel demand model TAZ systems was illustrated in

**Figure** 4. The 11 MWCOG TAZs within the project area were disaggregated into 31 analysis zones taking into consideration the impact of walking distances to or from the proposed streetcar stops on mode choices.

**Figure 4: MWCOG and Subarea Model TAZ and Network Comparison**



### 2.3.1.2 Model Validation

The VISUM model was validated against peak period counts for freeways and arterials, specifically 6:00 to 9:00 AM and 3:00 to 7:00 PM, which is consistent with the peak periods of the MWCOG model. Adjustments were made to link free-flow speeds and capacities to calibrate the model to traffic counts. Finally, the built-in VISUM matrix correction procedure, TFlowFuzzy, was used to adjust demand matrix values to link data and turning movement count data in order to obtain the final 2019 O-D matrices. **Table 1** shows the results of validation before and after the matrix correction procedure.

**Table 1: VISUM Model Validation Results**

| Calibration Measure | Calibration Threshold | | AM Peak Period | | | | PM Peak Period | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | Before Correction | | After Correction | | Before Correction | | After Correction | |
| **Link Volumes** F = Freeway A = Arterial | F | A | F | A | F | A | F | A | F | A |
| Number of Observations | | | 34 | 112 | 34 | 112 | 34 | 114 | 34 | 114 |
| Total Volume - Observed | | | 132,676 | 243,785 | 132,676 | 243,785 | 207,592 | 326,713 | 207,592 | 326,713 |
| Total Volume - Modeled | | | 131,465 | 251,970 | 131,075 | 244,142 | 213,462 | 368,870 | 205,684 | 327,042 |
| % Difference in Total Volume | 7% | 15% | -1% | 3% | -1% | 0% | 3% | 11% | -1% | 0% |
| R-Squared | 0.88 | 0.88 | 0.96 | 0.93 | 1.00 | 0.97 | 0.99 | 0.82 | 1.00 | 0.89 |
| % RMSE | 20% | 50% | 24% | 32% | 6% | 16% | 12% | 41% | 6% | 21% |
| RMSE | | | 915 | 682 | 245 | 350 | 697 | 1,173 | 347 | 584 |
| **Cutlines** | | | **NB/WB** | **SB/EB** | **NB/WB** | **SB/EB** | **NB/WB** | **SB/EB** | **NB/WB** | **SB/EB** |
| **Westbound/Eastbound across Anacostia River** | | | | | | | | | | |
| Observed | | | 14,135 | 4,511 | 14,135 | 4,511 | 7,863 | 14,969 | 7,863 | 14,969 |
| Modeled | | | 16,732 | 3,260 | 14,233 | 4,336 | 8,872 | 23,121 | 7,640 | 17,180 |
| % Difference | **15%** | | 18% | -28% | 1% | -4% | 13% | 54% | -3% | 15% |
| **Northbound/Southbound DC-295 & Minnesota Ave (South of Benning)** | | | | | | | | | | |
| Observed | | | 10,778 | 10,958 | 10,778 | 10,958 | 16,396 | 15,129 | 16,396 | 15,129 |
| Modeled | | | 10,227 | 11,610 | 10,828 | 10,783 | 16,981 | 14,230 | 16,427 | 13,913 |
| % Difference | **15%** | | -5% | 6% | 0% | -2% | 4% | -6% | 0% | -8% |
| **Northbound/Southbound DC-295 & Minnesota Ave (North of Benning)** | | | | | | | | | | |
| Observed | | | 9,960 | 14,345 | 9,960 | 14,345 | 19,742 | 14,452 | 19,742 | 14,452 |
| Modeled | | | 8,859 | 15,552 | 10,000 | 14,056 | 21,351 | 15,789 | 19,976 | 15,099 |
| % Difference | **15%** | | -11% | 8% | 0% | -2% | 8% | 9% | 1% | 4% |
| **Westbound/Eastbound East Capitol St/Benning Rd/Burroughs Ave** | | | | | | | | | | |
| Observed | | | 10,622 | 3,605 | 10,622 | 3,605 | 7,624 | 13,661 | 7,624 | 13,661 |
| Modeled | | | 9,757 | 2,729 | 10,386 | 3,063 | 5,487 | 13,167 | 6,721 | 11,908 |
| % Difference | **15%** | | -8% | -24% | -2% | -15% | -28% | -4% | -12% | -13% |

The same cut lines used previously to calibrate the MWCOG model were also used during this process. Calibration targets were developed based on guidance from the FHWA Transportation Model Improvement Program (TMIP) Travel Model Validation and Reasonability Checking Manual Second Edition (2010). All calibration thresholds were met for freeway and arterial measures.

### 2.3.2 Traffic Analysis

VISSIM 11 was used for evaluating multimodal traffic operations, streetcar operations, and queuing impacts at the study intersections and ramps within the VISSIM network limits. VISSIM is a multi-modal microscopic simulation model with the capability of simulating urban traffic and public transit operations, including various transit vehicle types, transit routes, and dwell time of passengers. The simulation was used to evaluate the traffic conditions in the future years as well as the operation of streetcar and its potential impacts on traffic.

#### 2.3.2.1 Simulation Analysis Period Development

A network-wide representative peak hour (herein referred to as the "network peak hour") was determined for the AM peak (7:45 AM to 8:45 AM) and PM peak (5:00 PM to 6:00 PM) using the traffic count data as well as the travel time data for the Benning Road corridor. During these periods, the key corridors of the study network experience the worst traffic operations conditions, characterized by demand greater than capacity, constrained throughput volumes, and plateauing of corridor travel times.

Peak volumes and travel times along Benning Road did not align with those on DC-295. To best serve the purpose and need of the project, the study team placed emphasis on the peak direction of Benning Road when selecting a network peak hour and VISSIM analysis period. Table 2 summarizes the VISSIM seeding, peak, and shoulder periods applied for each peak period of a typical weekday. Given that extensive congestion was observed on DC-295 during the data collection period, the study team utilized one-hour seeding and shoulder periods to allow adequate time for congestion to propagate and dissipate in the model.

**Table 2: VISSIM Simulation Period**

| Time of Day | VISSIM Seeding Period | VISSIM Peak Period | VISSIM Shoulder Period | Network Peak Hour |
|---|---|---|---|---|
| AM | 6:00 AM to 7:00 AM | 7:00 AM to 9:00 AM | 9:00 AM to 10:00 AM | 7:45 AM to 8:45 AM |
| PM | 3:30 PM to 4:30 PM | 4:30 PM to 6:30 PM | 6:30 PM to 7:30 PM | 5:00 PM to 6:00 PM |

### 2.3.2.2 VISSIM Model Development

#### 2.3.2.2.1 Roadway Geometry

The Bing Maps interface within VISSIM 11 was utilized to code network geometry with the following exceptions:

- The number of lanes or length of links at intersections and freeway ramps was modified where justified by field observations (e.g. a de facto right-turn lane was coded on northbound 44th Street NE at Nannie Helen Burroughs Avenue NE).
- Construction activity at the intersection of Benning Road NE and Minnesota Avenue NE required that lane assignment be modified from the typical existing geometry.
- Construction activity at the intersection of Benning Road NE and Minnesota Avenue NE required that lane closures be modeled in VISSIM during the PM peak period.

Video footage from April 2, 2019 confirmed that the right lane was closed on eastbound Benning Road NE just downstream of the Minnesota Avenue intersection throughout the entire peak period, while the left-turn lane on northbound Minnesota Avenue was blocked by a construction vehicle until 5:00 PM. These conditions substantially constrained throughput and caused queueing on both approaches to the intersection. Though included as part of the calibration process, these lane closures will not be modeled during alternatives analysis.

#### 2.3.2.2.2 Traffic Control

Key traffic control devices, such as traffic signals, stop signs, lane configurations, and speed limits were coded based on Synchro files provided by DDOT, Google Street View, and field observations. Traffic signal timing and phasing was verified through video footage and required modification in one location:

- The cycle length at the intersection of Benning Road NE and Minnesota Avenue NE during the AM and PM peak period was coded as 120 seconds in the provided Synchro files but observed as 150 seconds in the field.

Desired speed distributions in VISSIM were initially coded based on roadway speed limits but modified as necessary based on supplemental probe data analysis.

#### 2.3.2.2.3 Vehicle Routing

End-to-end vehicular routing was coded in VISSIM and existing balanced volumes combined with Location Services-based origin-destination (O-D) data from StreetLight were used to develop a seed O-D matrix. Existing balanced volumes were converted to target link and turning movement volumes to iteratively adjust this seed matrix in VISUM 18 using the TFlowFuzzy origin-destination matrix estimation procedure. The resultant final O-D matrices were used to load one set of vehicle routes per peak period in VISSIM, as travel patterns were found to not differ substantially between the start and finish of the AM and PM analysis periods. StreetLight data

suggested minimal difference in vehicular trips for major O-D pairs within the network, which supports the use of a single O-D matrix for the entire simulated peak period.

#### 2.3.2.2.4 Vehicle Compositions

Three vehicle classes were assumed to sufficiently define the primary traffic stream and coded in VISSIM: passenger cars, single unit trucks, and tractor-trailers. Separate vehicle compositions were coded for the freeway and arterials during each peak period based on vehicle classification data collected on mainline DC-295, interchange ramps, and arterial segments in the study area.

**Table** 3 summarizes the vehicle compositions used in the AM and PM models. These vehicle compositions were developed from the 72-hour freeway, ramp, and arterial counts, as well as the intersection turning movement counts. In VISSIM, Vehicle Compositions defined the percentage of passenger cars and trucks in the model, whereas the distribution of single unit trucks and tractor-trailers were accounted for in the 2D/3D Model Distributions.

**Table 3: Vehicle Composition Summary**

| Vehicle Class | Facility Type | Composition |
|---|---|---|
| **Passenger Cars** | Freeway | 95.0% (AM)<br>98.3% (PM) |
| | Arterial | 95.5% (AM)<br>97.3% (PM) |
| **Single Unit Trucks** | Freeway | 4.7% (AM)<br>1.6% (PM) |
| | Arterial | 4.2% (AM)<br>2.5% (PM) |
| **Tractor-Trailers** | Freeway | 0.3% (AM)<br>0.1% (PM) |
| | Arterial | 0.8% (AM)<br>0.2% (PM) |

#### 2.3.2.2.5 Transit Information

Transit vehicles (bus and streetcar) were coded separately using the Public Transport Lines tool in VISSIM. Bus routes and stops in the VISSIM network area were coded using posted maps and schedules. Routes included in the models are shown in Table 4. Bus stop dwell times were set using a normal distribution with a mean of 20 seconds and standard deviation of ten seconds.

**Table 4: Public Transit Route Summary**

| Operator | Bus Route |
|---|---|
| DDOT | DC Streetcar |
| Metrobus | X1, X2, X3, X9, V2, V4, V7, V8, U4, U5, U6, U7, 96 |

#### 2.3.2.2.6 Pedestrian Mode

The magnitude of pedestrian and bicyclist activities was assessed at the intersections adjacent to Metrorail stations or existing streetcar stops and coded in VISSIM accordingly. No dedicated bicycle facilities were included in the models.

#### 2.3.2.3 VISSIM Model Calibration

##### 2.3.2.3.1 Purpose of Calibration

Microsimulation models are developed to assess the impacts of proposed improvement alternatives. However, to establish confidence in model outputs under future build and no-build scenarios, it is critical that a model is capable of accurately replicating existing conditions. Calibration entails the adjustment of various input parameters to improve a model's ability to reproduce such conditions and associated measures of effectiveness (MOEs). VISSIM contains a variety of adjustable parameters that support the calibration process, most notably those related to car-following and lane-changing.

##### 2.3.2.3.2 Calibration Methodology and Targets

The Existing Conditions (2019) VISSIM models were calibrated according to the guidelines presented in FHWA's Traffic Analysis Toolbox (TAT) Volume III (2004). Vehicle throughput, travel time, speed, and queue length were used as calibration MOEs. Since queue length calibration is not defined in FHWA's TAT, the Virginia Department of Transportation's (VDOT) Traffic Operations and Safety Analysis Manual (TOSAM) was referenced for queue length calibration guidance. **Table 5**: provides the calibration measures and targets. The critical locations for queue calibration are identified in **Table 6**.

**Table 5: VISSIM Calibration Criteria and Acceptance Targets**

| Simulated Measure | Calibration Threshold | Calibration Period |
|---|---|---|
| **Simulated Traffic Volume – Individual Links (vehicles per hour)**<br>**For mainline and interchange ramps, difference targets must be met for a minimum of 85% of mainline segments and ramps**<br>**At intersections, difference targets must be met for a minimum of 85% of approaches for the study intersections** | Within ± 100 vph for <700 vph<br>Within ± 15% for ≥700 vph to <2,700 vph<br>Within ± 400 for ≥2,700 vph | Peak Hour |
| **Simulated Traffic Volume – Sum of All Link Flows** | Within 5% of sum of all link counts | Peak Hour |
| **Simulated Traffic Volume – GEH Statistic**<br>**For mainline and interchange ramps, GEH statistic target must be met for a minimum of 85% of segments** | < 5 for individual link flows<br>< 4 for sum of all link flows | Peak Hour |
| **Simulated Average Link Speed (miles per hour)** | Visually inspecting model speed heat map against INRIX or Google 15-minute average speed data for study corridor segments during the entire peak period and shoulder period | Peak Period + Shoulder Period |

| Simulated Measure | Calibration Threshold | Calibration Period |
|---|---|---|
| **Simulated Travel Time (minutes)** | Within ± 15% for average observed travel times of Benning Road and DC-295 study corridors | Peak Period |
| **Visual Audits**<br>**Bottleneck locations**<br>**Queuing impact at the identified critical locations that consist of ramps and intersection approaches** | Visually inspecting bottleneck locations using model speed heat map against INRIX or Google speed data as well as field-observed conditions<br>Visually inspecting model queues against observed data to verify queues that have the potential of impacting:<br>Spillover to an adjacent intersection<br>Spillover from a turn lane<br>The mainline in the case of a signal or junction at the end of a ramp terminal | Peak Period + Shoulder Period |

**Table 6: Critical Locations for Bottleneck and Queue Verification**

| Location Type | Location Description |
|---|---|
| **Intersection** | All approaches at Benning Road NE/Minnesota Avenue NE |
| **Intersection** | All approaches at Benning Road NE/East Capitol Street |
| **Intersection** | Westbound left turn at Benning Road NE/Oklahoma Avenue NE |
| **Mainline** | All merge and weave areas on DC-295 at the study area interchanges |
| **Mainline** | AM/PM: Southbound DC-295 freeway basic segments throughout study area<br>PM: Northbound DC-295 freeway basic segments throughout study area |
| **Ramp** | All ramps associated with the DC-295/Benning Road NE interchange |

As mentioned previously, the intersection of Benning Road NE and Minnesota Avenue NE was under construction throughout the data collection period. In order to calibrate to observed data, network geometry and traffic conditions were modeled to reflect the current phase of construction, which included multiple lane closures. While it was necessary to use construction-constrained traffic volume data to reproduce the queue length, travel time, and throughput data collected in the field, the study team was informed of DDOT's concerns that calibrated behavior at this intersection may not be appropriate for application to subsequent model scenarios. As such, the following were considered during calibration:

- Calibration efforts were focused on system-wide measures, such as Benning Road NE end-to-end corridor travel times.
- The study team attempted to calibrate the model without adjusting arterial driving behavior or by applying the same changes to driving behavior throughout the entire network.

Any construction-specific geometry and driving behavior changes at the intersection of Benning Road NE and Minnesota Avenue NE were coded with the intent to remove for subsequent model scenarios.

#### 2.3.2.3.3 Number of Model Runs

Since microsimulation models are stochastic and will produce unique results from run-to-run, multiple iterations must be conducted with different random seeds and post-processed to determine an "average" state of traffic operations in the study network. Based on FHWA TAT (2004) and VDOT Sample Size Determination Tool methodologies ten runs is an adequate sample size for reporting statistically valid results.

#### 2.3.2.3.4 Calibration Data

Balanced volumes developed from traffic counts as described in previous section as well as field travel time runs conducted on April 2nd (arterials) and April 9th (freeway) supplemented with crowdsourced probe data from Google were used as targets during the calibration process. However, the following data challenge was encountered:

- An incident occurred on northbound DC-295 off-ramp to Benning Road during the AM peak period on April 9th, so all applicable northbound field travel time runs were deemed insufficient for model calibration (i.e. the travel time runs were not representative of typical traffic conditions).

Since the crowdsourced probe data provided a substantially larger sample size, the study team decided to use these data for freeway calibration targets based on crowdsourced probe data from April 9th – 11th. Arterial travel time targets were set based on field travel time data runs because field run data closely represents the impact from the specific construction activities on April 2nd.

Given the high variability observed in both sources of travel time data, the probe data was validated by ensuring that the average field travel time fell within the range of travel times observed in the probe data.

#### 2.3.2.3.5 Calibration Parameters and Adjustments

For modification purposes, specific parameters were adjusted to achieve target traffic volumes, speed, travel time, and queue lengths. The primary adjusted parameters that included:

- Driver behavior
- Lane-change distance
- Free-flow speeds
- Traffic demand volume distribution (15-minute interval)
- Replicating external congestions at network termini using INRIX speed data

External congestion that impacts operations within the VISSIM study area exists on DC-295 external to the study area. Time-dependent speed reductions based on probe data from INRIX at the edge of the VISSIM network was used to replicate the extent and duration of reduced speeds.

#### 2.3.2.3.6 Calibration Results Summary

**Table 7** and **Table 8** summarized the AM and PM existing VISSIM results compared with field counts, travel times, speeds, and queue lengths, suggesting that the models were reasonably

calibrated to the standards and guidelines established by FHWA's Traffic Analysis Toolbox Volume III (2004).

The impacts of construction at the intersection of Benning Road NE and Minnesota Avenue NE that were present during data collection raise challenges for direct application of these Existing Conditions models to the development and analysis of future no build and build alternatives. While the Existing Conditions calibration required that prevailing conditions during the days of data collection be reasonably replicated, the study team avoided over-calibrating the model to these temporary conditions by making changes to network geometry and driving behavior sparingly. Calibration to these conditions were required to match calibration targets, but engineering judgement will be used to update the presented Existing Conditions models to become a typical "baseline" model for assessing future conditions.

**Table 7: AM Model Calibration Summary**

| Calibration Item | Basis | Criteria | Total | Percent | Target | Criteria Met |
|---|---|---|---|---|---|---|
| Simulated Traffic Volume (Intersections) | Approaches (n = 87) | Within ± 100 vph for < 700 vph | 86 | 99% | 85% | Yes |
| | | Within ± 15% for ≥ 700 vph to < 2,700 vph | | | | |
| | | Within ± 400 vph for ≥ 2,700 vph | | | | |
| Simulated Traffic Volume (Freeways) | Segments (n = 29) | Within ± 100 vph for < 700 vph | 29 | 100% | 85% | Yes |
| | | Within ± 15% for ≥ 700 vph to < 2,700 vph | | | | |
| | | Within ± 400 vph for ≥ 2,700 vph | | | | |
| Simulated Traffic Volume (Sum of All Link Flows) | All Segments/Approaches | Within 5% of sum of all link counts | | 0% | 5% | Yes |
| Simulated Traffic Volume (GEH Statistic) | Segments/Approaches (n = 116) | < 5 for individual link flows | 115 | 99% | 85% | Yes |
| | All Segments/Approaches | < 4 for the sum of all link flows | 0.1 | | 4.0 | Yes |
| Simulated Travel Time | Segments (n=4) | Within ± 15% for average travel time | 4 | 100% | 85% | Yes |
| Maximum Simulated Queue Length | Approaches (n = 14) | Modeled queues qualitatively reflect the impacts of observed queues | | | | Yes |
| Visual Review of Bottleneck Locations | Targeted Critical Locations | Speed heat maps qualitatively reflect the pattern and duration of congestion | | | | Yes |

**Table 8: PM Model Calibration Summary**

| Calibration Item | Basis | Criteria | Total | Percent | Target | Criteria Met |
|---|---|---|---|---|---|---|
| Simulated Traffic Volume (Intersections) | Approaches (n = 87) | Within ± 100 vph for < 700 vph<br>Within ± 15% for ≥ 700 vph to < 2,700 vph<br>Within ± 400 vph for ≥ 2,700 vph | 85 | 98% | 85% | Yes |
| Simulated Traffic Volume (Freeways) | Segments (n = 29) | Within ± 100 vph for < 700 vph<br>Within ± 15% for ≥ 700 vph to < 2,700 vph<br>Within ± 400 vph for ≥ 2,700 vph | 29 | 100% | 85% | Yes |
| Simulated Traffic Volume (Sum of All Link Flows) | All Segments/Approaches | Within 5% of sum of all link counts | | 0% | 5% | Yes |
| Simulated Traffic Volume (GEH Statistic) | Segments/Approaches (n = 116) | < 5 for individual link flows | 115 | 99% | 85% | Yes |
| | All Segments/Approaches | < 4 for the sum of all link flows | 0.7 | | 4.0 | Yes |
| Simulated Travel Time | Routes (n=4) | Within ± 15% for average travel time | 4 | 100% | 85% | Yes |
| Maximum Simulated Queue Length | Approaches (n = 14) | Modeled queues qualitatively reflect the impacts of observed queues | | | | Yes |
| Visual Review of Bottleneck Locations | Targeted Critical Locations | Speed heat maps qualitatively reflect the pattern and duration of congestion | | | | Yes |

# 3.0 Existing (2019) Conditions

This section describes the existing transportation conditions in the project area with the first sub-section focusing on the travel demand model and the second sub-section focusing on the results of the existing traffic analysis.

## 3.1 Existing Travel Demand Model

As discussed in previous section, existing conditions analysis is based on the traffic data and observations from site visits and results of the validated travel demand model. 2019 MWCOG Regional Travel Demand model ("Base Model") was used to reflect the existing conditions.

### 3.1.1 Model Inputs

The two major inputs in the modeling process used in this analysis are land use data and transportation networks. To develop the existing conditions scenario, models were calibrated to match existing traffic counts using the inputs outlined below.

### 3.1.2 Existing Land Use

For the existing conditions, the analysis used the MWCOG Round 9.1 Cooperative Land Use Forecasts for 2019. Table 9 shows the total population and employment by sector in the project area in 2019.

**Table 9: Existing Population and Employment Condition**

| | 2019 Total |
|---|---|
| Households | 18,418 |
| Population | 46,878 |
| Employment | 6,786 |

### 3.1.3 Existing Transportation Network

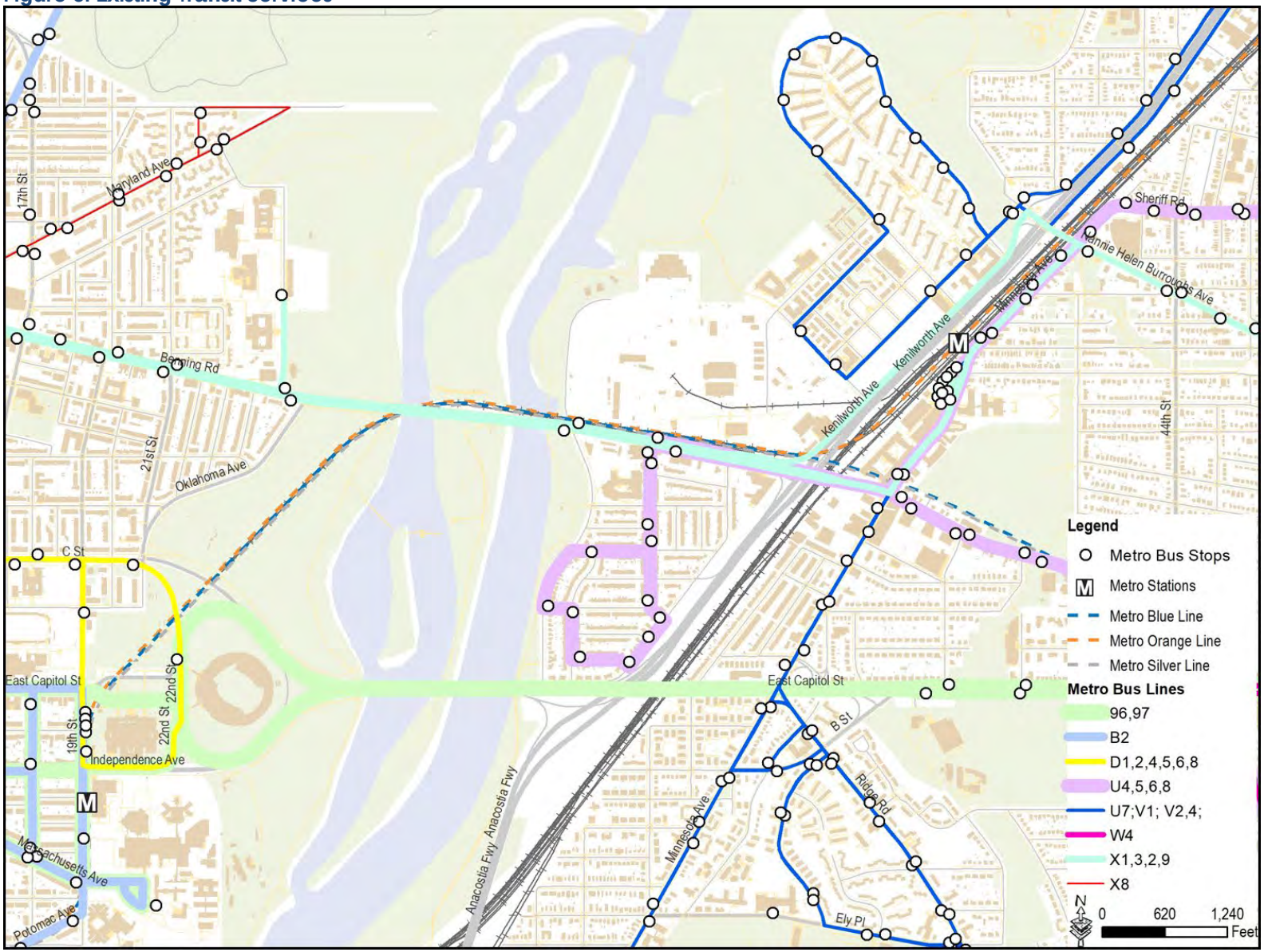
The transportation networks used in the model represent the current roadway and transit systems in the region. **Figure 5** and

**Figure** 6 show the roadway and transit network in the project area, respectively. The network has a grid layout with additional diagonals along portions of Benning Road and East Capitol Street. The grid is organized into a hierarchy of expressway, arterial, collectors and local streets.

The travel demand model used the MWCOG 2014 roadway network for the region outside of the travel demand analysis area. The MWCOG 2014 transit network was also used to represent the existing transit service in the region.

**Figure 5: Existing Roadway Network**

**Figure 6: Existing Transit Services**



## 3.2 Existing VISSIM Simulation Modeling

This section provides an assessment of existing traffic conditions in the project area. The traffic data collected within the project area for the analysis of existing conditions included traffic volume counts, pedestrian and bicycle counts, and historic crash data.

### 3.2.1 Existing Volumes

**Figure 7**,

**Figure** 8, and

**Figure** 9 show the existing (2019) morning and evening peak hour traffic volumes at the project area freeways and intersections. During the morning peak hour, the traffic is heaviest in the "inbound" or the westbound direction along Benning Road. In the evening peak hour, the travel pattern reverses in which people travel in the "outbound" direction.

### 3.2.2 Existing Conditions

In the morning peak, southbound DC-295 congestion persisted throughout the simulation period and extends the full length of the study area from East Capitol Street to Nannie Helen Burroughs Avenue NE. The primary bottleneck on southbound DC-295 occurred at the East Capitol Street off-ramp, which included a lane drop. Merging, diverging, and weaving behavior at other ramp junctions along southbound DC-295 (e.g. Benning Road NE and Kenilworth Avenue NE) also resulted in reduced speeds and additional congestion. While external to the direct study area, the impact of congestion at the ramp junction with Pennsylvania Avenue SE extended to the southern boundary of the study area. Northbound DC-295 operated under free flow conditions throughout the AM peak period.

In the evening peak, northbound DC-295 congestion persisted throughout the simulation period and extended the full length of the study area from East Capitol Street to Nannie Helen Burroughs Avenue NE. The primary bottlenecks responsible for this congestion included the US 50 interchange (external to the network), the Benning Road NE onramp, and the Kenilworth Avenue NE on-ramp. Likewise, volumes on southbound DC-295 plateaued before PM simulation period and do not substantially rise or fall until after 6:00 PM. Congestion extended from the southern terminus of the network to near the interchange at Nannie Helen Burroughs Avenue NE well before the start of the VISSIM model simulation period due to two primary bottlenecks: the Pennsylvania Avenue SE interchange (external to the network) and the East Capitol Street lane drop.

Arterial network also experienced significant demand in both AM and PM peak.

**Figure** 10 and

**Figure** 11 show the intersection LOS at the project area intersections under existing conditions during the morning and evening peak hours. **Table 10** provides delay and LOS by movement for the critical intersections for the morning and evening peak hours. Critical intersections are defined as those with intersection LOS E or worse. **Table 11** shows the associated maximum queue lengths by approach.

Results show that none of the intersections along Benning Road operated under LOS F in existing morning peak; the only two intersections that are under LOS F in Existing AM peak were Deane Avenue NE at Kenilworth Terrace NE and Kenilworth Avenue NE at Foote Street NE. There were, however, three intersections along Benning Road that operated under LOS F in the evening peak hour. These intersections are:

- Benning Road NE at Anacostia Avenue NE;
- Benning Road NE at 34th Street NE; and
- Benning Road NE at Minnesota Avenue NE

In the morning peak, east on Benning Road NE, congestion was observed in the eastbound direction between 44th Street NE and East Capitol Street. This congestion was primarily caused by queueing from the eastbound approach to East Capitol Street as well as turning volumes from crossing streets (e.g., 44th and 45th Street NE) that are closely spaced to East Capitol Street. Traveling westbound on Benning Road NE, west of the DC-295/Benning Road NE interchange, congestion was observed at Benning Road NE and Oklahoma Avenue NE, primarily caused by high left-turn volumes at this intersection. Significant queueing was observed on Nannie Helen Burroughs Avenue NE and the surrounding local streets (e.g. southbound Minnesota Avenue NE, southbound Kenilworth Avenue NE, and Deane Avenue NE).

**Table 10: Existing (2019) Peak Hour (AM and PM) Delay and Levels of Service (LOS) at the Critical Intersections**

| Intersection | Traffic Control | Peak Hour | Intersection | | North-bound | | South-bound | | West-bound | | East-bound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road NE at Anacostia Avenue NE | Signalized | PM | 127 | F | 44 | D | 59 | E | 3 | A | 191 | F |
| Benning Road NE at 34th Street NE | Signalized | PM | 107 | F | 19 | B | 45 | D | 26 | C | 166 | F |
| Benning Road NE Ramp to DC-295 at 36th Street NE | Unsignalized | PM | 46 | E | 7 | A | | | | | 59 | F |
| Benning Road NE at Minnesota Avenue NE | Signalized | PM | 213 | F | 139 | F | 39 | D | 82 | E | 387 | F |
| Minnesota Avenue NE at Dix Street NE | Signalized | PM | 58 | E | 87 | F | 12 | B | 98 | F | 38 | D |
| Deane Avenue NE at Lee St NE | Unsignalized | AM | 177 | F | | | 227 | F | 1 | A | 271 | F |
| Deane Avenue NE at Kenilworth Terrace NE | Signalized | AM | 113 | F | 34 | C | 228 | F | 3 | A | 59 | E |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC- 295 U-turns | Signalized | PM | 63 | E | 161 | F | | | 30 | C | 17 | B |
| Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | Signalized | AM | 75 | E | 44 | D | 212 | F | 62 | E | 22 | C |
| Kenilworth Avenue NE at Foote Street NE | Unsignalized | AM | 158 | F | | | 183 | F | | | 17 | B |

**Table 11: Existing (2019) Peak Hour (AM and PM) Maximum Queue Length (feet) at the Critical Intersections**

| Intersection | Peak Hour | Northbound | Southbound | Westbound | Eastbound |
|---|---|---|---|---|---|
| Benning Road NE at East Capitol Street SE | AM | 726 | 1059 | 776 | 279 |
| Benning Road NE at East Capitol Street SE | PM | 278 | 337 | 276 | 708 |
| East Capitol Street SE at Texas Avenue SE | AM | 699 | 516 | - | - |
| East Capitol Street SE at Texas Avenue SE | PM | 277 | 191 | - | - |
| Benning Road NE and Minnesota Avenue NE | AM | 454 | 537 | 411 | 554 |
| Benning Road NE and Minnesota Avenue NE | PM | 581 | 424 | 297 | 5057 |

Two unexpected lane closures were in place during the PM peak period: eastbound Benning Road NE at Minnesota Avenue NE and northbound Minnesota Avenue NE at Benning Road NE. As mentioned previously, one lane was closed on eastbound Benning Road NE just downstream of the Minnesota Avenue NE intersection, and a construction vehicle blocked the left-turn lane on northbound Minnesota Avenue NE until 5:00PM. These lane closures led to significant queueing west (through the Anacostia Avenue NE intersection) on Benning Road NE and south (through the Dix Street NE intersection) of Minnesota Avenue NE. Bottleneck conditions were also observed on Nannie Helen Burroughs Avenue NE and the surrounding local streets (e.g. southbound Minnesota Avenue NE, southbound Kenilworth Avenue NE, and Deane Avenue NE).

Detailed modeling results for the existing conditions for all project area intersections are provided in **Attachment A**.

**Figure 7: Existing (2019) ADT, Morning and Evening Peak Hour Freeway Traffic Volumes**

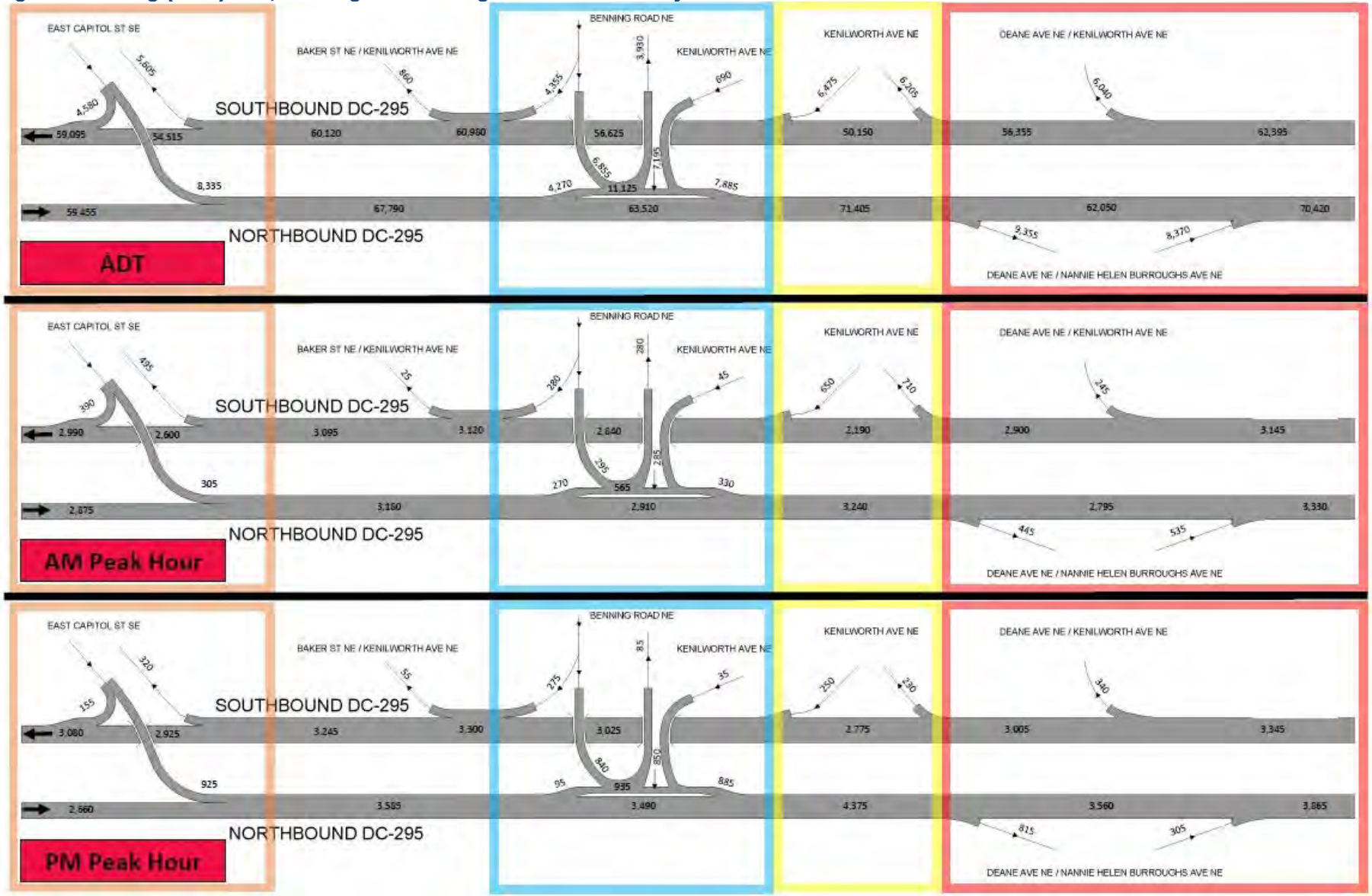
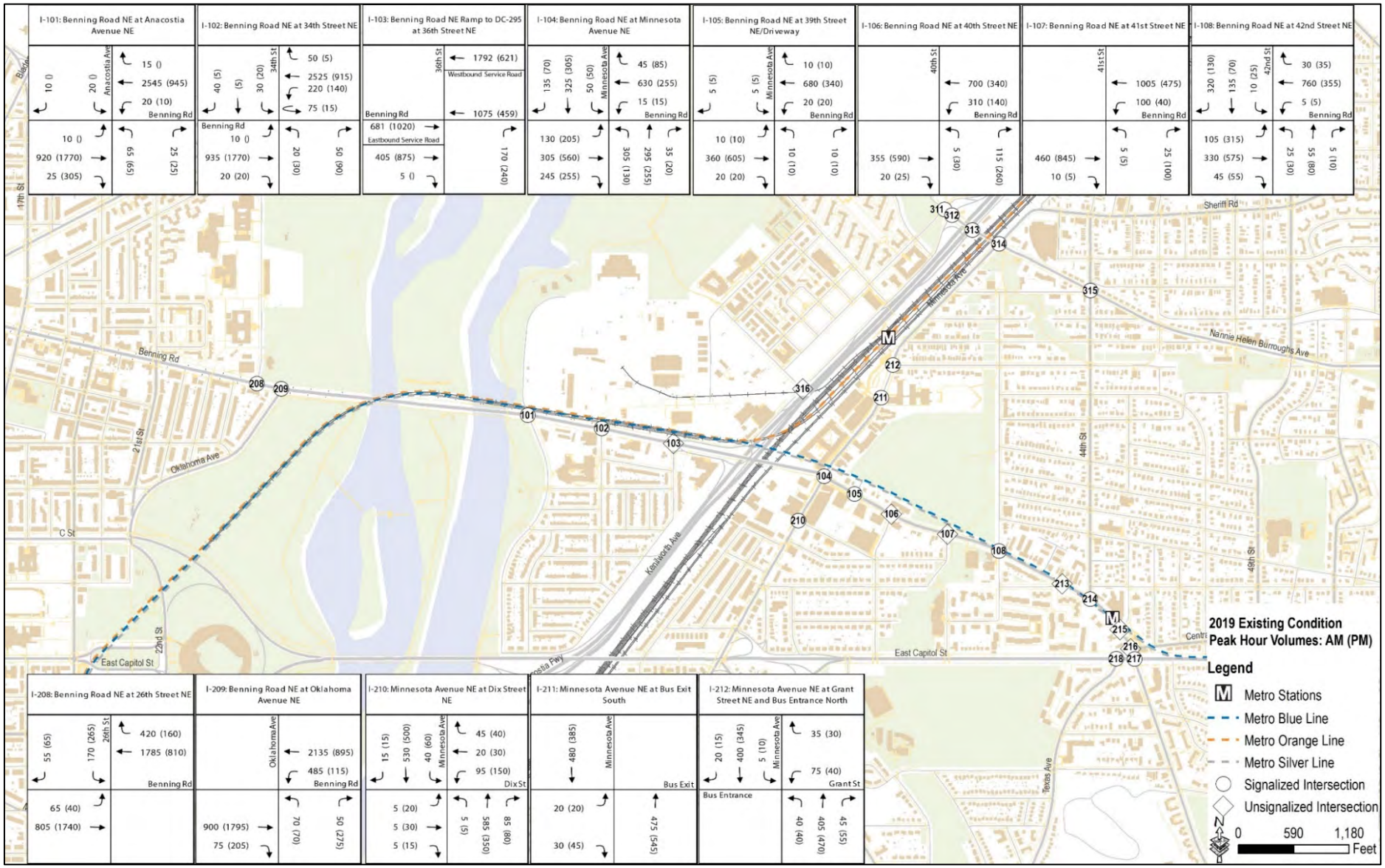


**Figure 8: Existing (2019) Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 1 of 2)**



## Figure 9: Existing (2019) Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 2 of 2)

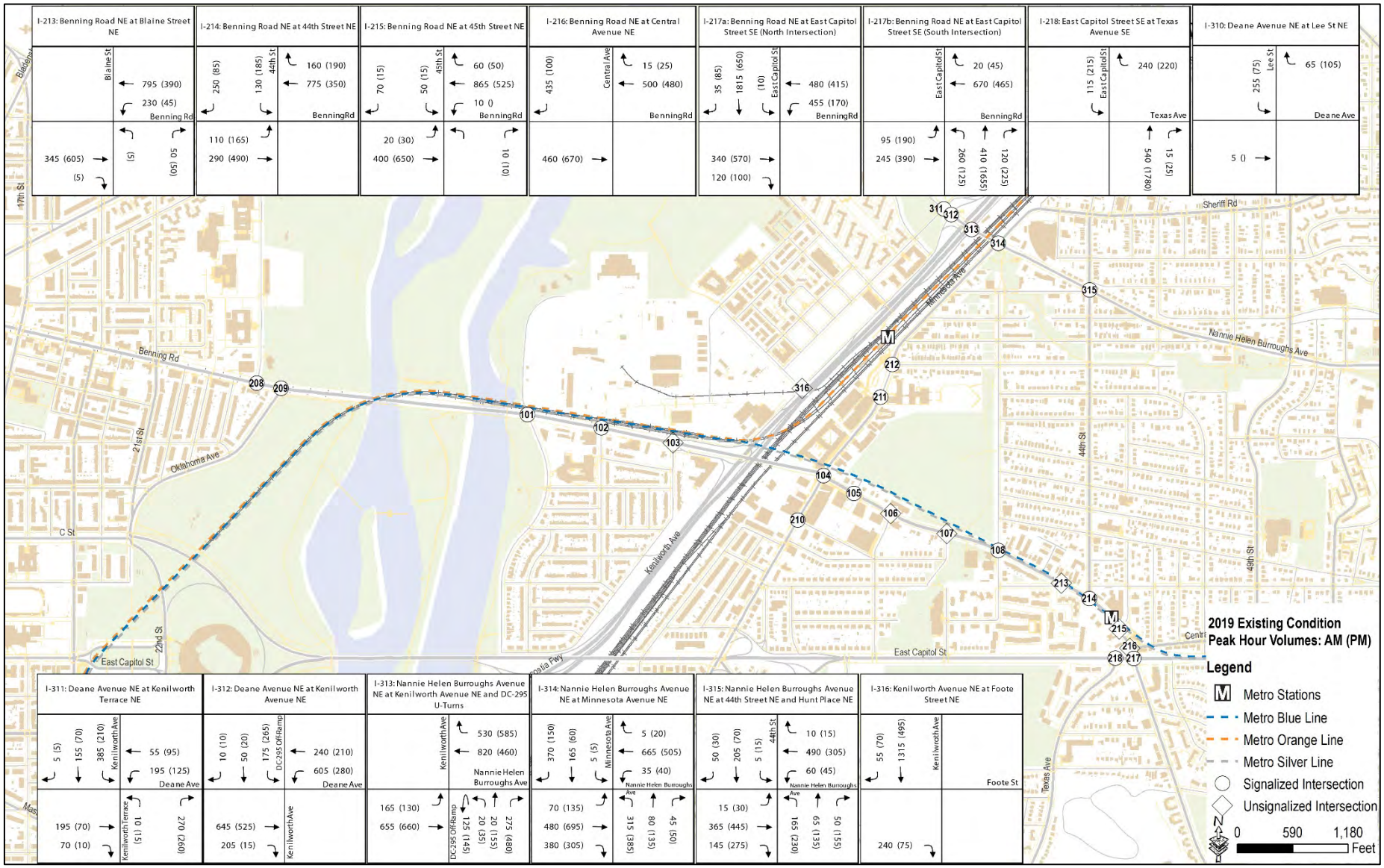


**Figure 10: Existing Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 1 of 2)**

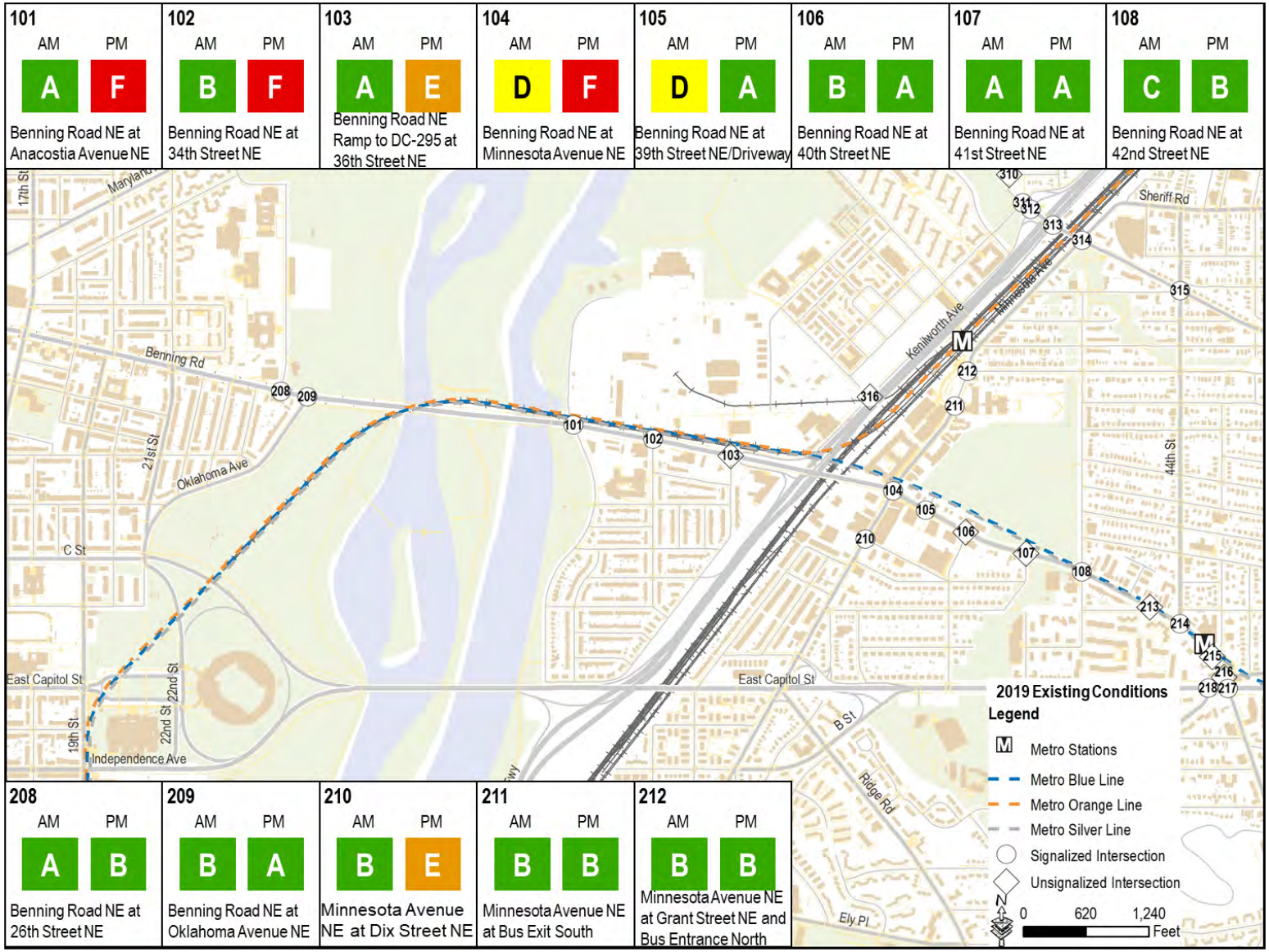
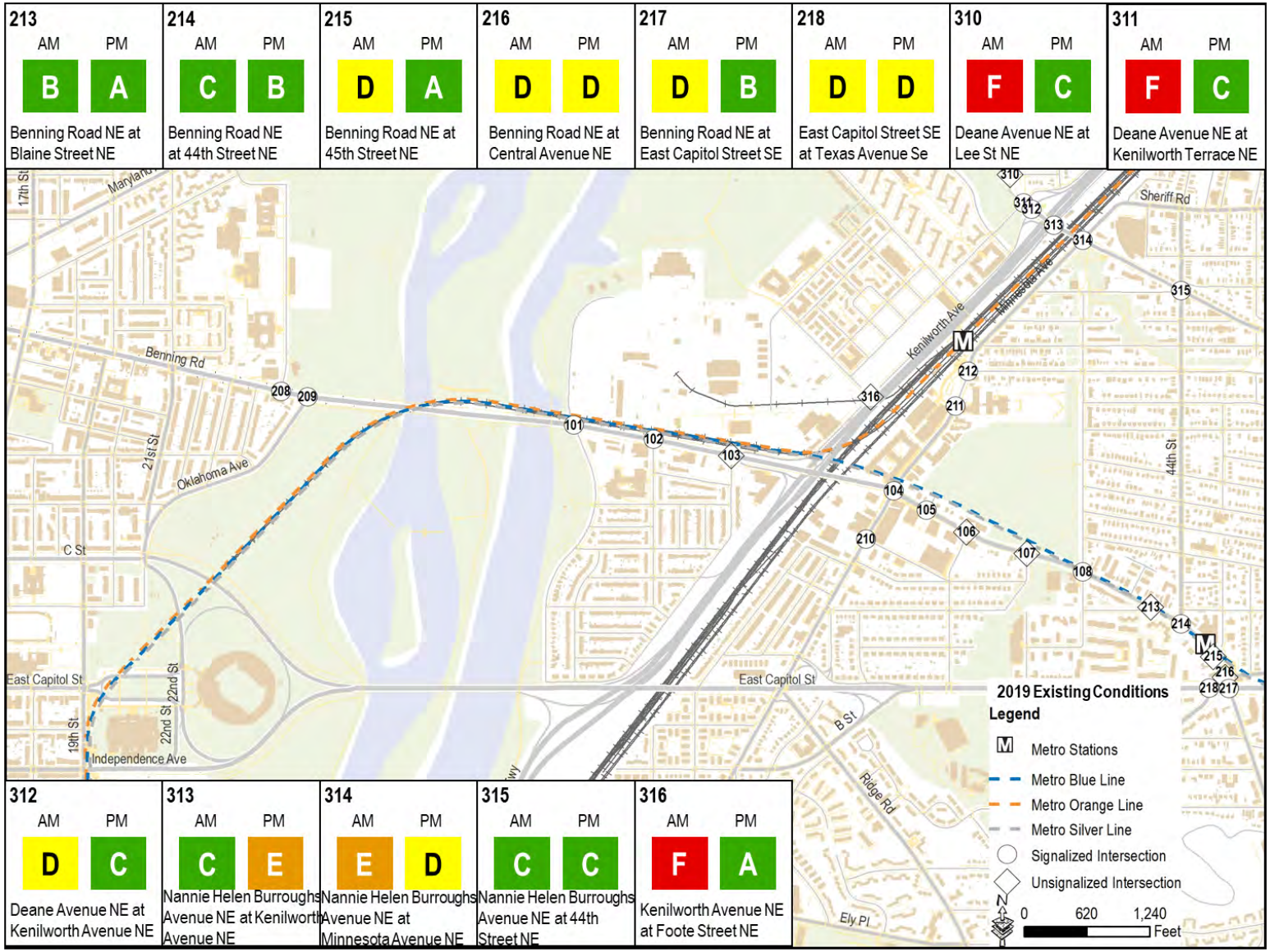


**Figure 11: Existing Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 2 of 2)**



### 3.2.3 Existing Traffic Safety Conditions

Detailed crashed data analysis was performed based on a three-year crash data (2016 – 2018) provided by DDOT. The data includes type of crashes (e.g., rear end, side swiped, etc.), crash severity (e.g., injuries involved), the crash location, and indicates whether any pedestrians were involved in the accident. The analysis indicated that Benning Road and Minnesota Avenue, Benning Road and East Capitol Street, and Minnesota Avenue and Nannie Helen Burroughs intersections are the three intersections with the highest crash rates. Detailed information regarding these calculations and analysis can be found in **Appendix A**, *Crash Data and Safety Analysis Technical Memorandum*.

# 4.0 Opening Year 2025 Conditions

It was assumed that the proposed action would be fully operational in 2025. Traffic and transit operations during the morning and evening peak hours were evaluated for the opening year 2025. A future No Build scenario was analyzed for the year 2025 to serve as a baseline comparison for the Build Alternatives. No Build refers to planned and/or programmed highway, transit, High-Occupancy Vehicle (HOV), and bicycle and pedestrian projects defined in the Financially Constrained Long-Range Plan (CLRP).

For the build scenarios, two streetcar alternatives were developed and tested. The first alternative assumed curbside operation, while the second alternative assumed median operation, with both alternatives terminating at the Benning Road Metrorail Station.

## 4.1 Opening Year 2025 No Build Travel Demand Forecasting

The two major inputs into the demand modelling process used in this analysis were land use data and transportation networks. For the No-Build scenario, both inputs were based on regionally accepted baseline conditions including the MWCOG Round 9.1 Cooperative Land Use Forecasts and the regional CLRP.

### 4.1.1 2025 No-Build Land Use

For the opening year 2025 No-Build scenario, the regional land use was determined based on the MWCOG Round 9.1 Cooperative Land Use Forecasts for 2025. Regionally, the model shows a growth of 3.4 percent in number of households, 2.9 percent in population, and 11 percent in employment over the existing conditions (2019). **Table 12** highlights the total population and employment by sector within a half-mile of the Benning Road corridor for 2025.

**Table 12: No Build Population and Employment Growth**

| | 2019 Total | Growth Factor | Total Growth | 2025 Total |
|---|---|---|---|---|
| Households | 18,418 | 2.26% | 13.54% | 20,911 |
| Population | 46,878 | 2.02% | 12.11% | 52,554 |
| Total Employment | 6,786 | 1.90% | 11.42% | 7,561 |

### 4.1.2 2025 No Build Transportation Network

The transportation network for the 2025 No-Build scenario includes the changes proposed in the 2020 CLRP. The CLRP includes a range of planned improvements to the roadway and transit networks throughout the metropolitan region. Within the project area, the only one change to the roadway network identified in the CLRP is the removal of one of the three lanes in each direction along East Capitol Street between 40th Street and Southern Avenue to improve pedestrian safety[1]. As a result, East Capitol Street will operate with two through lanes in both directions between 40th Street and Southern Avenue.

#### 4.1.2.1 Metrorail

Regional Metrorail service improvements provide some changes to the services provided at the two stations within the project area. **Table 13** summarizes the peak and off-peak headways of the assumed Metrorail system in 2020.

**Table 13: Peak and Off-Peak Headways of Metrorail Lines (2025)**

| Line | Terminus A | Terminus B | Peak Headway (minutes) | Off-Peak Headway (minutes) |
|---|---|---|---|---|
| Blue | Franconia/Springfield | Largo | 7 | 12 |
| Orange | Vienna | New Carrollton | 6 | 12 |
| Silver | Wiehle-Reston East | Largo Town Center | 6 | 12 |

#### 4.1.2.2 Local Bus

Local bus service in the project area is provided primarily by Metrobus. **Table 14** summarizes the peak and off-peak headways for the local routes serving the project area. The table shows morning peak frequencies; evening peak frequencies are assumed to be directionally reversed.

## 4.2 Opening Year 2025 No-Build VISSIM Simulation Modeling

This section describes the development of the 2025 No-Build VISSIM model and provides an assessment of No-Build traffic conditions in the project area. To reflect the change proposed in the CLRP, the VISSIM model was updated at East Capitol Street and Benning Road intersection to accommodate the through-lane reduction on East Capitol Street.

[1] http://www.mwcog.org/clrp/projects/new/proposed_2013.asp

### 4.2.1 2025 No-Build Traffic Volume Development

The 2025 No-Build future year intersection traffic volumes were developed using a growth rate obtained from MWCOG Version 2.3.75 regional travel demand model. As mentioned previously, traffic volume growth rates for the links in the subarea were estimated by developing future year O-D matrices for AM and PM peak periods, assigning this demand to the Visum network, and comparing against the 2019 traffic assignment. **Figure 12**,

**Figure** 13, and **Figure 14** show the projected peak hour traffic volumes for the opening year 2025.

**Table 14: Local Bus Frequency (2025)**

| Route | Direction | Morning Peak Headway (minutes) | Off-Peak Headway (minutes) |
|---|---|---|---|
| 96,97 | Eastbound | 20 | 60 |
| | Westbound | 20 | 60 |
| U2 | Westbound | 30 | 30 |
| | Southbound | 30 | 30 |
| U4 | Clockwise | 12 | 30 |
| U5,U6 | Northbound | 30 | 38 |
| | Southbound | 14 | 14 |
| U8 | Northbound | 12 | 12 |
| | Southbound | 60 | 60 |
| V7,8,9 | Eastbound | 20 | 30 |
| | Westbound | 20 | 27 |
| W4 | Southbound | 30 | 60 |
| | Northbound | 12 | 60 |
| X1,X3 | Eastbound | 30 | - |
| | Westbound | 15 | - |
| X2 | Eastbound | 6 | 8 |
| | Westbound | 7 | 9 |
| X9 | Eastbound | 15 | 15 |
| | Westbound | 15 | 15 |

### 4.2.2 2025 No-Build Conditions

Like the existing condition, extensive congestion persisted on southbound DC-295 over the entire simulation period in the morning peak due to multiple capacity constraints, including the downstream bottleneck at the Pennsylvania Boulevard SE interchange, lane drop at the East Capitol Street interchange, and merges from Benning Road NE and Kenilworth Avenue NE.

In the evening peak, extensive congestion was observed in northbound DC-295 over most of the simulation period like existing condition due to multiple capacity constraints, including the downstream bottleneck at the US 50 interchange, diverge to Nannie Helen Burroughs Avenue NE, and merges from Benning Road NE and Kenilworth Avenue NE. Southbound DC-295 travel time improved by nearly 1.5 minutes, likely due to increased metering of demand from eastbound Benning Road NE by the eastbound-to-northbound ramp, which suffers increased delay and queueing under 2025 volume.

Figure 15 and

Figure 16 display No Build intersection LOS at the project area intersections during the morning and evening peak hours for opening year 2025. Table 15 provides delay and LOS by movement for the critical intersections for the morning and evening peak hours. Critical intersections are defined as those with intersection LOS E or worse.

Table 16 shows the associated maximum queue lengths by approach.

Substantial delays were observed at East Capitol Street, especially on the westbound Benning Road NE and southbound East Capitol Street approaches in the morning peak. In the meantime, Northeast Heights Development access points, such as westbound and westbound Dix Street NE were congested too.

As for the evening peak, operations were dramatically improved on eastbound Benning Road NE under 2025 No-Build scenario relative to existing conditions, since the latter was calibrated with a lane closure in place. Further improvements to signal timing and the realignment of 39th Street (which eliminates split phasing at this intersection) also contributed to smoother traffic flow. The addition of a northbound left turn at Texas Avenue SE contributed to a doubling in delay at East Capitol Street SE at Texas Avenue SE intersection.

Detailed results for the study area in the Opening Year 2025 No-Build conditions are provided in **Attachment B.**

**Table 15: 2025 No-Build Peak Hour (AM and PM) Delay and Levels of Service (LOS) at the Critical Intersections**

| Intersection | Traffic Control | Peak Hour | Intersection | | Northbound | | Southbound | | Westbound | | Eastbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road NE at East Capitol Street SE | Signalized | AM | 105 | F | 12 | B | 214 | F | 48 | D | 19 | B |
| East Capitol Street SE at Texas Avenue SE | Signalized | PM | 74 | E | 82 | F | | | 8 | A | 114 | F |
| Deane Avenue NE at Lee Street NE | Unsignalized | AM | 287 | F | | | 398 | F | 1 | A | 321 | F |
| Deane Avenue NE at Kenilworth Terrace NE | Signalized | AM | 62 | E | 91 | F | 71 | E | 4 | A | 61 | E |
| Deane Avenue NE at Kenilworth Avenue NE | Signalized | AM | 55 | E | | | 291 | F | 59 | E | 8 | A |
| Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC-295 U-turns | Signalized | PM | 68 | E | 152 | F | 175 | F | 24 | C | 30 | C |
| Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | Signalized | AM | 78 | E | 249 | F | 80 | E | 43 | D | 24 | C |
| Kenilworth Avenue NE at Foote Street NE | Unsignalized | AM | 163 | F | | | 189 | D | | | 17 | B |

***** *Stop-controlled intersection, in which intersection LOS is expressed in terms of the average vehicle delay of the worst movement*

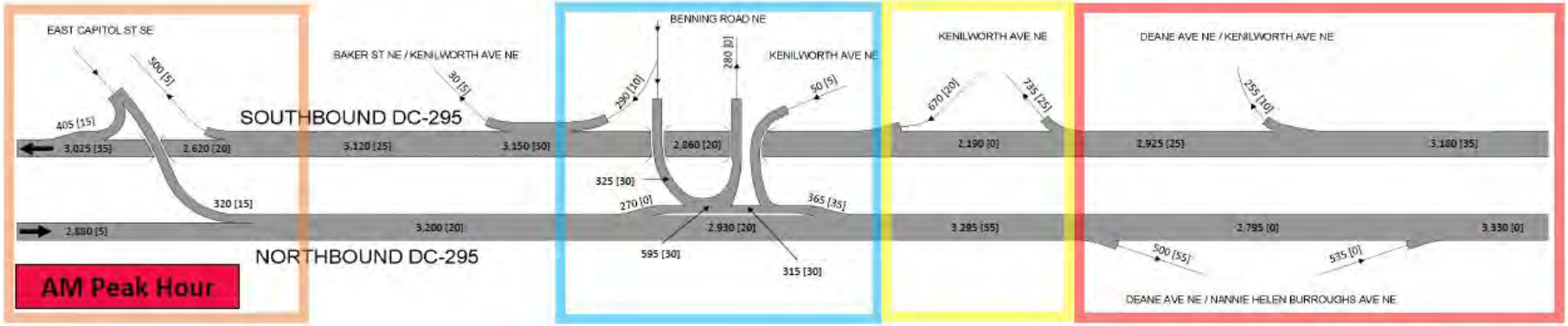
**Table 16: 2025 No-Build Peak Hour (AM and PM) Maximum Queue Length (feet)**

| Intersection | Peak Hour | Northbound | Southbound | Westbound | Eastbound |
|---|---|---|---|---|---|
| Benning Road NE at East Capitol Street SE | AM | 417 | 533 | 1775 | 220 |
| Benning Road NE at East Capitol Street SE | PM | 244 | 492 | 229 | 1332 |
| East Capitol Street SE at Texas Avenue SE | AM | 432 | 74 | - | - |
| East Capitol Street SE at Texas Avenue SE | PM | 207 | 253 | - | - |
| Benning Road NE and Minnesota Avenue NE | AM | 460 | 530 | 378 | 372 |
| Benning Road NE and Minnesota Avenue NE | PM | 285 | 447 | 284 | 560 |

*[This is space is intentionally blank]*

**Figure 12: 2025 No-Build Morning and Evening Peak Hour Freeway Traffic Volumes**

* Numbers on Figures denote: Forecasted Volumes [Vehicle difference from Existing Conditions]



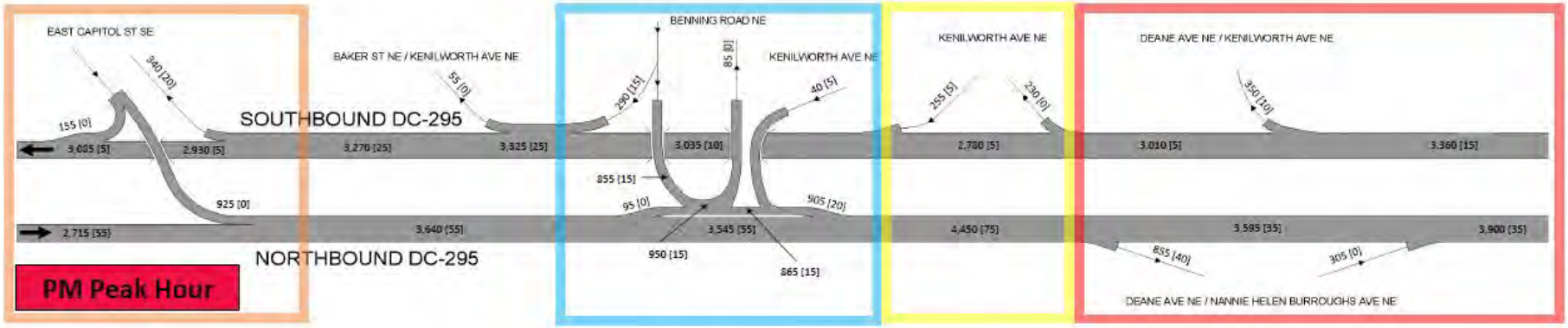



**Figure 13: 2025 No-Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 1 of 2)**

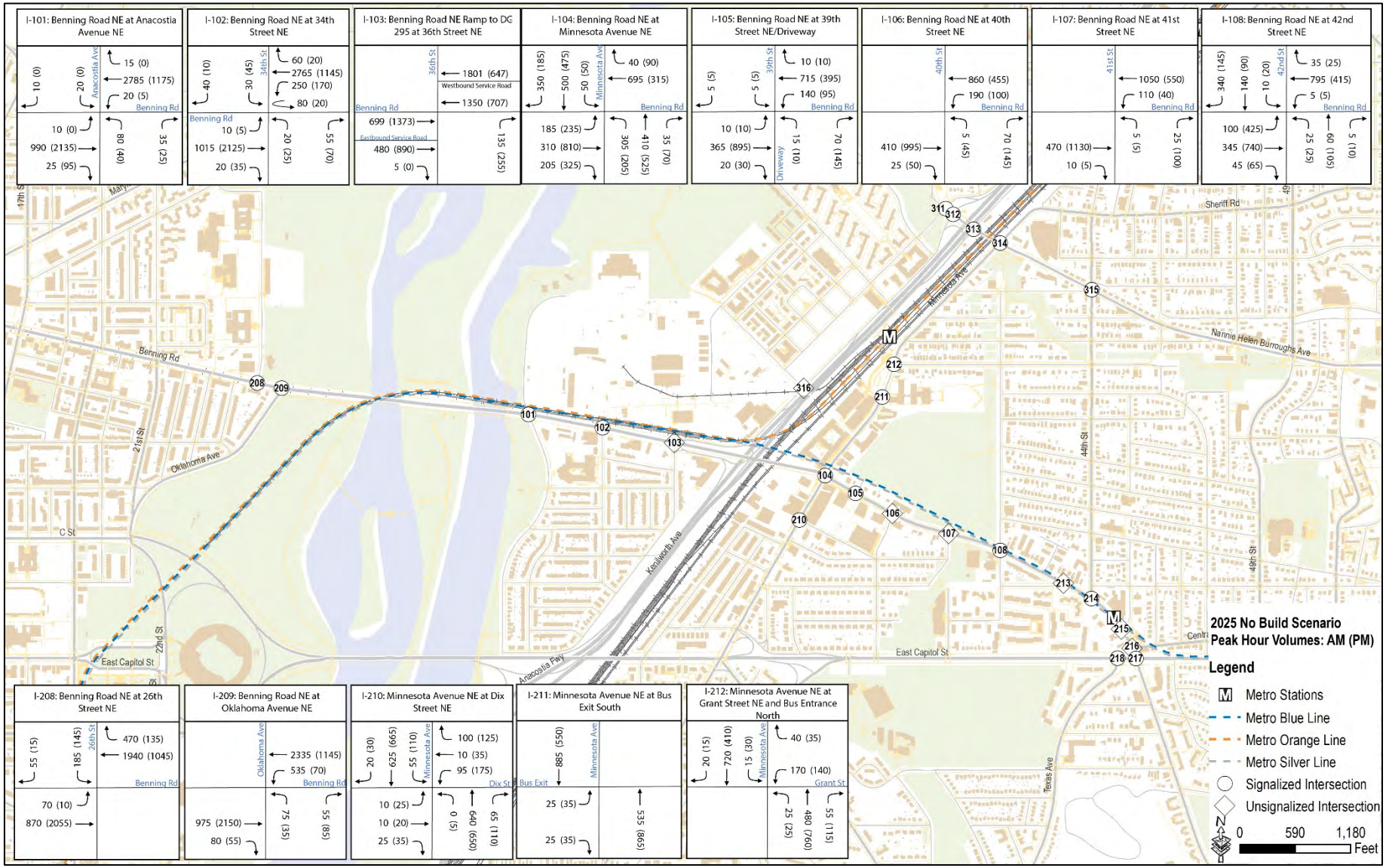


**Figure 14: 2025 No-Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 2 of 2)**

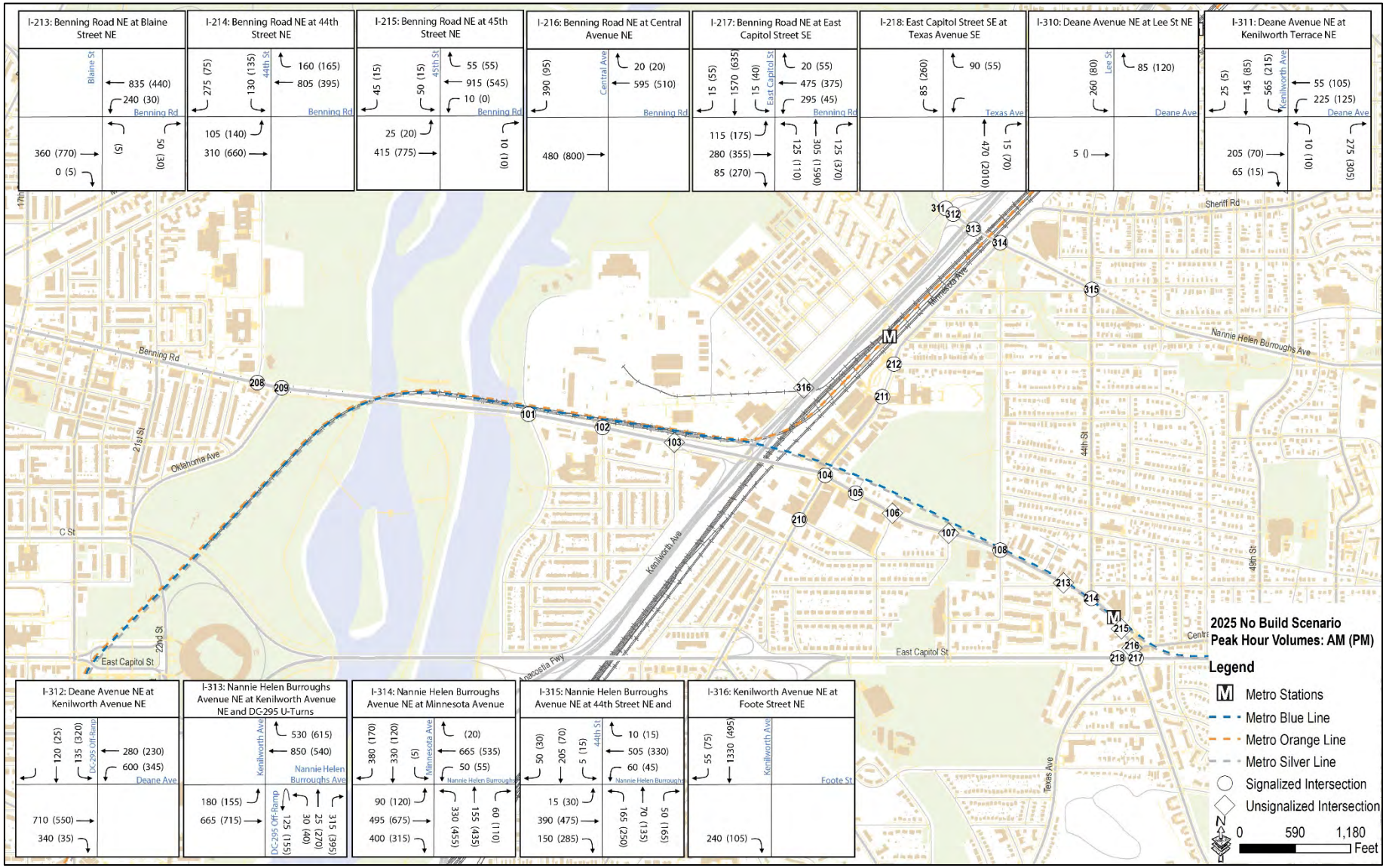


**Figure 15: 2025 No-Build Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 1 of 2)**

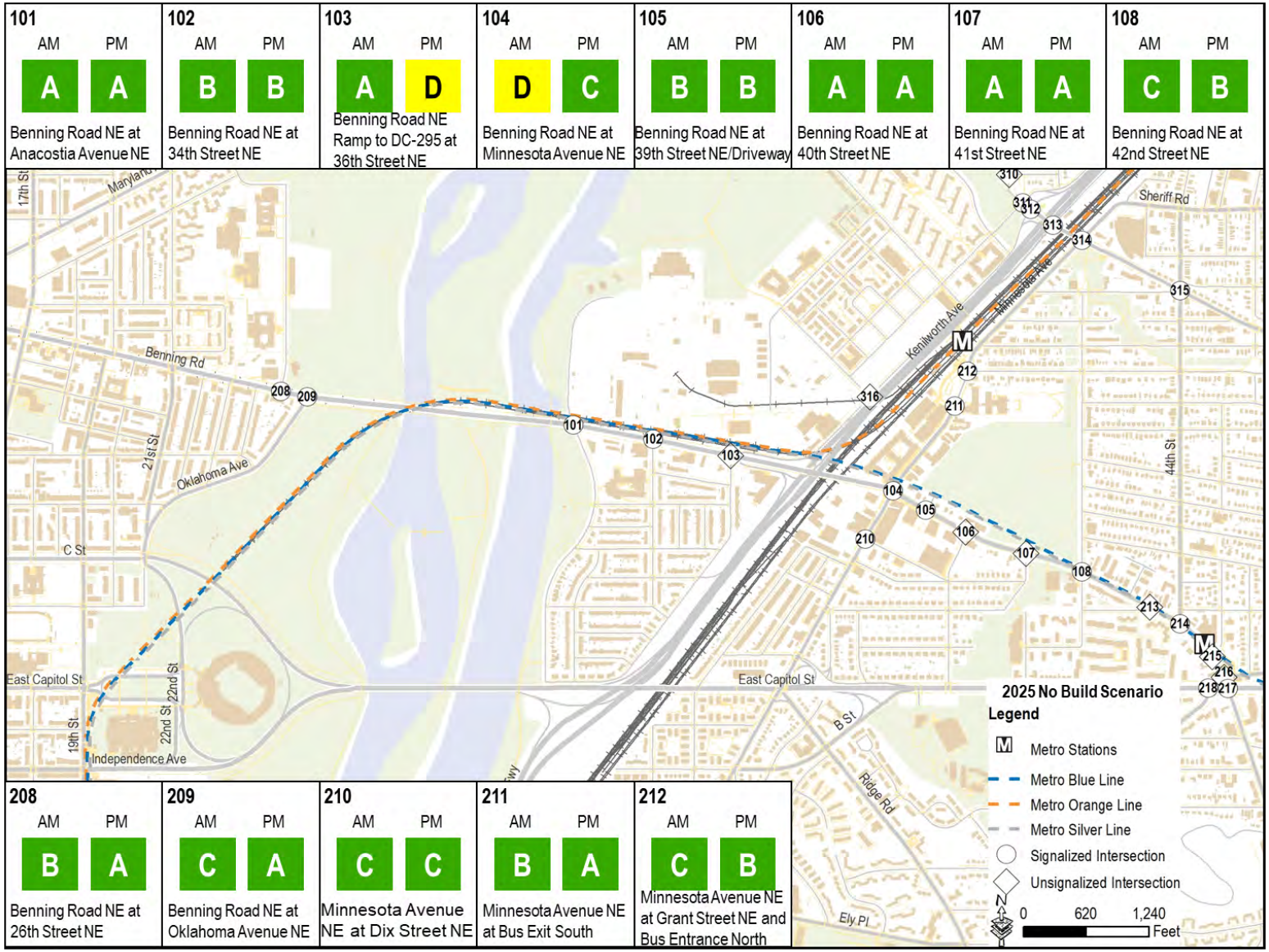
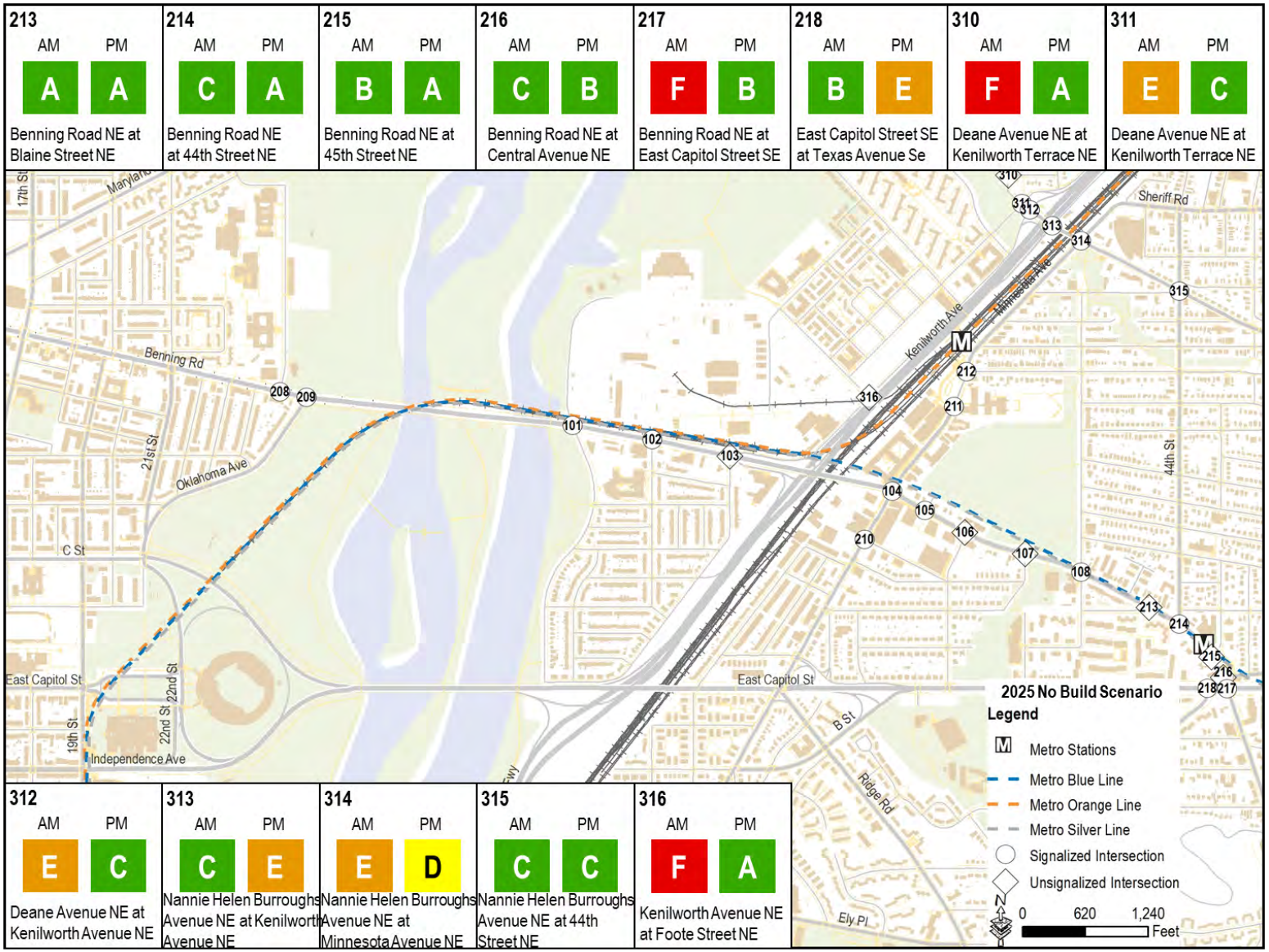


**Figure 16: 2025 No-Build Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 2 of 2)**



## 4.3 Opening Year 2025 Build Travel Demand Forecasting

A future build scenario, which included the proposed action, was analyzed for the year 2025 to test the alternatives developed as part of the Benning Road EA. This scenario combined regional baseline assumptions with a more fine-grained roadway system to predict travel patterns, transit usage and vehicular turning movements in the project area.

### 4.3.1 2025 Build Land Use

For the build scenario, the regional land use of the travel demand analysis area was the same as for the No-Build scenario, using the MWCOG Round 9.1 Cooperative Land Use Forecasts for 2025.

### 4.3.2 2025 Build Transportation Network

The transportation networks in the build scenario is based on the regional CLRP transportation networks which is the same as the No-Build scenario, except it includes the proposed action. The proposed frequency of service for the line is 10 minutes in both directions through the entire service day.

### 4.3.3 2025 Build Ridership Forecasting

Simplified Trips-on-Project Software (STOPS) (version 2.5) was used to forecast ridership for the proposed extension of streetcar transit service to the Benning Road Metrorail station. STOPS was developed by the Federal Transit Administration (FTA) and has been widely used in ridership analysis and forecasting for transit planning and development projects. STOPS estimates daily ridership patterns using typical planning data including current and projected regional land use and demographic data. It reports line-level and stop-level ridership, but it does not report peak versus off-peak trips separately. It is also able to model both local and regional transit networks, including the first phase of the DC Streetcar and the planned extension. STOPS provides an order of magnitude estimate of line-level ridership but is less precise at the stop-level.

For the STOPS planning-level analysis it is assumed that in 2025 the H Street Bridge construction will be completed, and the Streetcar stop at Union Station will be operational with the relevant federal and local certifications granted for revenue service. The actual timing of the H Street Bridge construction work and completion is unknown at this time and it is expected to impact Streetcar ridership and operations. The STOPS model also does not fully capture any impacts of the H Street Bridge construction (including the closure of the Union Station Streetcar stop) on transit ridership (Metrobus and DC Streetcar) and traffic patterns, and the time required for travel patterns to normalize after completion of the bridge. In addition, special markets and associated transit trips are not modeled. Special markets include those related to tourism, recreation, and sporting events.

STOPS may not accurately differentiate between overlapping services of the same mode, therefore bus routes along shared corridors should be looked at together. The STOPS analysis also does not

include any changes to bus routes or bus schedules with the introduction of the Benning Road Streetcar Extension.

**Table 17** summarizes the projected streetcar boardings at each stop under the No-Build (terminating at Oklahoma Avenue) and the build (includes extension to Benning Road Metrorail Station) scenarios.

**Table 17: 2025 No-Build and Build Weekday Streetcar Ridership**

| Stop | 2025 | | |
|---|---|---|---|
| | No-Build | Build | Change |
| Union Station | 1,240 | 1,510 | *+270* |
| 3rd Street and H Street NE | 210 | 590 | *+380* |
| 5th Street and H Street NE | 150 | 210 | *+60* |
| 8th Street and H Street NE | 250 | 350 | *+100* |
| 13th Street and H Street NE | 390 | 460 | *+70* |
| 15th Street and Benning Road NE | 390 | 700 | *+310* |
| 19th Street and Benning Road NE | 480 | 720 | *+240* |
| Oklahoma Avenue and Benning Road NE | 600 | 530 | *-70* |
| Kingman Island and Benning Road NE | - | 10 | *+10* |
| 34th Street and Benning Road NE | - | 440 | *+440* |
| 39th Street and Benning Road NE | - | 400 | *+400* |
| 42nd Street and Benning Road NE | - | 360 | *+360* |
| Benning Road Metrorail Station | - | 1,310 | *+1,310* |
| **Total** | **3,710** | ***7,590*** | ***+3,880*** |
| Existing Stops | 3,710 | 5,070 | *+1,360* |
| Proposed Stops | - | 2,520 | *+2,520* |

It is projected that in 2025, combined weekday boardings at the proposed stops along the Benning Road Extension would be approximately 2,500 riders. This is in addition to a projected 5,000 total riders boarding at stops along the existing line between Union Station and Oklahoma Avenue, 27% of which are riders projected to be generated by the addition of the extension.

**Table 18** provides weekday bus ridership under the No-Build and build scenarios for 2025 for key routes or lines that serve the study area. These numbers include ridership for the entire routes, not just ridership at stops within the study area. Compared to the 2025 No-Build scenario, the total daily weekday bus ridership in the study area (bus stops within a quarter mile of an existing or proposed Streetcar stop) would decrease by approximately 6 percent in the 2025 Build scenario—from 16,800 to 15,700 daily weekday riders. This decrease may be explained by the introduction of the Streetcar service, which offers faster service at a higher frequency, particularly during the off-peak periods because the Streetcar would operate with the same 10-minute headway during both the peak and off-peak, thereby reducing passenger waiting time between the Benning Road Metrorail Station and Union Station.

**Table 18: 2025 No-Build and Build Weekday Bus Ridership (Boardings)**

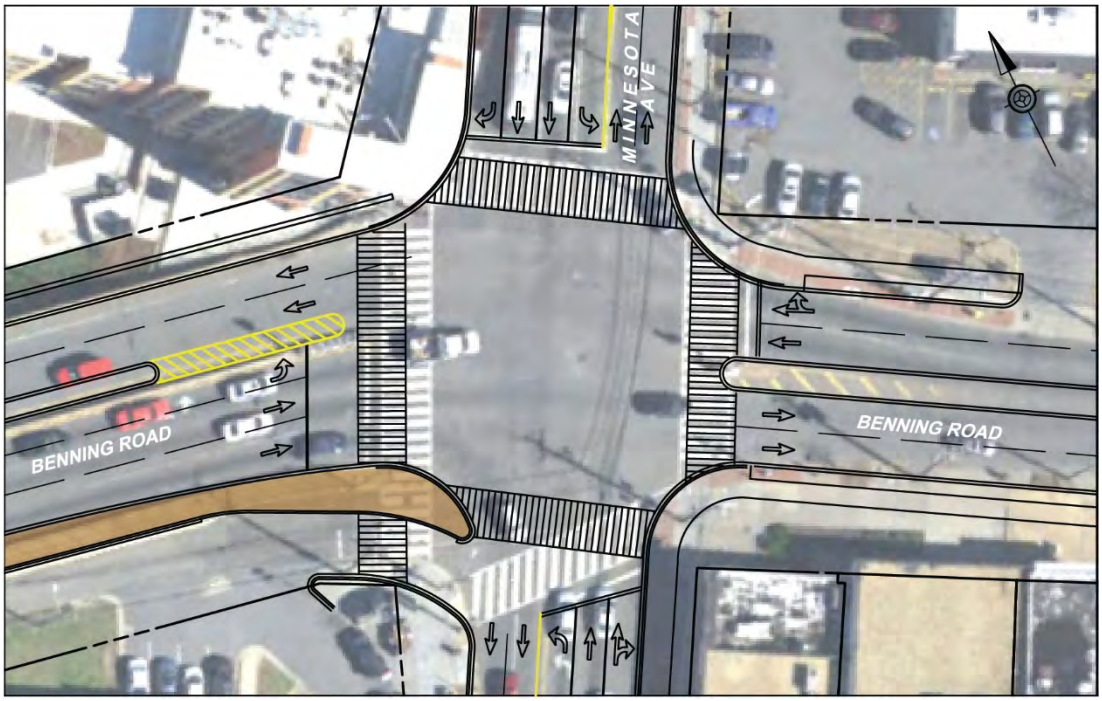
| Stop | 2025 | | |
|---|---|---|---|
| | No- Build | Build | Change |
| X Line (X1, X2, X3, X9) | 17,490 | 16,480 | *-1,010* |
| U4 | 1,900 | 1,880 | *-20* |
| U5, U6 | 2,410 | 2,340 | *-70* |
| U8 | 2,570 | 2,250 | *-320* |
| 96, 97 | 7,880 | 7,700 | *-180* |
| W4 | 8,170 | 8,240 | *+70* |
| **Total** | **40,420** | **38,890** | ***-1,530*** |
| Percent Difference Compared to No-Build | *-3.8%* | | |

## 4.4 Opening Year 2025 Build VISSIM Simulation Modeling

The build scenario assumes the same transportation network as in the No-Build, with the exception of two changes: (1) the introduction of the streetcar from 26th Street to Benning Road Metrorail Station; and (2) proposed lane changes at the intersection of Benning Road and Minnesota Avenue to improve traffic operations. Intersection improvements at Benning Road and East Capitol Street intersection to reduce vehicular delay are beyond the scope and therefore not considered in this analysis.

The proposed lane configuration at Benning Road and Minnesota Avenue intersection is shown in **Figure 17**. Visual observations and sensitivity tests showed potential capacity failure at this intersection, particularly for the southbound Minnesota Avenue intersection. Therefore, the proposed lane configuration changes are found to be more effective in 2045. This will be discussed in further detail in **Section 5**.

**Figure 17: Proposed Lane Configuration at Benning Road and Minnesota Avenue Intersection**




The proposed improvements include:

- Providing one additional through lane (two in total) on the southbound approach of Minnesota Avenue with a 100-foot left turn pocket
- Modifying the southbound approach with a 200-foot right turn pocket
- Restricting the westbound left turn on Benning Road to increase through-lane capacity

The Build scenario also considered special transit-only signals at certain intersections where streetcar tracks transition to an adjacent lane. The intersections where transitions occur for curbside and median alignments are described below:

Eastbound Curbside Streetcar Alignment

- Benning Road and Oklahoma Avenue intersection: Transition from the recently constructed median tracks to a track in the curb lane.
- Benning Road and 34th Street intersection: Transition from the curb lane onto the third lane to continue in curb lane on the eastbound structure over DC-295 and CSX Railroad.
- Benning Road and 45th Street intersection: Transition from the curb lane to the Benning Road Station terminus. This transition would require signalization of the intersection as it currently operates as an unsignalized intersection.

Westbound Curbside Streetcar Alignment

- Benning Road and 45th Street intersection: Transition from the Benning Road Station terminus to a track in the curb lane.

- Benning Road and 36th Street intersection: Transition from the curb lane of the bridge to the curb of Benning Road. Only westbound -ramp traffic from Kenilworth Avenue would be stopped to allow the streetcar to make this transition.

Eastbound Median Streetcar Alignment

- Benning Road and 45th Street intersection: Transition from the median tracks to the Benning Road Station terminus.

Westbound Median Streetcar Alignment

- Benning Road and 45th Street intersection: Transition from the median tracks to the Benning Road Station terminus.
- Benning Road, west of Kingman Island stop: Transition from the fourth lane to the third lane to align track with the existing tail track extending from the Benning Road and Oklahoma Avenue intersection. This would require a new signalized intersection at Kingman Island to stop westbound traffic to allow this transition.

### 4.4.1 2025 Build Traffic Volume Development

Same forecasting methods for the 2025 No-Build scenario were used to develop the 2025 Build scenario. **Figure 18**, **Figure 19**, and

**Figure** 20 show the freeway and intersection traffic volume in 2025 Build scenario.

### 4.4.2 2025 Build Conditions

A comparison 2025 No-Build and Median Alignment Build revealed several findings:

In the morning peak, travel times were comparable between the No-Build and Streetcar Build scenario for both directions of Benning Road NE and DC-295. Southbound DC-295 was very congested over the entire AM analysis period in 2019 and the congestion did not increase much in 2025 due to little increase in forecasted demand due to capacity constraints. Unresolved bottlenecks downstream of the study area are expected to govern.

In the evening peak, Benning Road NE eastbound and westbound travel times increased by between 30 seconds and one (1) minute from the 2025 No-Build to 2025 Streetcar Build scenario. In the eastbound direction, this travel time increase was primarily observed west of the Benning Road and Minnesota Avenue intersection. In the westbound direction, this travel time increase was observed primarily east of the Benning Road and Minnesota Avenue intersection, but slightly impacted by the lane reductions on Benning Road NE to the west.

In the morning peak, the intersection of Benning Road NE and Oklahoma Avenue NE operated with more delay under the 2025 No-Build scenario than the 2025 Streetcar Build scenario. This difference was due to the changes in volume on westbound Benning Road NE. Under the Streetcar Build scenario, the westbound approach demand was approximately 170 vehicles fewer than in the No-Build, primarily due to the proposed lane reduction on Benning Road. The intersections of Benning Road NE with 45th Street NE and Central Avenue NE operated with similar delay under the Streetcar Build scenario and No-Build scenario, suggesting that the added signal for the EOL did not have significant impact in the near-term. The streetcar experienced approximately 40 seconds of delay at this intersection, and when present, blocked the leftmost eastbound through lane. Congestion and significant weaving patterns were observed west of the Benning Road NE and DC-295 Interchange under the Streetcar Build scenario, where a lane reduction began in the westbound direction. The impact of this weaving area was amplified by a bus stop on the rightmost lane just west of the Kenilworth Avenue NE and Benning Road NE merge. Queue lengths greater than 400 feet are observed under the 2025 Streetcar Build scenario at the signalized crosswalk across southbound Kenilworth Avenue at westbound Benning Road NE. The impact of increased pedestrian volumes on vehicular operations here should be monitored.

In the evening peak, at the intersections of Benning Road NE with Anacostia Avenue NE and 34th Street NE, the eastbound approach delay increased slightly from No-Build to Streetcar Build due to the lane reduction on Benning Road NE. Traffic operations at the intersection of Benning Road NE and 36th Street NE were worse under the No-Build than the Streetcar Build scenario due to queue spillback from the eastbound Benning Road NE on-ramp to northbound DC-295. The intersection of East Capitol Street and Texas Avenue SE operated at LOS E under both the 2025 No-Build and Streetcar Build scenarios. This decrease in intersection LOS relative to existing conditions can be explained by the road diet planned for East Capitol Street. While the eastbound demand was forecasted to decrease slightly with the reduction of a travel lane, the eastbound

approach experienced the largest increase in delay relative to existing conditions. At the intersection of Benning Road NE and Minnesota Avenue NE, intersection LOS was C under both the 2025 No-Build and Streetcar Build scenarios. The proposed design and signal timing at this intersection was effective in processing forecasted demand, and intersection delay only increased by five seconds under the Streetcar Build scenario. Intersections along Nannie Helen Burroughs Avenue NE experienced increased delay due to higher volumes under the 2025 No-Build and Streetcar Build scenarios relative to existing conditions. There was significant queue spillback at the intersections with the northbound DC-295 offramp and with Minnesota Avenue NE. In general, the operation of streetcar service, including transitions, results in typically very marginal increase in intersection delay.

The findings of the 2025 Curbside Build and Median Alignment Build traffic analysis are summarized below:

- Benning Road and East Capitol Street intersection operated with LOS F in the morning peak and evening peak hours under Curbside alignment but LOS B under Median alignment in the evening peak.
- During evening peak, intersection LOS at Benning Road at 44th Street was B under Median alignment but downgraded to E under curbside alignment and from LOS F to LOS D with the median alignment.

Figure 21 provides intersection LOS at the project area intersections during the morning and evening peak hours with the curbside alignments and

Figure 22 and Figure 23 show the operational results under median alignment. Table 19 provides delay and LOS by movement for the critical intersections for the 2025 Build curbside alignment. **Table 20** displays the associated queue lengths by movement**.**

**Table** 21 and

**Table** 22 provide delay and queuing results for the median alignment, respectively.

**Attachment B** provides the detailed results for all project area intersections for the 2025 Build Alternatives.

### Table 19: 2025 Build Curbside Alignment Peak Hour (AM and PM) Delay and Levels of Service (LOS) at the Critical Intersections

| Intersection | Traffic Control | Peak Hour | Intersection | | Northbound | | Southbound | | Westbound | | Eastbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road and East Capitol Street | Signalized | AM | 181 | F | 285 | F | 62 | E | 127 | F | 386 | F |
| Benning Road and 44th Street | Signalized | PM | 60 | E | 18 | B | 99 | F | 35 | C | - | - |
| Benning Road and 45th Street | Unsignalized | PM | 55 | D | 3 | A | 99 | F | 28 | C | 34 | C |
| Benning Road and East Capitol Street | Signalized | PM | 166 | F | 287 | F | 69 | E | 251 | F | 148 | F |

** The curbside results are based on the original AECOM study.*

### Table 20: 2025 Build Curbside Alignment Peak Hour (AM and PM) Maximum Queue Length (feet) at the Critical Intersections

| Intersection | Peak Hour | Northbound | | | Southbound | | | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT |
| Benning Road and East Capitol Street | AM | 1,070 | 1,070 | 1,070 | 320 | 320 | 330 | 1,675 | 1,675 | 1,675 | 1,465 | 1,465 | 1,465 |
| Benning Road and 44th Street | PM | - | 235 | 235 | 830 | 830 | - | 255 | - | 255 | - | - | - |
| Benning Road and 45th Street | PM | 135 | 135 | 135 | 470 | 470 | 470 | 105 | 55 | 85 | 30 | 30 | 30 |
| Benning Road and East Capitol Street | PM | 1,015 | 1,015 | 1,015 | 365 | 365 | 375 | 1,030 | 1,030 | 1,030 | 1,465 | 1,465 | 1,465 |

** The curbside results are based on the original AECOM study.*

### Table 21: 2025 Build Median Alignment Peak Hour (AM and PM) Delay and Levels of Service (LOS) at the Critical Intersections

| Intersection | Traffic Control | Peak Hour | Intersection | | Northbound | | Southbound | | Westbound | | Eastbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road NE at East Capitol Street SE | Signalized | AM | 106 | F | 12 | B | 210 | F | 50 | D | 19 | B |
| East Capitol Street SE at Texas Avenue SE | Signalized | PM | 75 | E | 87 | F | | | 6 | A | 113 | F |
| Deane Avenue NE at Lee St NE | Unsignalized | AM | 304 | F | | | 426 | F | 1 | A | 387 | F |
| Deane Avenue NE at Kenilworth Terrace NE | Signalized | AM | 93 | F | 154 | F | 107 | F | 4 | A | 63 | E |
| Deane Avenue NE at Kenilworth Avenue NE | Signalized | AM | 58 | E | | | 291 | F | 66 | E | 9 | A |
| Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC-295 U-turns | Signalized | PM | 67 | E | 154 | F | | | 23 | C | 31 | C |
| Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | Signalized | AM | 93 | F | 349 | F | 100 | F | 43 | D | 24 | C |
| Kenilworth Avenue NE at Foote Street NE | Unsignalized | AM | 163 | F | | | 190 | D | | | 14 | B |

### Table 22: 2025 Build Median Alignment Peak Hour (AM and PM) Maximum Queue Length (feet)

| Intersection | Peak Hour | Northbound | Southbound | Westbound | Eastbound |
|---|---|---|---|---|---|
| Benning Road NE at East Capitol Street SE | AM | 438 | 410 | 1781 | 232 |
| Benning Road NE at East Capitol Street SE | PM | 235 | 402 | 219 | 1335 |
| East Capitol Street SE at Texas Avenue SE | AM | 450 | 95 | - | - |
| East Capitol Street SE at Texas Avenue SE | PM | 232 | 156 | - | - |
| Benning Road NE and Minnesota Avenue NE | AM | 353 | 533 | 412 | 270 |
| Benning Road NE and Minnesota Avenue NE | PM | 442 | 445 | 285 | 673 |

## Figure 18: 2025 Build Morning and Evening Peak Hour Freeway Traffic Volumes

*** Numbers on Figures denote: Forecasted Volumes [Vehicle difference from 2025 No-Build without Streetcar and Interchange (Scenario 5)]**

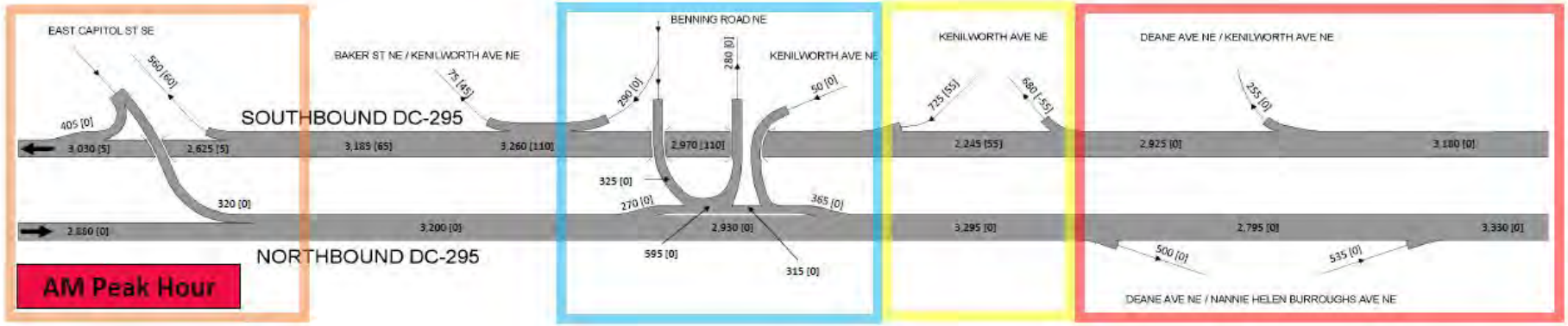
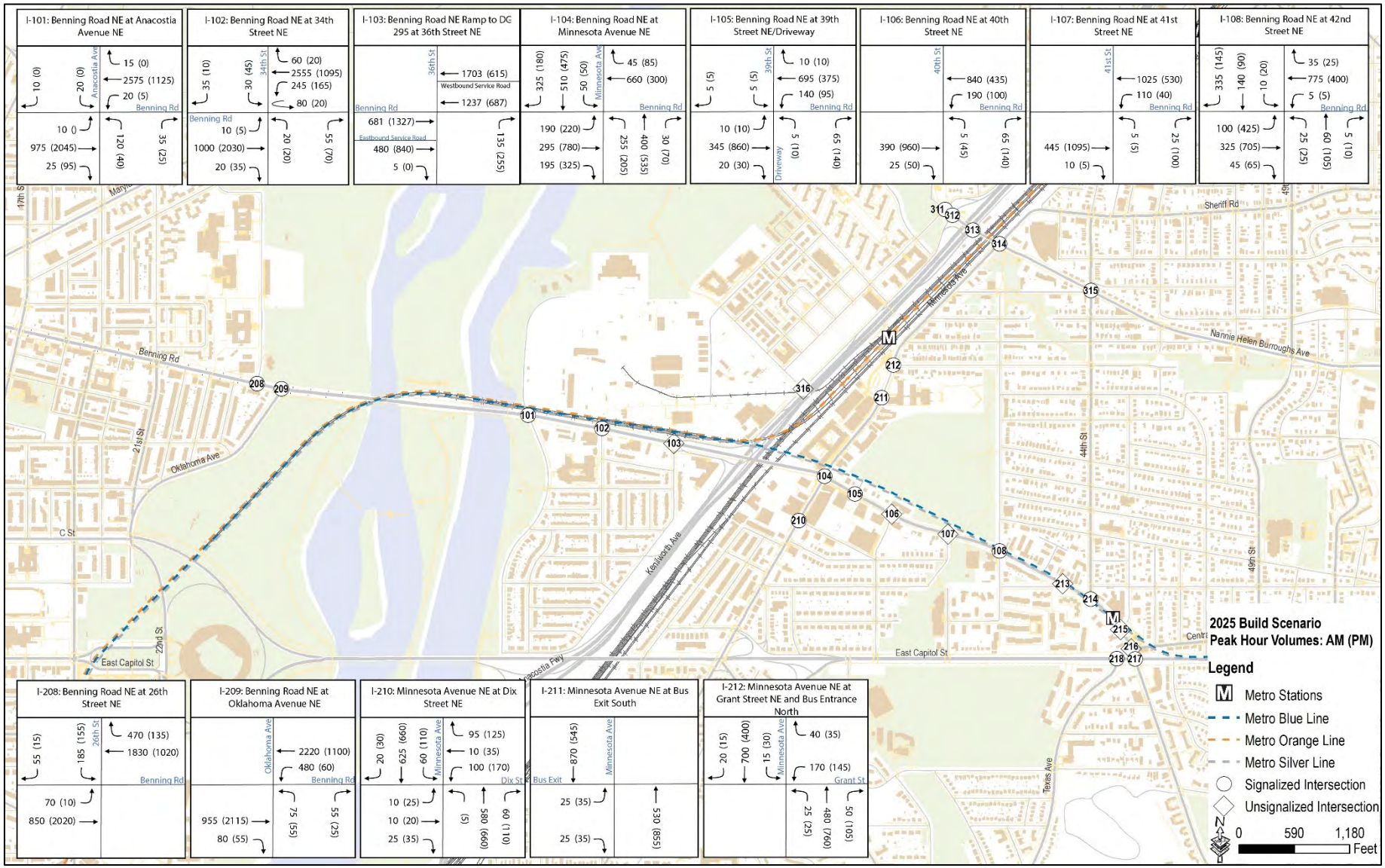


**Figure 19: 2025 Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 1 of 2)**



## Figure 20: 2025 Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 2 of 2)

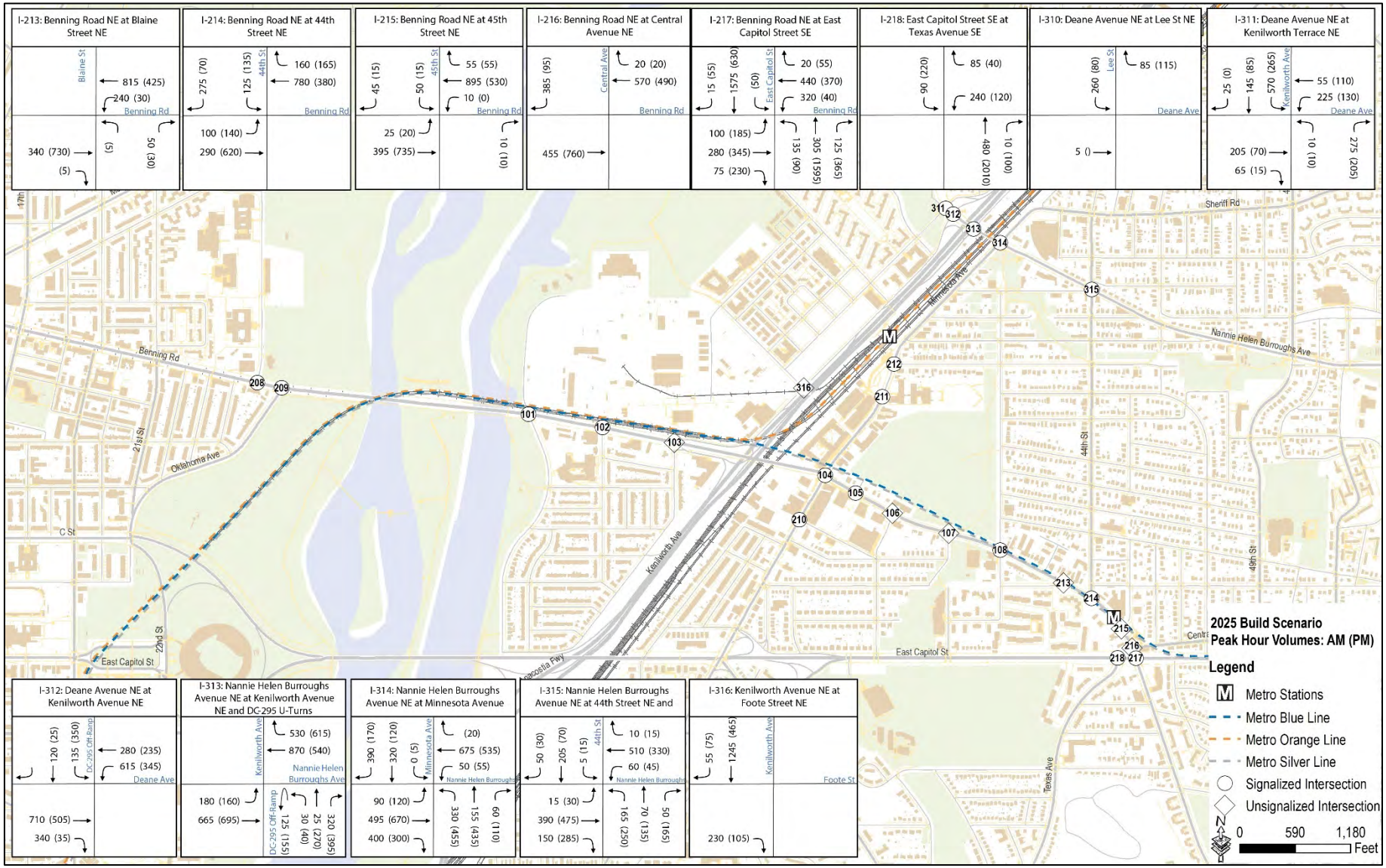
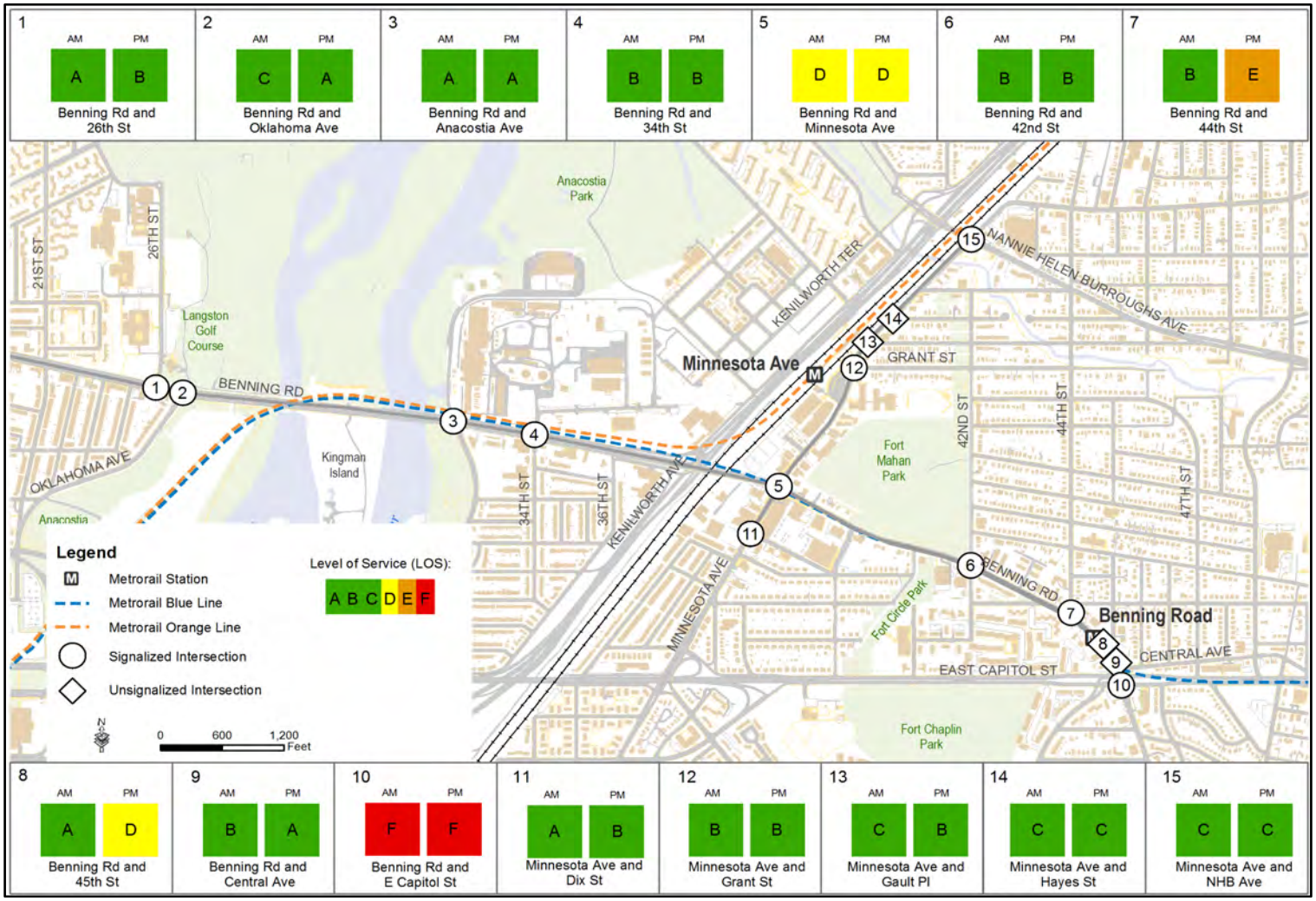


**Figure 21: 2025 Build Curbside Alignment Morning and Evening Peak Hour Intersection Levels of Service (LOS)**




** The curbside results are based on the original AECOM study.*

**Figure 22: 2025 Build Median Alignment Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 1 of 2)**

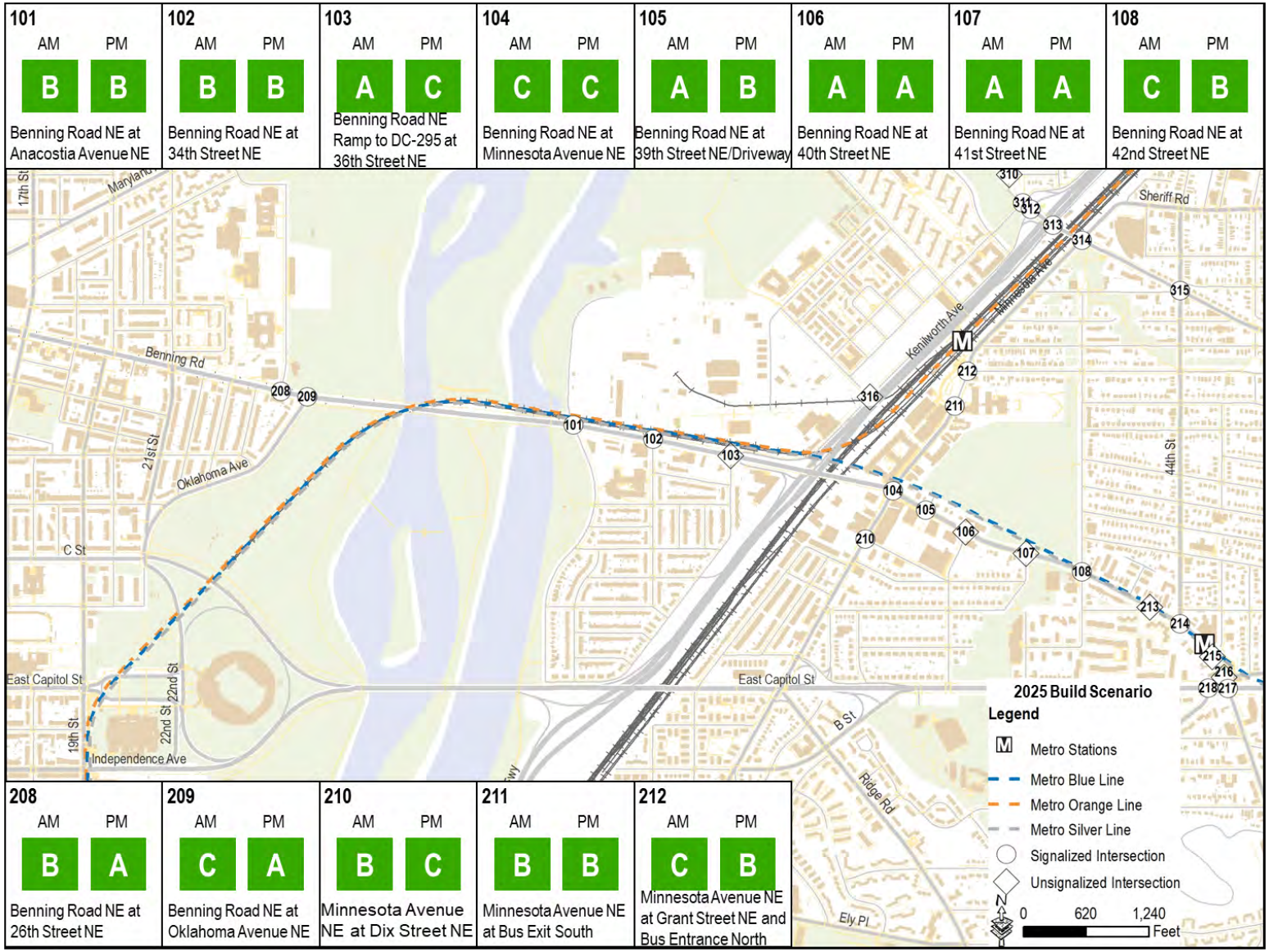
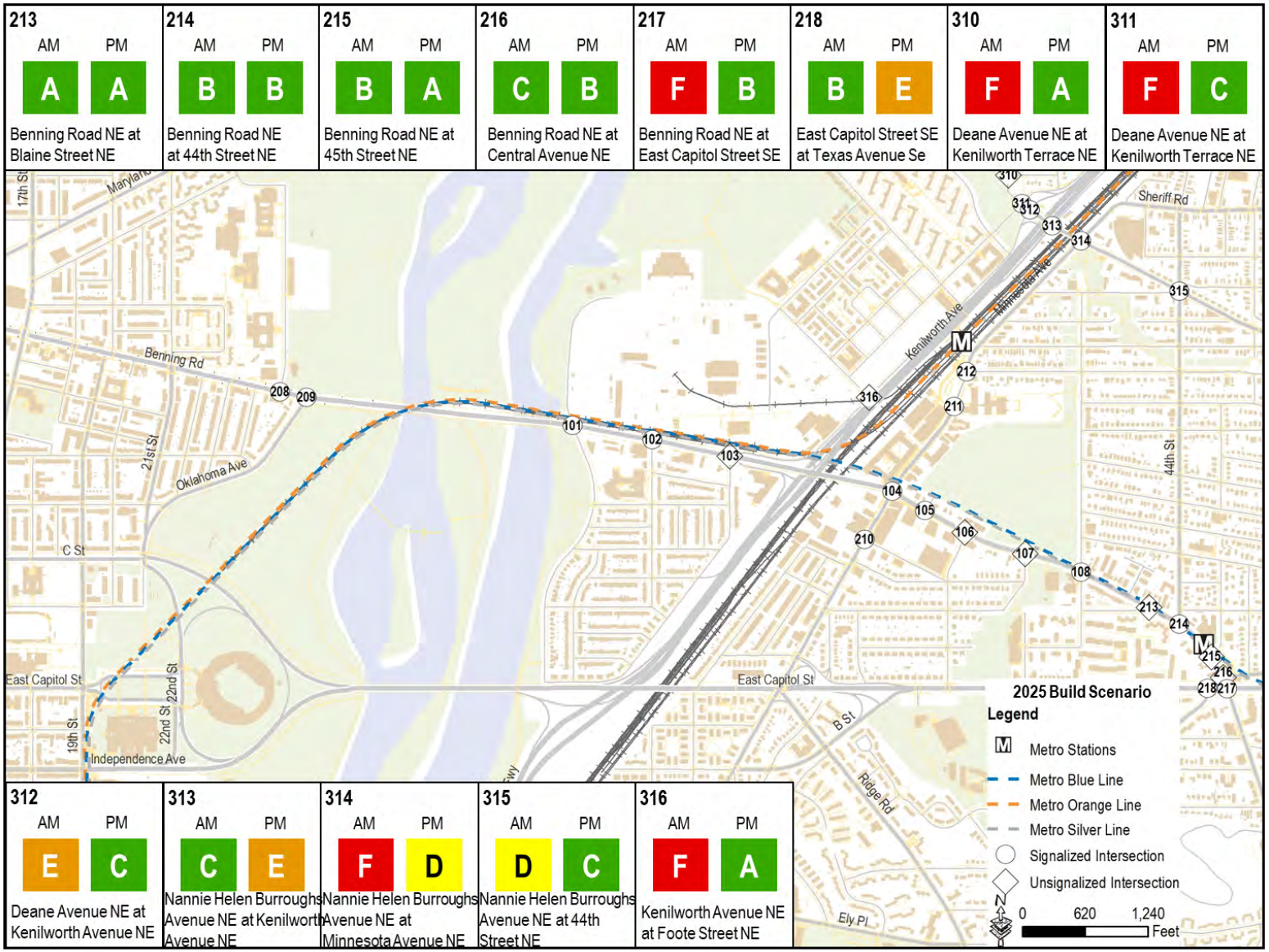


**Figure 23: 2025 Build Median Alignment Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 2 of 2)**



### 4.4.3 2025 Build Streetcar Operations

To evaluate the operation of the streetcar alignments, average travel speeds were obtained from the VISSIM simulation model. VISSIM travel time segments for curbside alignment are defined from 20th Street to Benning Road Metrorail Station in the eastbound direction and from Benning Road Metrorail Station to 26th Street in the westbound direction. Travel time segments for median alignments are defined from 26th Street to Benning Road Metrorail Station in the eastbound direction and from Benning Road Metrorail Station to 26th Street in the westbound direction. **Table 23** provides average travel time and speed for the curbside and median streetcar alignment in the morning and evening peak hours.

**Table 23: 2025 Average Travel Time and Speed for the Streetcar Alignments in the Morning and Evening Peak Hour**

| Direction | Peak Hour | Travel Time (min) | Speed (mph) |
|---|---|---|---|
| **Curbside Streetcar Alignment** | | | |
| **Eastbound** | AM | 10.0 | 12.8 |
| **Westbound (peak direction)** | | 10.9 | 10.3 |
| **Eastbound (peak direction)** | PM | 13.9 | 9.2 |
| **Westbound** | | 9.6 | 11.7 |
| **Median Streetcar Alignment** | | | |
| **Eastbound** | AM | 7.3 | 15.4 |
| **Westbound (peak direction)** | | 7.3 | 15.4 |
| **Eastbound (peak direction)** | PM | 7.9 | 14.2 |
| **Westbound** | | 7.1 | 15.8 |

** The curbside results are based on the original AECOM study.*

Results show that the curbside alignment operates with relatively slower speeds compared to the median alignment during the both peak hours. This can be attributed to the higher number of transitions for the curbside alignment, which increases intersection delay as no signal pre-emption was provided for the special streetcar signals to limit the disruption of general traffic. Another important finding is that the average streetcar speed is generally higher than 10mph, faster than the typical peak period bus speeds in downtown Washington DC[2], as a result of off-board fare collection, level boarding, and relatively larger spacing between streetcar stops.

**Table 24** and **Table 25** show stop to stop travel times for both Build Alternatives in 2025 based on VISSIM results. Vehicle travel times along Benning Road for the same travel segments were also presented in **Table 26** and

**Table** 27 for comparison purposes.

For both morning and evening peak, travel times (excluding dwell time at the streetcar stops) for the streetcar vehicles were slightly higher than t/hose for vehicular traffic in both directions of

[2] *http://www.wmata.com/pdfs/planning/November2009_AMSpeedMap.pdf*

Benning Road NE. The biggest difference existed along the segment from 42nd Street NE to 45th Street NE due to long delays and eastbound queue impacts at the Streetcar End of Line (EOL).

**Table 24: 2025 Station to Station VISSIM Travel Time Results for Curbside Streetcar Alignment**

| Segment | Curbside Alignment | |
|---|---|---|
| | Travel Time (min) – AM Peak Hour | Travel Time (min) – PM Peak Hour |
| **Eastbound Direction** | | |
| **20th Street to Oklahoma Avenue** | 0.7 | 0.8 |
| **Oklahoma Avenue to Kingman Island** | 2.0 | 2.1 |
| **Kingman Island to 34th Street** | 1.0 | 1.3 |
| **34th Street to Minnesota Avenue** | 3.3 | 3.6 |
| **Minnesota Avenue to 42nd Street** | 1.0 | 1.3 |
| **42nd Street to Benning Road Metrorail Station** | 2.0 | 4.9 |
| **TOTAL** | **10.0** | **13.9** |
| **Westbound Direction** | | |
| **Benning Road Metrorail Station to 42nd Street** | 2.0 | 1.6 |
| **42nd Street to Minnesota Avenue** | 2.0 | 1.2 |
| **Minnesota Avenue to 34th Street** | 2.3 | 3.0 |
| **34th Street to Kingman Island** | 1.4 | 1.2 |
| **Kingman Island to Oklahoma Avenue** | 2.7 | 2.2 |
| **Oklahoma Avenue to 26th Street** | 0.5 | 0.4 |
| **TOTAL** | **10.9** | **9.6** |

** The curbside results are based on the original AECOM study.*

**Table 25: 2025 Station to Station VISSIM Travel Time Results for Median Streetcar Alignment**

| Segment | Median Alignment | |
|---|---|---|
| | Travel Time (min) – AM Peak Hour | Travel Time (min) – PM Peak Hour |
| **Eastbound Direction** | | |
| **20th Street to Oklahoma Avenue** | 0.1 | 0.1 |
| **Oklahoma Avenue to Langston Golf Course** | 1.2 | 1.0 |
| **Langston Golf Course to 34th Street** | 1.6 | 1.8 |
| **34th Street to 39th Street** | 1.7 | 2.0 |
| **39th Street to 42nd Street** | 0.9 | 1.0 |
| **42nd Street to Benning Road Metrorail Station** | 2.0 | 2.0 |
| **TOTAL** | **7.3** | **7.9** |
| **Westbound Direction** | | |
| **Benning Road Metrorail Station to 42nd Street** | 1.4 | 1.2 |
| **42nd Street to 39th Street** | 0.9 | 0.9 |
| **39th Street to 34th Street** | 2.1 | 2.5 |
| **34th Street to Langston Golf Course** | 1.3 | 1.1 |
| **Langston Golf Course to Oklahoma Avenue** | 1.0 | 1.0 |

| | Median Alignment | |
|---|---|---|
| Segment | Travel Time (min) – AM Peak Hour | Travel Time (min) – PM Peak Hour |
| **Oklahoma Avenue to 20th Street** | 0.5 | 0.4 |
| **TOTAL** | **7.3** | **7.1** |

### Table 26: 2025 Corridor Vehicle Travel Times under Curbside Alignment

| | Curbside Streetcar | |
|---|---|---|
| Segment | **Travel Time (min) – AM Peak Hour** | **Travel Time (min) – PM Peak Hour** |
| **Eastbound Direction** | | |
| 20th Street to Benning Road Metrorail Station | 6.3 | 9.9 |
| **Westbound Direction** | | |
| Benning Road Metrorail Station to 26th Street | 6.0 | 5.3 |

** The curbside results are based on the original AECOM study.*

### Table 27: 2025 Corridor Vehicle Travel Times under Median Alignment

| | Median Streetcar | |
|---|---|---|
| Segment | **Travel Time (min) – AM Peak Hour** | **Travel Time (min) – PM Peak Hour** |
| **Eastbound Direction** | | |
| 26th Street to Benning Road Metrorail Station | 5.2 | 5.8 |
| **Westbound Direction** | | |
| Benning Road Metrorail Station to 26th Street | 6.0 | 5.5 |

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# 5.0 Design Year 2045 Conditions

This section describes transit and general traffic conditions in the project area for the design year 2040. Like the opening year analysis, curbside and median alignments were tested as part of the Build scenario and their impact on general traffic is evaluated.

## 5.1 Design Year 2045 No-Build Travel Demand Forecasting

For the 2045 No Build scenario, both inputs were based on regionally accepted baseline conditions for 2045, including the MWCOG Round 9.1 Cooperative Land Use Forecasts and the regional CLRP.

### 5.1.1 2045 No-Build Land Use

The regional land use was determined based on the MWCOG Round 9.1 Cooperative Land Use Forecasts for 2045. Regionally, this represents growth of approximately 30 percent in population and 59 percent in employment over the existing conditions. **Table 28** shows the total population and employment by sector in the project area for 2045.

**Table 28: 2045 No-Build Population and Employment Growth**

| | 2019 Total | Growth Factor | Growth between 2019-2045 | 2045 Total |
|---|---|---|---|---|
| Households | 18,418 | 1.97% | 51.21% | 27,850 |
| Population | 46,878 | 1.85% | 48.17% | 69,457 |
| Total Employment | 6,786 | 4.87% | 126.66% | 15,381 |

### 5.1.2 2045 No-Build Transportation Network

As discussed in the 2025 No Build Transportation Network Section (**Section 4.1.2**), the only change to the roadway network in the project area is the removal one of the three lanes in each direction along East Capitol Street from 40th Street to Southern Avenue to improve pedestrian safety. As a result, East Capitol Street will operate with two through lanes in both directions between 40th Street and Southern Avenue.

#### 5.1.2.1 Metrorail

Regional Metrorail service improvements provide some changes to the services provided at the two stations within the project area. **Table 29** summarizes the peak and off-peak headways of the assumed Metrorail system in 2045.

**Table 29: Peak and Off-Peak Headways of Metrorail Lines (2045)**

| Line | Terminus A | Terminus B | Peak Headway (minutes) | Off-Peak Headway (minutes) |
|---|---|---|---|---|
| Blue | Franconia/Springfield | Largo | 7 | 12 |
| Orange | Vienna | New Carrollton | 6 | 12 |
| Silver | VA 772 | Armory | 7 | 12 |

#### 5.1.2.2 Local Bus

Local bus service in the project area is provided primarily by Metrobus. **Table 30** summarizes the peak and off-peak headways for the local routes serving the project area. The table shows morning peak frequencies; evening peak frequencies are assumed to be directionally reversed.

**Table 30: Local Bus Frequency (2045)**

| Route | Direction | Morning Peak Headway (minutes) | Off-Peak Headway (minutes) |
|---|---|---|---|
| 96,97 | Eastbound | 20 | 60 |
| | Westbound | 20 | 60 |
| U2 | Westbound | 20 | 30 |
| | Southbound | 30 | 30 |
| U4 | Clockwise | 12 | 30 |
| U5,U6 | Northbound | 30 | 38 |
| | Southbound | 14 | 14 |
| U8 | Northbound | 12 | 12 |
| | Southbound | 60 | 60 |
| V7,8,9 | Eastbound | 20 | 30 |
| | Westbound | 20 | 27 |
| W4 | Southbound | 30 | 60 |
| | Northbound | 12 | 60 |
| X1,X3 | Eastbound | 30 | - |
| | Westbound | 15 | - |
| X2 | Eastbound | 6 | 8 |
| | Westbound | 7 | 9 |
| X9 | Eastbound | 10 | 15 |
| | Westbound | 10 | 15 |

## 5.2 Design Year 2045 No Build VISSIM Simulation Modeling

This section describes the development of the 2045 No Build VISSIM model and provides the summary of the traffic analysis. Like the 2025 VISSIM models, the number of through lanes on East Capitol Street is reduced from three lanes to two lanes in both directions to accommodate the changes that are described in CLRP.

### 5.2.1 2045 No Build Traffic Volume Development

Traffic volume growth rates for the links in the subarea were estimated by developing 2045 O-D matrices for AM and PM peak periods, assigning this demand to the VISUM network, and comparing against the 2019 traffic assignment. The 2045 O-D matrices for AM and PM peak periods were developed from the corrected 2019 O-D matrices using three methods:

- Pass-through trips were grown for each cordon zone O-D pair using the applicable growth from the MWCOG model (2019 to 2045). Adjustments previously made to the 2019 MWCOG trip tables based on StreetLight data were also made to the 2045 trip tables prior to determining growth rates;
- For zones with projects in the development pipeline, development-based trip growth was used. The developments taken into consideration includes Hill East, Northeast Heights and Parkside; and
- For zones without projects in the development pipeline, uniformly applied annual growth rates of 0.92% and 0.84% for the AM and PM peak periods, respectively, were used. These growth rates were developed from the total trips for these zones in the MWCOG model.

**Figure 24, Figure 19**, and

**Figure** 26 shows the projected peak hour traffic volumes in freeway and intersections for the year 2045.

### 5.2.2 2045 No Build Conditions

In general, the trends in traffic operations observed throughout the network are consistent with those of 2025 No-Build but the increases in delay at the intersection and corridor level were more substantial under the 2045 scenario due to higher traffic volumes.

In the morning peak, queue spillback from the westbound left turn at Benning Road NE/Oklahoma Avenue NE intersection was present over an extensive period during the morning peak, causing turbulence to westbound traffic flow on Benning Road. Difficulty for buses to maneuver to the stop on westbound Benning Road NE at 34th Street NE was observed in the model due to large traffic flows from westbound Kenilworth Service Road. Congestion and queueing existed on westbound Benning Road NE between Minnesota Avenue NE and 42nd Street NE. Delay on this segment decreased slightly under the 2045 No-Build scenario due to the realignment of 39th Street NE, which eliminated split phasing at this intersection. Congestion and queueing were present on southbound 42nd Street NE and 44th Street NE due to large turning volumes and lack of dedicated turn lanes. Higher delay and larger queuing impacts existed on Nannie Helen Burroughs Avenue NE and the associated minor streets in comparison to Existing Conditions due to increased demand and challenging intersection geometry and signal phasing. Delays were especially high the at Kenilworth Avenue NE and Kenilworth Terrance NE intersections with Deane Avenue NE due to large traffic flows from southbound Kenilworth Avenue NE to eastbound Deane Avenue NE and to southbound DC-295.

In the evening peak, the intersection of the northbound DC-295 off-ramp with Nannie Helen Burroughs Avenue NE operated with nearly 100 additional seconds of delay under the 2045 No-Build scenario, increasing the potential for queue spillback onto the freeway. This deterioration in LOS was caused by an increase in demand, especially for the northbound right turn movement. Adjacent intersections along Nannie Helen Burroughs Avenue NE were also adversely impacted.

To accommodate the future year volumes, split timing and offsets for traffic signals were optimized at critical intersections while maintaining the existing cycle length. Figure 27 and

Figure 28 display intersection LOS at the project area intersections for the morning and evening peak hours. Table 31 provides delay and LOS by movement for the critical intersections for the 2045 No-Build for the morning and evening peak hours.

Table 32 shows the maximum delay in associated intersections. Detailed operational results for all project area intersections for the 2045 No-Build conditions are provided in Attachment C.

**Table 31: 2045 No-Build Peak Hour (AM and PM) Delay and Levels of Service (LOS) at the Critical Intersections**

| Intersection | Traffic Control | Peak Hour | Intersection | | Northbound | | Southbound | | Westbound | | Eastbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road NE Ramp to DC-295 at 36th Street NE | Unsignalized | PM | 140 | F | 280 | F | | | | | 104 | F |
| Benning Road NE at Oklahoma Avenue NE | Signalized | AM | 56 | E | 39 | D | | | 75 | E | 13 | B |
| Benning Road NE at East Capitol Street SE | Signalized | AM | 104 | F | 17 | B | 215 | F | 53 | D | 19 | B |
| East Capitol Street SE at Texas Avenue SE | Signalized | PM | 73 | E | 80 | E | | | 8 | A | 112 | F |
| Deane Avenue NE at Lee Street NE | Unsignalized | AM | 387 | F | | | 516 | F | 1 | A | 394 | F |
| Deane Avenue NE at Kenilworth Terrace NE | Signalized | AM | 179 | F | 268 | F | 258 | F | 5 | A | 57 | E |
| Deane Avenue NE at Kenilworth Avenue NE | Signalized | AM | 62 | E | | | 314 | F | 66 | E | 8 | A |
| Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC- 295 U-turns | Signalized | PM | 154 | F | 339 | F | | | 45 | D | 33 | C |
| Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | Signalized | AM | 155 | F | 364 | F | 366 | F | 49 | D | 29 | C |
| Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | Signalized | PM | 176 | F | 182 | F | 130 | F | 512 | F | 31 | C |
| Kenilworth Avenue NE at Foote Street NE | Unsignalized | AM | 192 | F | | | 226 | F | | | 17 | B |

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Nannie Helen Burroughs Avenue NE at 44th Street NE and Hunt Place NE | Signalized | PM | 177 | F | 360 | F | 81 | F | 404 | F | 23 | C |

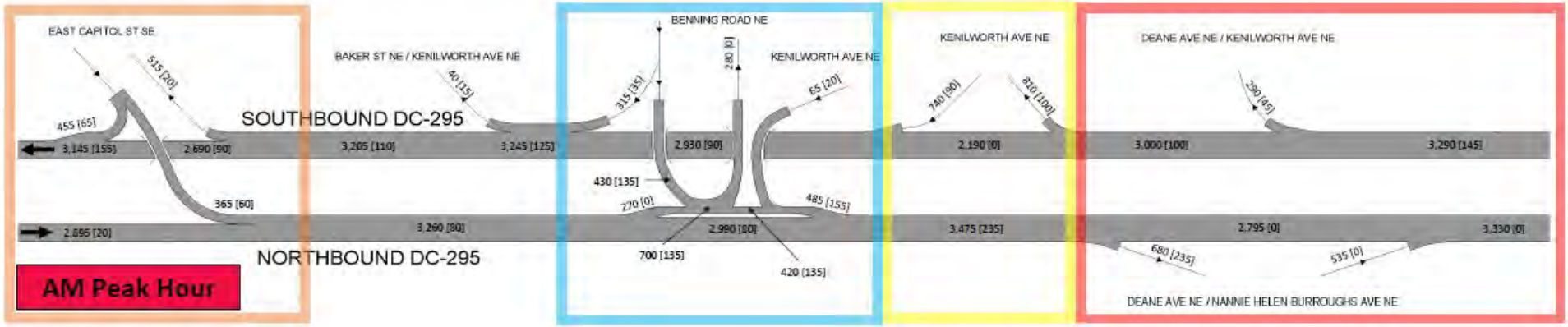
**Table 32: 2045 No-Build Peak Hour (AM and PM) Maximum Queue Length (feet)**

| Intersection | Peak Hour | Northbound | Southbound | Westbound | Eastbound |
|---|---|---|---|---|---|
| Benning Road NE at East Capitol Street SE | AM | 555 | 903 | 1776 | 247 |
| Benning Road NE at East Capitol Street SE | PM | 292 | 522 | 240 | 1335 |
| East Capitol Street SE at Texas Avenue SE | AM | 540 | 86 | - | - |
| East Capitol Street SE at Texas Avenue SE | PM | 204 | 278 | - | - |
| Benning Road NE and Minnesota Avenue NE | AM | 478 | 532 | 389 | 382 |
| Benning Road NE and Minnesota Avenue NE | PM | 373 | 454 | 313 | 645 |

*[This space left intentionally blank.]*

**Figure 24: 2045 No-Build Morning and Evening Peak Hour Freeway Traffic Volumes**

* Numbers on Figures denote: Forecasted Volumes [Vehicle difference from Existing Conditions]



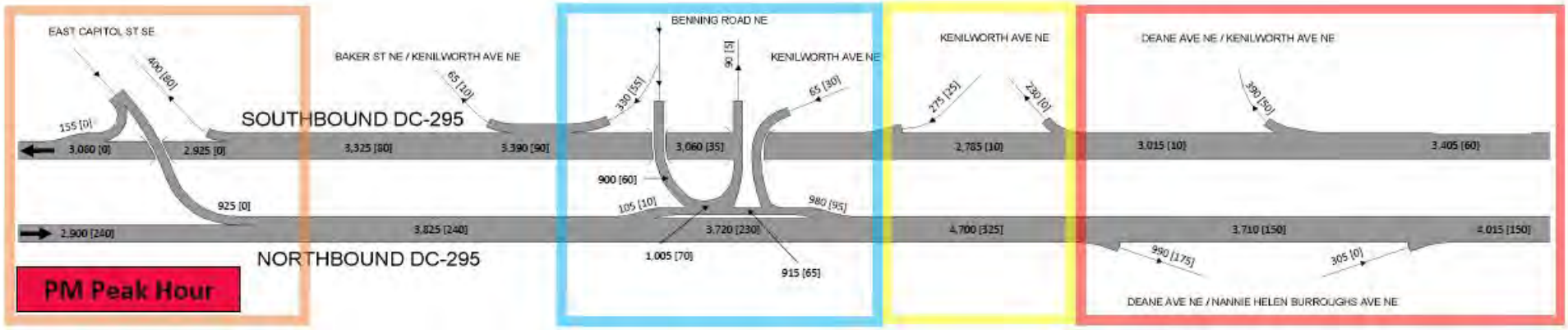
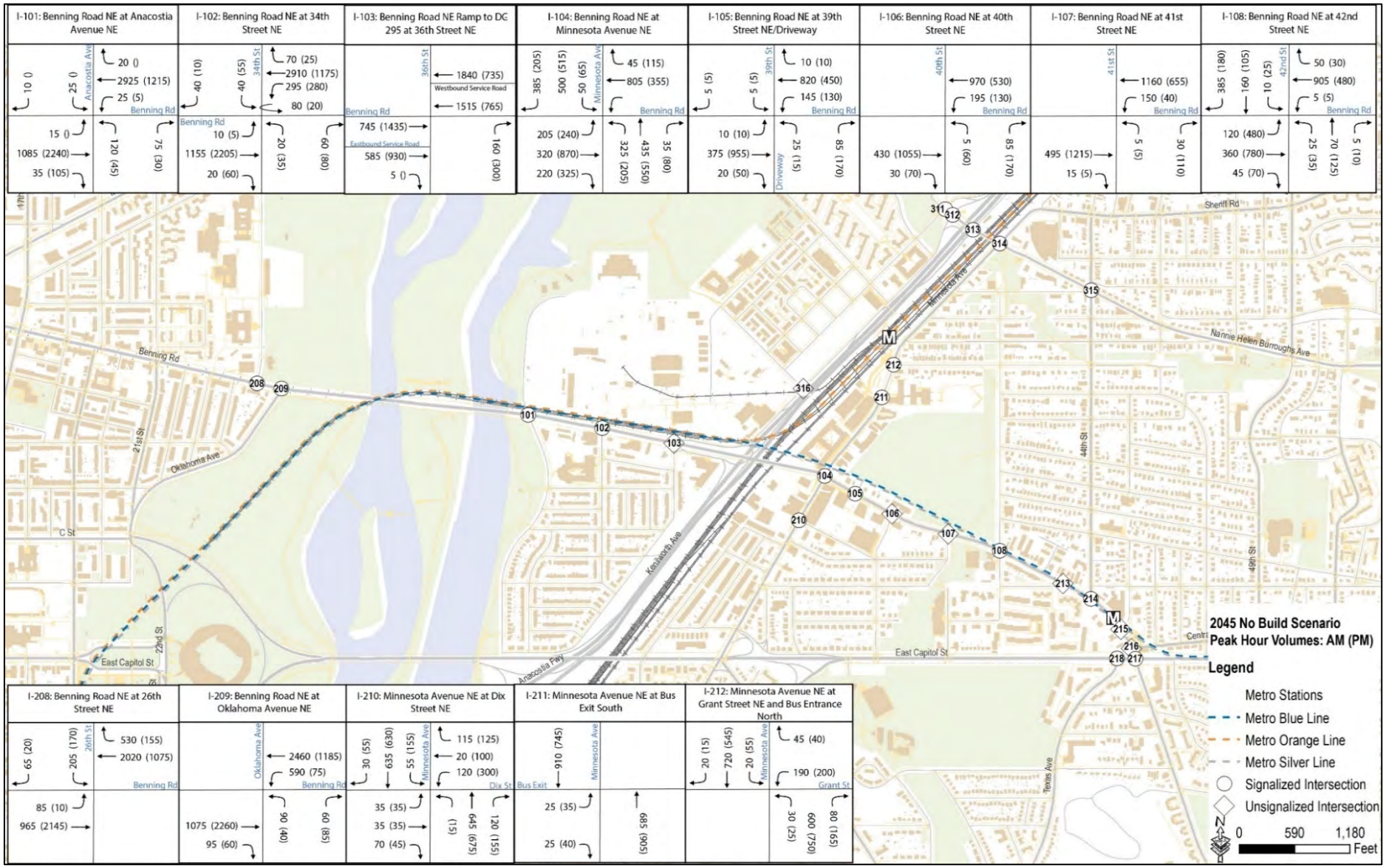



**Figure 25: 2045 No-Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 1 of 2)**



## Figure 26: 2045 No-Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 2 of 2)

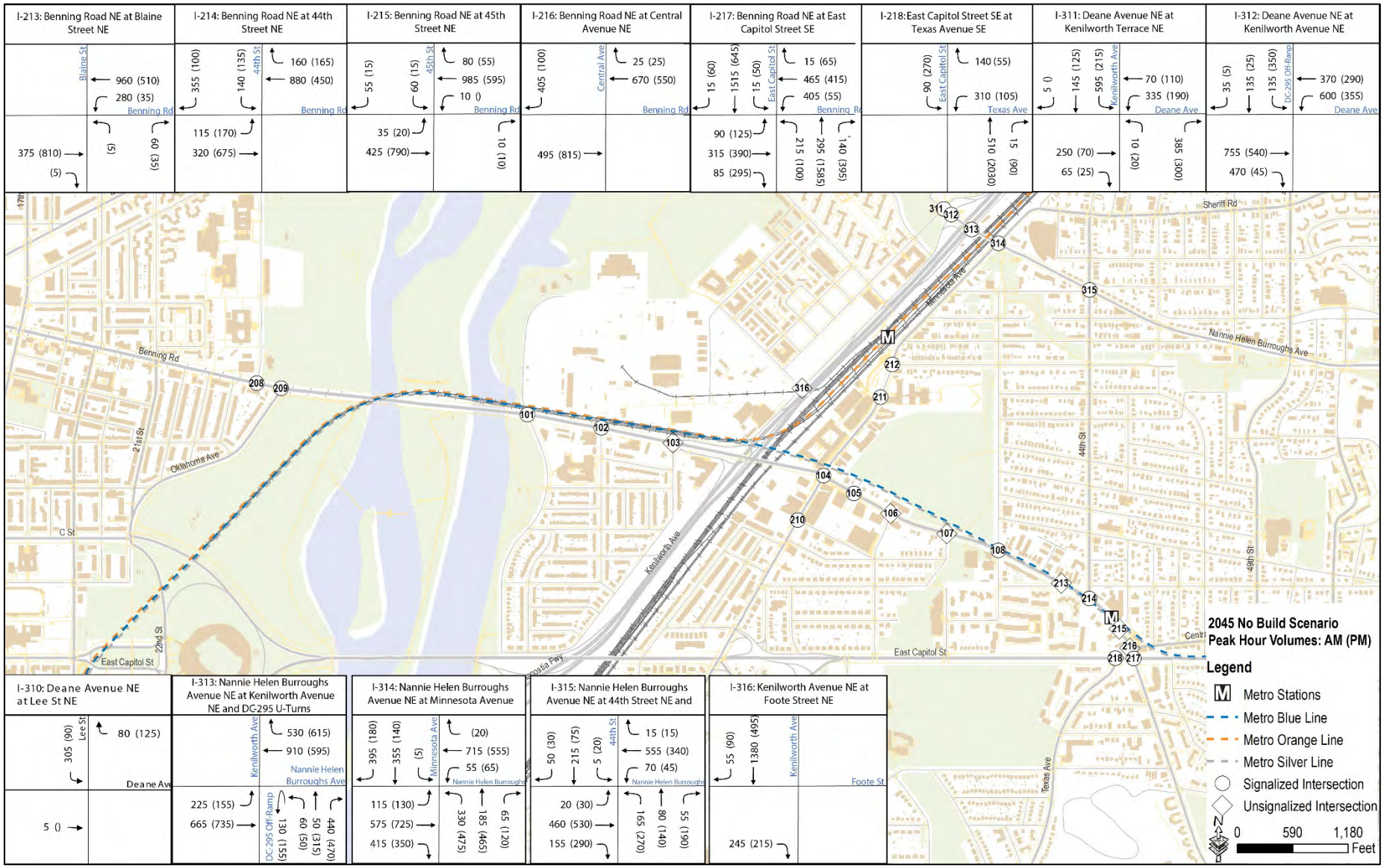


**Figure 27: 2045 No-Build Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 1 of 2)**

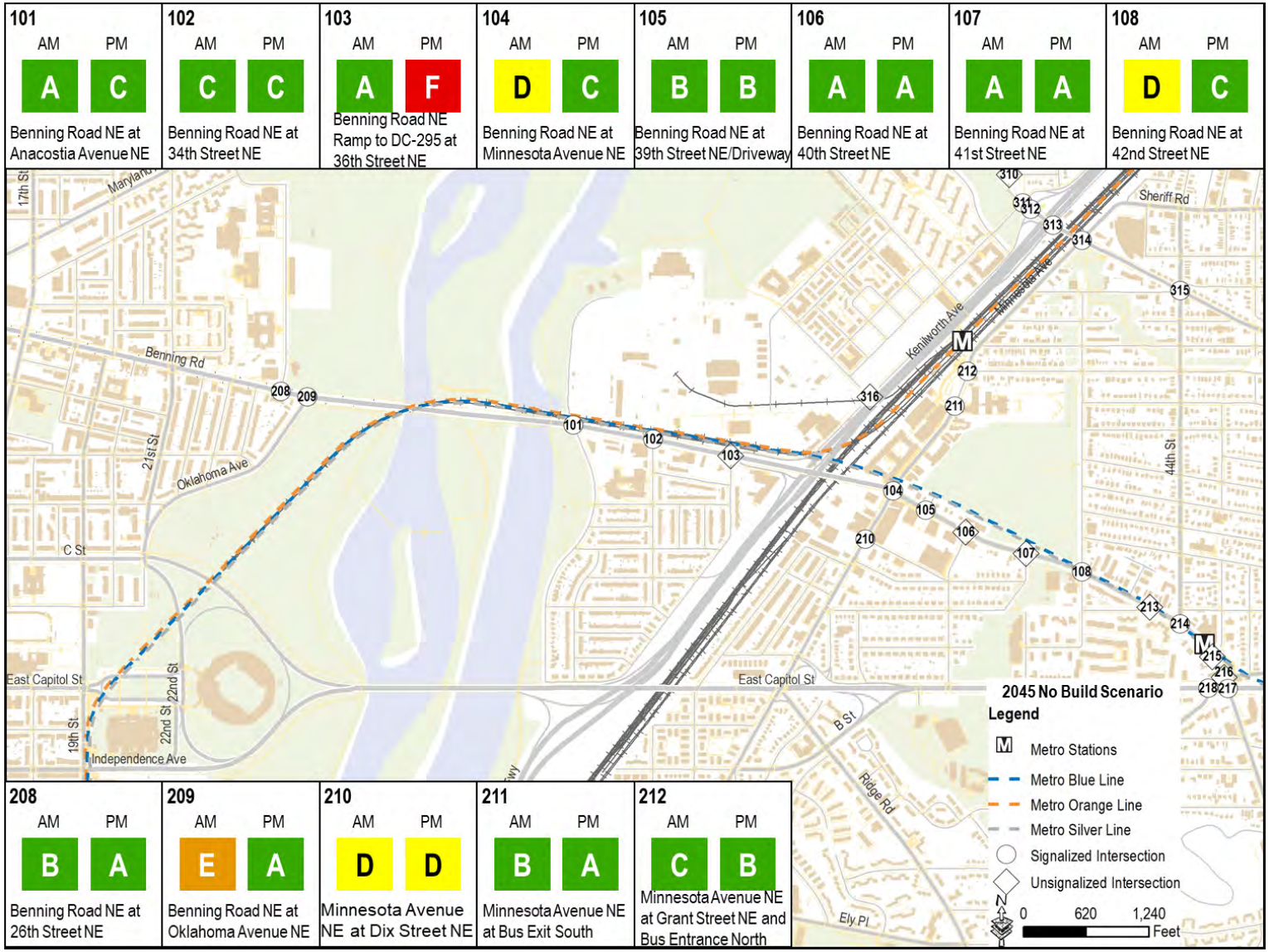
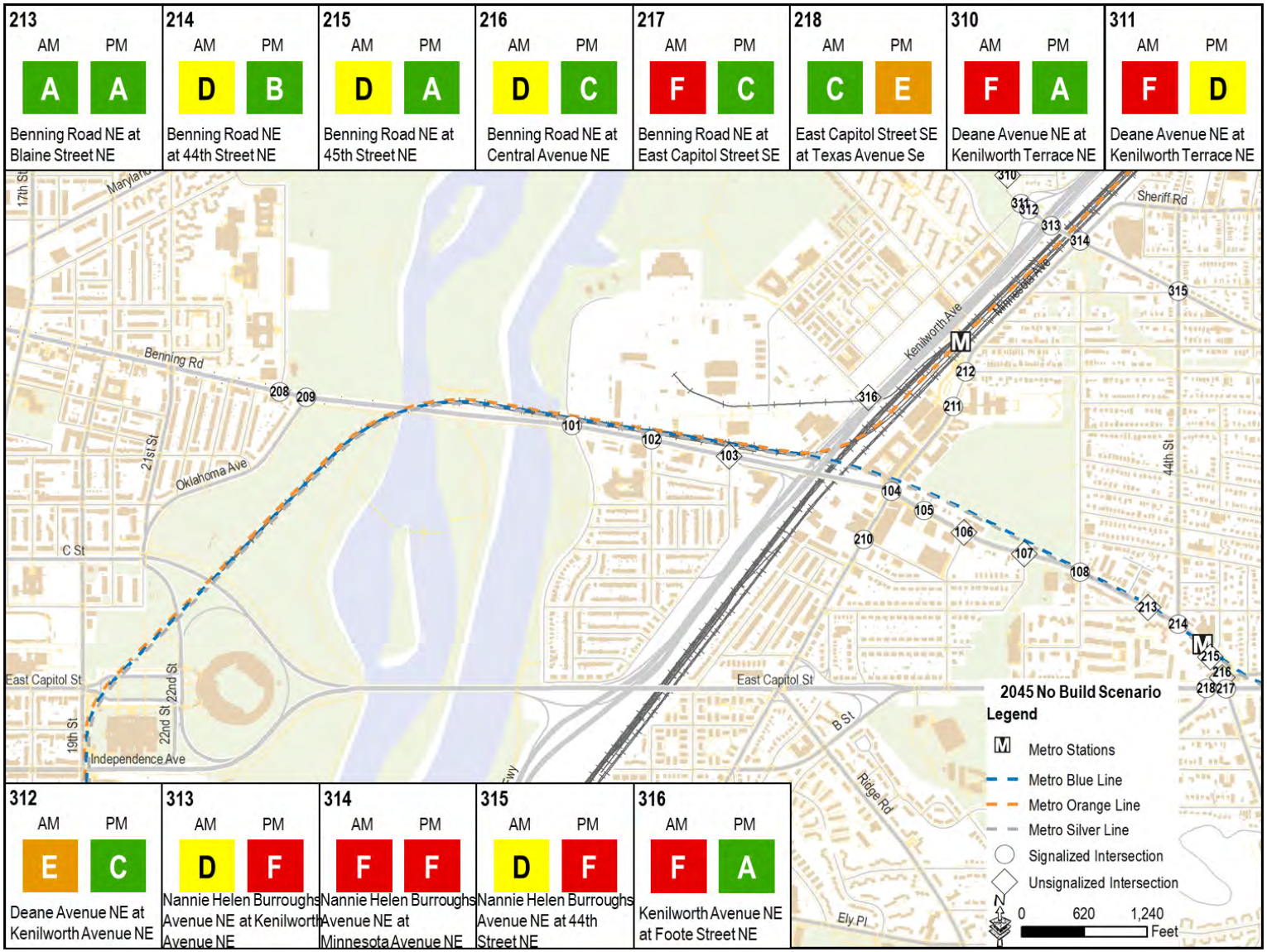


**Figure 28: 2045 No-Build Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 2 of 2)**



## 5.3 Design Year 2045 Build Travel Demand Forecasting

The 2045 build travel demand model combined regional baseline assumptions for 2045 with the proposed action.

### 5.3.1 2045 Build Land Use

For the build scenario, the regional land use of the travel demand analysis area was the same as for the No-Build scenario, using the MWCOG Round 9.1 Cooperative Land Use Forecasts for 2045.

### 5.3.2 2045 Build Transportation Network

The transportation networks in the build scenario are the same as for the No-Build scenario except for the addition of the proposed action.

### 5.3.3 2045 Build Ridership Forecasting

**Table 33** summarizes the projected streetcar boardings at each stop under the No-Build and the build scenarios in 2045. Same techniques as described in section 4.3.3 was used to forecast the 2045 ridership.

**Table 33: 2045 No-Build and Build Weekday Streetcar Ridership**

| Stop | 2045 | | |
|---|---|---|---|
| | No-Build | Build | Change |
| Union Station | 2,210 | 2,840 | *+630* |
| 3rd Street and H Street NE | 380 | 1,190 | *+810* |
| 5th Street and H Street NE | 270 | 390 | *+120* |
| 8th Street and H Street NE | 470 | 640 | *+170* |
| 13th Street and H Street NE | 690 | 800 | *+110* |
| 15th Street and Benning Road NE | 680 | 1,110 | *+430* |
| 19th Street and Benning Road NE | 930 | 1,410 | *+480* |
| Oklahoma Avenue and Benning Road NE | 1,340 | 1,430 | *+90* |
| Kingman Island and Benning Road NE | - | 20 | *+20* |
| 34th Street and Benning Road NE | - | 770 | *+770* |
| 39th Street and Benning Road NE | - | 1,010 | *+1,010* |
| 42nd Street and Benning Road NE | - | 750 | *+750* |
| Benning Road Metrorail Station | - | 2,390 | *+2,390* |
| **Total** | **6,970** | **14,750** | ***+7,780*** |
| Existing Stops | 6,970 | 9,810 | *+2,840* |
| Proposed Stops | - | 4,940 | *+4,940* |

By 2045, estimated weekday boardings at proposed stops along the Benning Road Extension would be approximately 4,900 riders. This is in addition to a projected 9,800 riders boarding at

stops along the existing line, 29% of which is projected to be generated by the addition of the extension.

**Table 34** provides the weekday bus ridership under the No-Build and build scenarios for 2045 for key routes or lines that serve the study area.

**Table 34: 2045 No-Build and Build Route Level Daily Bus Ridership**

| Stop | 2045 | | |
|---|---|---|---|
| | No- Build | Build | Change |
| X Line (X1, X2, X3, X9) | 21,630 | 19,580 | *-2,050* |
| U4 | 2,160 | 2,020 | *-140* |
| U5, U6 | 3,390 | 3,200 | *-190* |
| U8 | 3,430 | 2,880 | *-550* |
| 96, 97 | 9,320 | 9,040 | *-280* |
| W4 | 13,330 | 13,430 | *+100* |
| **Total** | **53,260** | **50,150** | ***-3,110*** |
| Percent Difference Compared to No-Build | *-5.8%* | | |

Like the results of opening year analysis, the introduction of the streetcar reduces passenger waiting time and provides faster services. By the year of 2045, the total daily weekday bus ridership in the study area was projected to decrease from 23,000 to 20,800 (nine percent decrease).

## 5.4 Design Year 2045 Build VISSIM Simulation Modeling

The build scenario for design year 2045 assumes the same transportation network as in the 2025 build scenario **(Section 4.3)**. The changes compared to the 2045 No-Build model are summarized below:

- Proposed lane configuration changes at Benning Road and Minnesota Avenue intersection **(Figure 12)**
- Extension of the streetcar to Benning Road Metrorail Station

The same transitions and special transit-only signals described for the 2025 scenario (**Section 4.3**) are considered in the 2045 traffic analysis.

### 5.4.1 2045 Build Traffic Volume Development

Same forecasting methods were used to develop the 2045 build scenario. (**Figure 23**,

Figure **24**, and

Figure 25).

### 5.4.2 2045 Build Conditions

Figure **26**,

**Figure** 33,

**Figure** 34, and

Figure **29** provide 2045 build intersection LOS at the project area intersections during the morning and evening peak hours with the curbside and median alignment, respectively. Note that, like the 2025 traffic analysis, the traffic control type at Benning Road and 45th Street intersection was changed from unsignalized to signalized control to accommodate the transition of the streetcar at Benning Road Metrorail Station.

Overall, the impact of Streetcar is similar as of 2025. In the morning peak, travel times were comparable between the No-Build and Streetcar Build scenario for both directions of Benning Road NE and DC-295.

In the meantime, the intersection of Benning Road NE and Oklahoma Avenue NE operated with more delay under the 2045 No-Build scenario than the 2045 Streetcar Build scenario. This difference was due to the changes in volume on westbound Benning Road NE. Under the Streetcar Build scenario, the westbound approach demand is 200 vehicles fewer than in the No-Build, primarily due to the proposed lane reduction on Benning Road. The intersections of Benning Road NE with 44th Street NE and 45th Street NE operated with more delay under the Streetcar Build scenario than the No-Build scenario. This difference may primarily be attributed to the added signal for the EOL. The streetcar experienced nearly 3 minutes of delay at this intersection, and when present, blocked the leftmost eastbound through lane. Congestion and significant weaving patterns were observed west of the Benning Road NE and DC-295 Interchange under the Streetcar Build scenario, where a lane reduction begins in the westbound direction. The impact of this weaving area was amplified by a bus stop on the rightmost lane just west of the Kenilworth Avenue NE and Benning Road NE merge. The intersection of Benning Road NE and East Capitol Street operated with more delay under the Streetcar Build scenario than the No-Build scenario. The increase in delay occurred on the approaches of southbound East Capitol Street (true westbound direction) and westbound Benning Road NE, and was attributable to the slight increases in demand heading to southbound East Capitol Street and the blockage of traffic by the permissive southbound left turn to eastbound Benning Road NE.

In the evening peak, at the intersections of Benning Road NE with Anacostia Avenue NE and 34th Street NE, the eastbound approach delay increased slightly from No-Build to Streetcar Build due to queue spillback from the on-ramp from eastbound Benning Road NE to northbound DC-295 and the lane reduction on Benning Road NE. Traffic operations at the intersection of Benning Road NE and 36th Street NE were worse under the No-Build than the Streetcar Build scenario due to severe queue spillback from the eastbound Benning Road NE on-ramp to northbound DC-295. The intersection of Minnesota Avenue NE and Dix Street NE operated at LOS D and LOS F on the westbound approach. At the intersection of Benning Road NE and Minnesota Avenue NE, intersection LOS is C under both the 2045 No-Build and Streetcar Build scenarios. The proposed design and signal timing at this intersection is effective in processing forecasted demand, and intersection delay only increases by seven seconds under the Streetcar Build scenario.

Table 35 and Table 37 provide delay and LOS by movement for the critical intersections for the 2045 Build curbside and median alignments respectively. Table 36 and

Table 38 provide queueing results for the curbside and median alignments. Attachment C provides detailed operational results for all project area intersections for both the curbside and median alignments.

### Table 35: 2045 Build Curbside Alignment Peak Hour (AM and PM) Delay and Levels of Service (LOS) at the Critical Intersections

| Intersection | Traffic Control | Peak Hour | Intersection | | Northbound | | Southbound | | Westbound | | Eastbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road and Minnesota Avenue | Signalized | AM | 73 | E | 63 | E | 105 | F | 70 | E | 51 | D |
| Benning Road and East Capitol Street | Signalized | AM | 189 | F | 256 | F | 75 | E | 198 | F | 287 | F |
| Benning Road and East Capitol Street | Signalized | PM | 214 | F | 384 | F | 54 | D | 424 | F | 158 | F |
| Minnesota Avenue and NHB Avenue | Signalized | PM | 66 | E | 68 | E | 32 | C | 27 | C | 93 | F |

** The curbside results are based on the original AECOM study.*

### Table 36: 2045 Build Curbside Alignment Peak Hour (AM and PM) Maximum Queue Length (feet) by Movement at the Critical Intersections

| Intersection | Peak Hour | Northbound | | | Southbound | | | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | LT | TH | RT | LT | TH | RT | LT | TH | RT | LT | TH | RT |
| Benning Road and Minnesota Avenue | AM | 545 | 265 | 265 | 1345 | 1345 | 1345 | - | 745 | 745 | 480 | 325 | 325 |
| Benning Road and East Capitol Street | AM | 1,075 | 1,075 | 1,075 | 350 | 350 | 360 | 1,675 | 1,675 | 1,675 | 1,465 | 1,465 | 1,465 |
| Benning Road and East Capitol Street | PM | 1,070 | 1,070 | 1,070 | 365 | 365 | 375 | 1,675 | 1,675 | 1,675 | 1,465 | 1,465 | 1,465 |
| Minnesota Avenue and NHB Avenue | PM | 810 | 810 | 810 | - | 190 | 210 | 205 | 205 | 225 | 950 | 950 | 950 |

** The curbside results are based on the original AECOM study.*

### Table 37: 2045 Build Median Alignment Peak Hour (AM and PM) Delay and Levels of Service (LOS) at the Critical Intersections

| Intersection | Traffic Control | Peak Hour | Intersection | | Northbound | | Southbound | | Westbound | | Eastbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road NE Ramp to DC-295 at 36th Street NE | Unsignalized | PM | 53 | F | 19 | C | | | | | 64 | F |
| Benning Road NE at Central Avenue NE | Unsignalized | AM | 36 | E | | | 41 | E | 6 | A | 83 | F |
| Benning Road NE at East Capitol Street SE | Signalized | AM | 119 | F | 19 | B | 209 | F | 110 | F | 19 | B |
| East Capitol Street SE at Texas Avenue SE | Signalized | PM | 74 | E | 87 | F | | | 6 | A | 111 | F |
| Deane Avenue NE at Lee Street NE | Unsignalized | AM | 382 | F | | | 515 | F | 1 | A | 297 | F |
| Deane Avenue NE at Kenilworth Terrace NE | Signalized | AM | 195 | F | 297 | F | 281 | F | 5 | A | 59 | E |

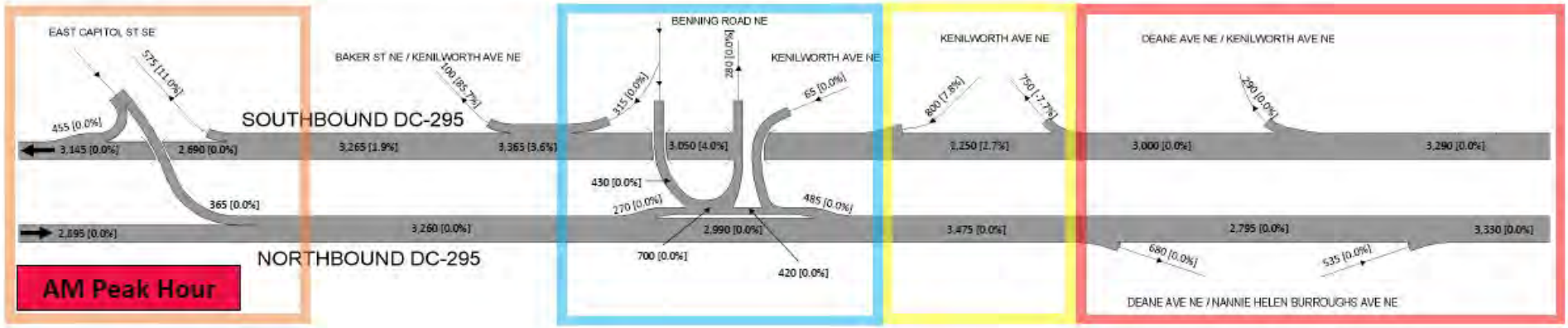
| Intersection | Traffic Control | Peak Hour | Intersection | | Northbound | | Southbound | | Westbound | | Eastbound | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Deane Avenue NE at Kenilworth Avenue NE | Signalized | AM | 61 | E | | | 294 | F | 69 | E | 8 | A |
| Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC- 295 U-turns | Signalized | PM | 125 | F | 287 | F | | | 27 | C | 35 | D |
| Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | Signalized | AM | 171 | F | 355 | F | 458 | F | 60 | E | 31 | C |
| Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | Signalized | PM | 84 | F | 52 | D | 112 | F | 216 | F | 29 | C |
| Nannie Helen Burroughs Avenue NE at 44th Street NE and Hunt Place NE | Signalized | AM | 56 | E | 66 | E | 32 | C | 105 | F | 16 | B |
| Kenilworth Avenue NE at Foote Street NE | Unsignalized | AM | 191 | F | | | 225 | F | | | 15 | B |

**Table 38: 2045 Build Median Alignment Peak Hour (AM and PM) Maximum Queue Length (feet) by Approach**

| Intersection | Peak Hour | Northbound | Southbound | Westbound | Eastbound |
|---|---|---|---|---|---|
| Benning Road NE at East Capitol Street SE | AM | 862 | 913 | 1784 | 320 |
| Benning Road NE at East Capitol Street SE | PM | 271 | 459 | 220 | 1334 |
| East Capitol Street SE at Texas Avenue SE | AM | 541 | 79 | - | - |
| East Capitol Street SE at Texas Avenue SE | PM | 232 | 238 | - | - |
| Benning Road NE and Minnesota Avenue NE | AM | 403 | 549 | 416 | 304 |
| Benning Road NE and Minnesota Avenue NE | PM | 482 | 482 | 330 | 777 |

**Figure 29: 2045 Build Morning and Evening Peak Hour Freeway Traffic Volumes**

* Numbers on Figures denote: Forecasted Volumes [% Difference from Scenario 2 (2045 No-Build)]



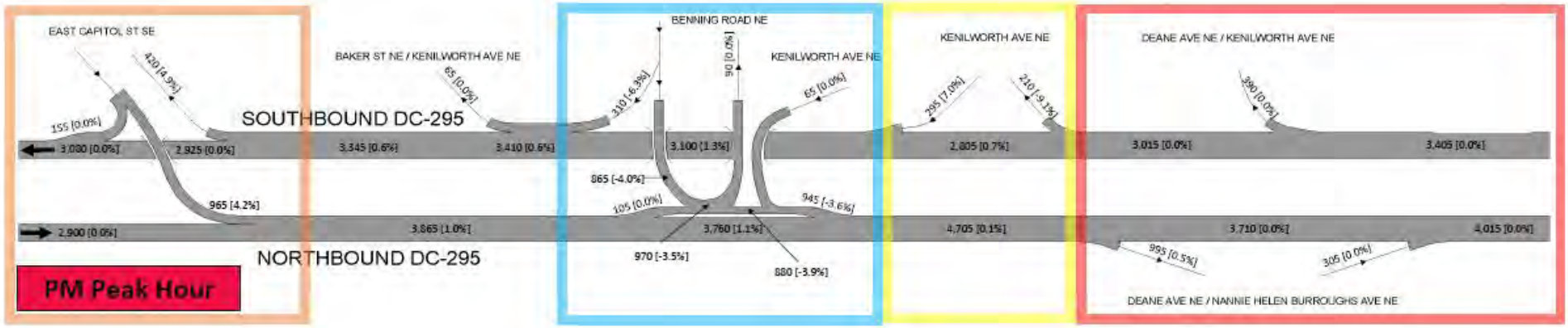



**Figure 30: 2045 Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 1 of 2)**

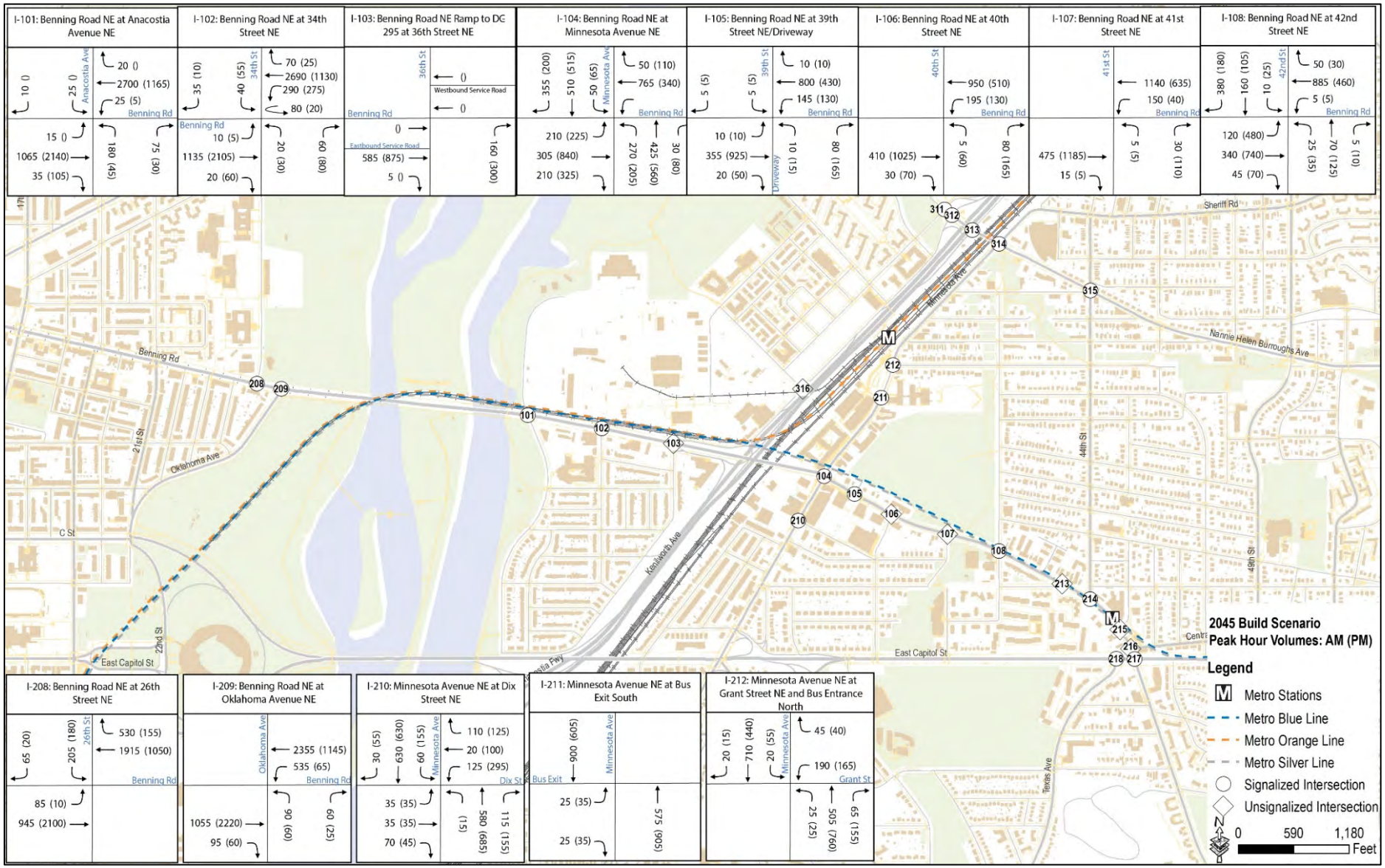


**Figure 31: 2045 Build Morning and Evening Peak Hour Intersection Traffic Volumes (Sheet 2 of 2)**

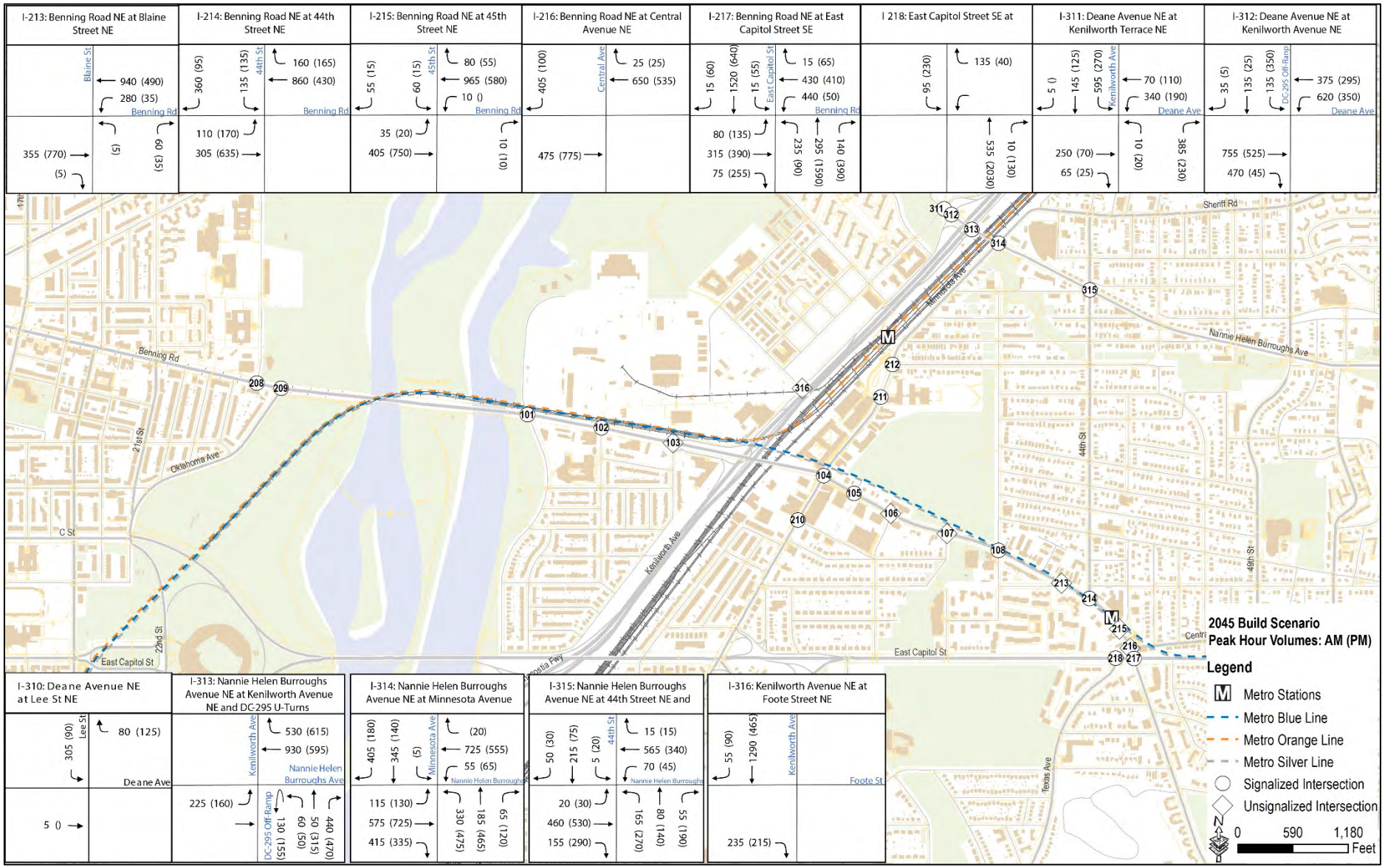
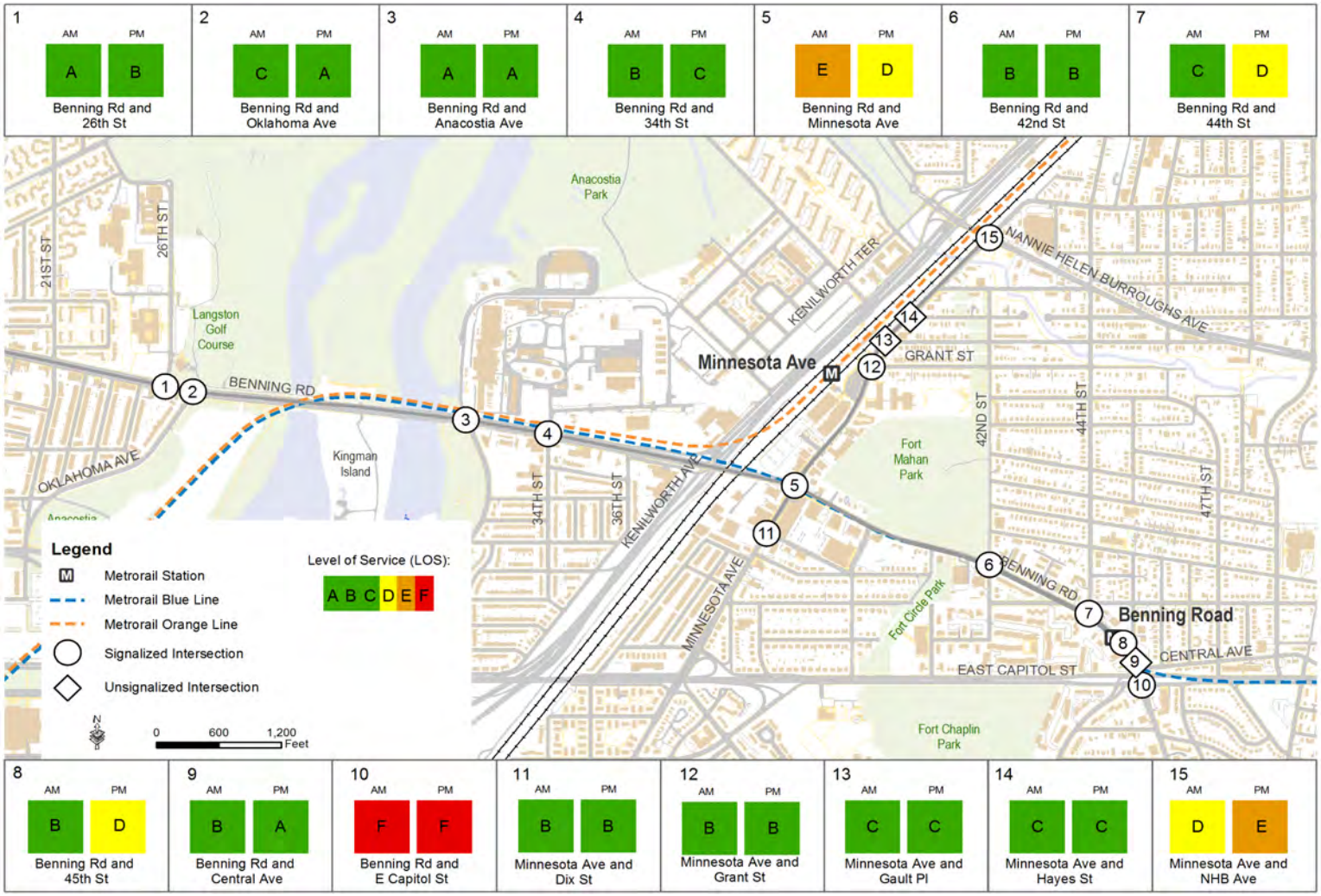
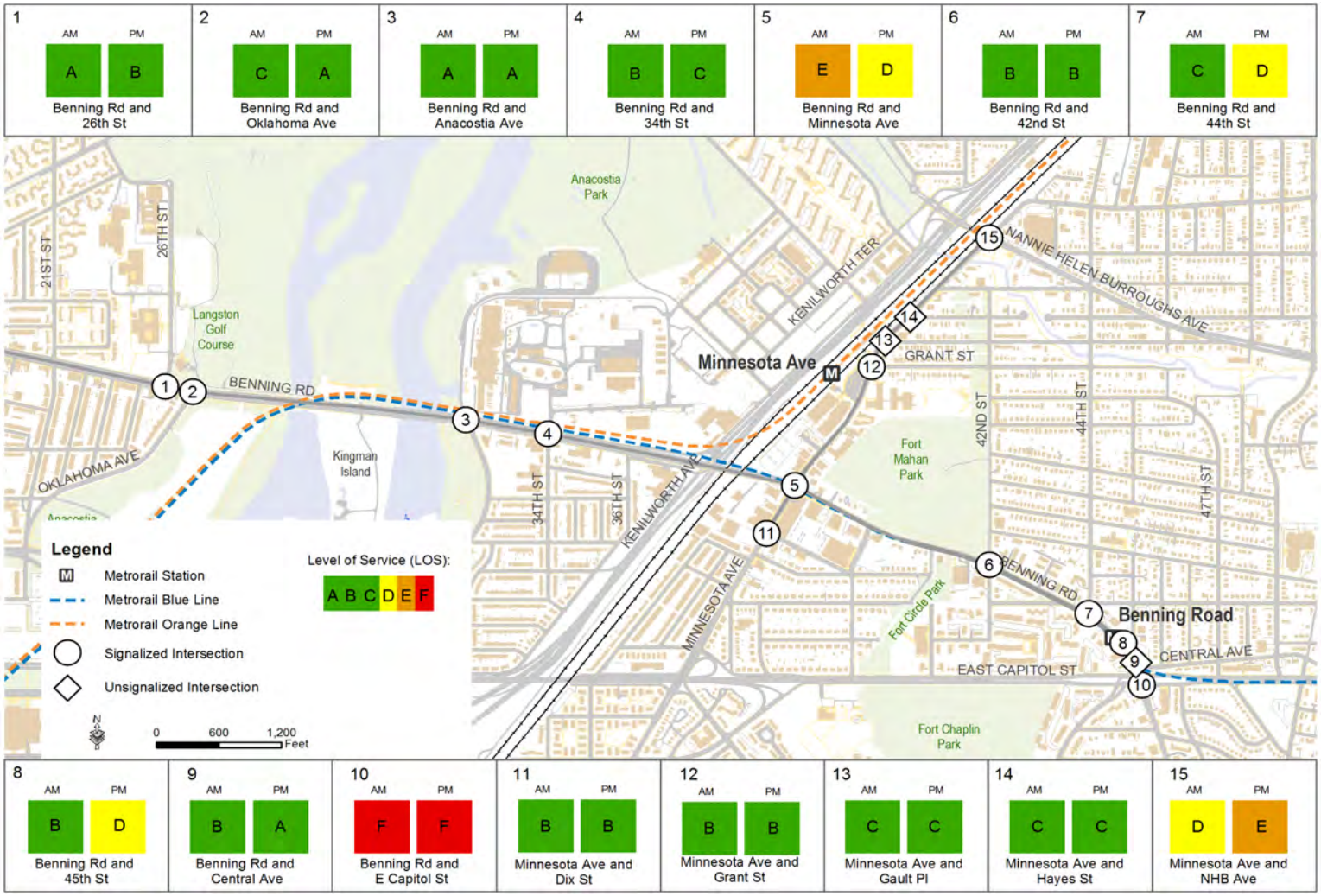


**Figure 32: 2045 Build Curbside Alignment Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 1 of 2)**




** The curbside results are based on the original AECOM study.*

**Figure 33: 2045 Build Curbside Alignment Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 2 of 2)**




** The curbside results are based on the original AECOM study.*

**Figure 34: 2045 Build Median Alignment Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 1 of 2)**

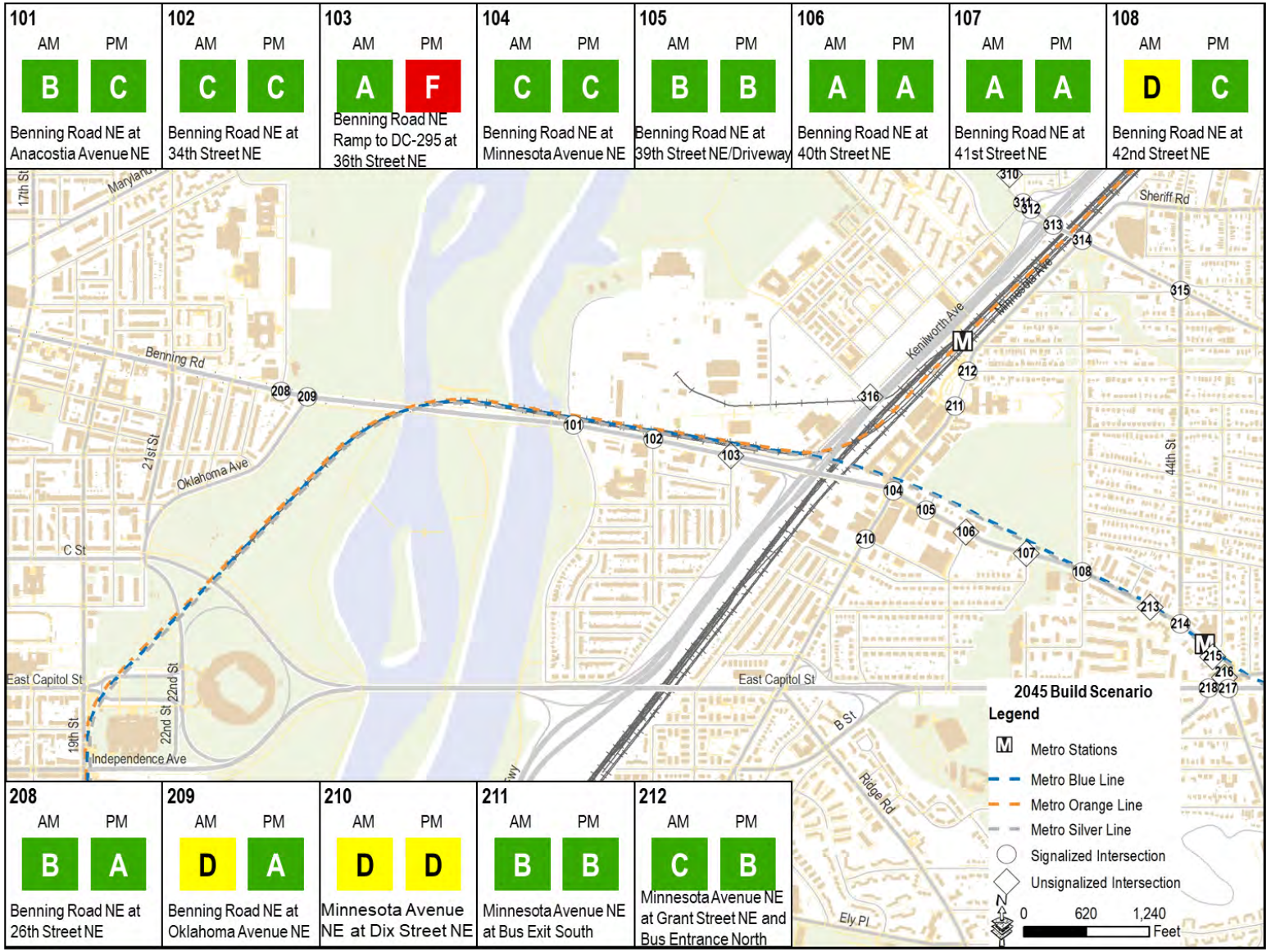
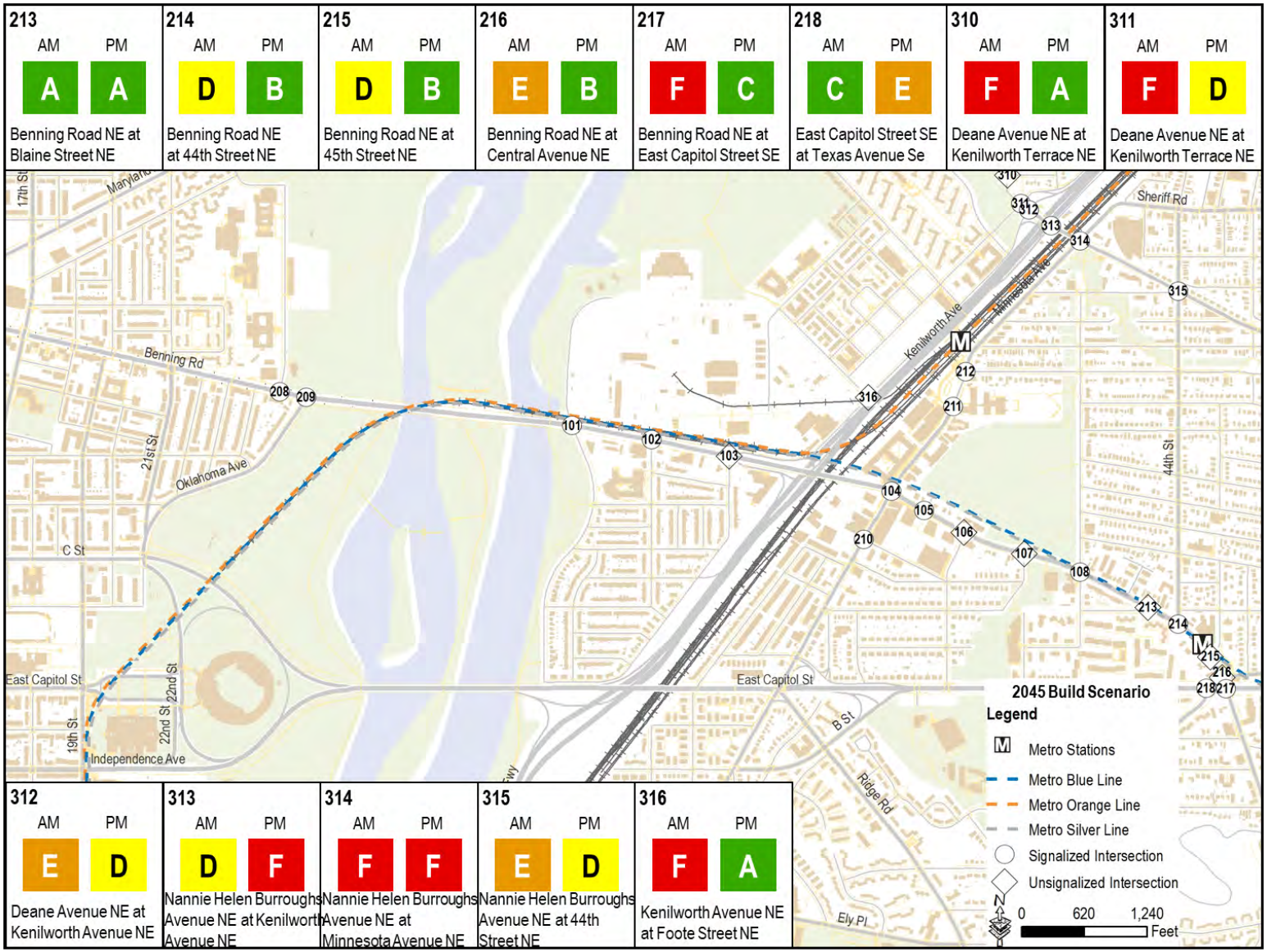


**Figure 35: 2045 Build Median Alignment Morning and Evening Peak Hour Intersection Levels of Service (LOS) (Sheet 2 of 2)**



### 5.4.3 2045 Build Streetcar Operations

Streetcar operation was evaluated based on the average travel speeds which were obtained from the VISSIM simulation model. VISSIM travel time segments were defined from 20th Street to Benning Road Metrorail Station in the eastbound direction and from Benning Road Metrorail Station to 26th Street in the westbound direction. Travel time segments for median alignments are defined from 26th Street to Benning Road Metrorail Station in the eastbound direction and from Benning Road Metrorail Station to 26th Street in the westbound direction. **Table 39** provides average travel time and speed for the curbside and median streetcar alignments in 2045 during the morning and evening peak hours.

**Table 39: 2045 Average Travel Time and Speed for the Streetcar Alignments in the Morning and Evening Peak Hour**

| Direction | Peak Hour | Travel Time (min) | Speed (mph) |
|---|---|---|---|
| **Curbside Streetcar Alignment** | | | |
| **Eastbound** | AM | 10.3 | 12.5 |
| **Westbound (peak direction)** | | 11.5 | 9.7 |
| **Eastbound (peak direction)** | PM | 13.2 | 9.7 |
| **Westbound** | | 9.8 | 11.4 |
| **Median Streetcar Alignment** | | | |
| **Eastbound** | AM | 8.1 | 13.8 |
| **Westbound (peak direction)** | | 7.3 | 15.3 |
| **Eastbound (peak direction)** | PM | 8.5 | 13.1 |
| **Westbound** | | 7.1 | 15.7 |

** The curbside results are based on the original AECOM study.*

Similar findings, as reported in the 2025 Build section, were obtained from the analysis. Travel times (excluding dwell time at the streetcar stops) for the streetcar vehicles were slightly higher than those for vehicular traffic in both directions of Benning Road NE. The biggest difference existed along the segment from 42nd Street NE to 45th Street NE due to long delays and eastbound queue impacts at the streetcar EOL. The curbside alignment operates with relatively slower speeds compared to the median alignment during the both peak hours due to the higher number of transitions for the curbside alignment. Moreover, results suggest that with the increase in background traffic in 2040, streetcar travel times would generally increase with the exception of eastbound travel times during the evening peak hour, where this can be attributed to the 2045 MWCOG projections. MWCOG model projected lower traffic volumes in 2045 on East Capitol Street compared to 2025 projections due to the through lane reduction on East Capitol Street. As a result, more green time could be allocated to Benning Road approach at Benning Road and East Capitol Street intersection in 2045 (due to lower East Capitol Street volumes), limiting congestion and queue spillback on Benning Road approach, thereby improving travel times.

**Table** 40 and **Table 41** show stop to stop travel times for streetcar alternatives in 2045 based on the VISSIM output. Vehicle travel times obtained from VISSIM along Benning Road for the same travel segments were also included in **Table 42** and **Table 43** or comparison purposes.

### Table 40: 2045 Station to Station VISSIM Travel Time Results for Curbside Streetcar Alignment

| Segment | Curbside Streetcar | |
|---|---|---|
| | Travel Time (min) – AM Peak Hour | Travel Time (min) – PM Peak Hour |
| **Eastbound Direction** | | |
| 20th Street to Oklahoma Avenue | 0.7 | 0.8 |
| Oklahoma Avenue to Kingman Island | 2.0 | 2.1 |
| Kingman Island to 34th Street | 1.0 | 1.3 |
| 34th Street to 39th Street | 3.3 | 3.8 |
| 39th Street to 42nd Street | 1.0 | 1.2 |
| 42nd Street to Benning Road Metrorail Station | 2.2 | 3.9 |
| **TOTAL** | **10.3** | **13.2** |
| **Westbound Direction** | | |
| Benning Road Metrorail Station to 42nd Street | 2.1 | 1.7 |
| 42nd Street to 39th Street | 2.3 | 1.3 |
| 39th Street to 34th Street | 2.4 | 3.0 |
| 34th Street to Kingman Island | 1.4 | 1.2 |
| Kingman Island to Oklahoma Avenue | 2.8 | 2.2 |
| Oklahoma Avenue to 26th Street | 0.5 | 0.4 |
| **TOTAL** | **11.5** | **9.8** |

** The curbside results are based on the original AECOM study.*

### Table 41: 2045 Station to Station VISSIM Travel Time Results for Median Streetcar Alignment

| Segment | Median Alignment | |
|---|---|---|
| | Travel Time (min) – AM Peak Hour | Travel Time (min) – PM Peak Hour |
| **Eastbound Direction** | | |
| 20th Street to Oklahoma Avenue | 0.1 | 0.1 |
| Oklahoma Avenue to Langston Golf Course | 1.2 | 1.1 |
| Langston Golf Course to 34th Street | 1.7 | 2.0 |
| 34th Street to 39th Street | 1.6 | 2.1 |
| 39th Street to 42nd Street | 0.9 | 1.1 |
| 42nd Street to Benning Road Metrorail Station | 2.7 | 2.3 |
| **TOTAL** | **8.1** | **8.5** |
| **Westbound Direction** | | |
| Benning Road Metrorail Station to 42nd Street | 1.4 | 1.2 |
| 42nd Street to 39th Street | 0.9 | 1.0 |
| 39th Street to 34th Street | 2.2 | 2.5 |
| 34th Street to Langston Golf Course | 1.3 | 1.1 |
| Langston Golf Course to Oklahoma Avenue | 1.1 | 1.0 |
| Oklahoma Avenue to 20th Street | 0.5 | 0.4 |
| **TOTAL** | **7.3** | **7.1** |

### Table 42: 2045 Corridor Vehicle Travel Times under Curbside Alignment

| Segment | Curbside Streetcar | |
|---|---|---|
| | Travel Time (min) – AM Peak Hour | Travel Time (min) – PM Peak Hour |
| **Eastbound Direction** | | |
| 20th Street to Benning Road Metrorail Station | 6.8 | 9.3 |
| **Westbound Direction** | | |
| Benning Road Metrorail Station to 26th Street | 6.4 | 5.3 |

** The curbside results are based on the original AECOM study.*

### Table 43: 2045 Corridor Vehicle Travel Times under Median Alignment

| Segment | Median Streetcar | |
|---|---|---|
| | Travel Time (min) – AM Peak Hour | Travel Time (min) – PM Peak Hour |
| **Eastbound Direction** | | |
| 26th Street to Benning Road Metrorail Station | 5.3 | 6.6 |
| **Westbound Direction** | | |
| Benning Road Metrorail Station to 26th Street | 6.2 | 5.6 |

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# 6.0 Attachment A – 2019 Existing Model Calibration

### 6.1.1.1 Volume Calibration (Freeways)

#### 6.1.1.1.1 AM Peak Hour (7:45 AM - 8:45 AM)

| | | Subtotal | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|---|
| Segments (n = 29) | Within ± 100 vph for < 700 vph | 14 | 29 | 100% | 85% | Yes |
| | Within ± 15% for ≥ 700 vph to < 2,700 vph | 3 | | | | |
| | Within ± 400 vph for ≥ 2,700 vph | 12 | | | | |

*** MOEs of Throughput, Speed, and Density represent an average of 10 simulation runs.**

| Facility | Segment | Type | Balanced Count (vph) | VISSIM Throughput (vph) | Difference (vph) | Difference (%) | Average Speed (mph) | Average Density (vpmpl) |
|---|---|---|---|---|---|---|---|---|
| NB DC-295 | Mainline south of EB Capitol Street On-Ramp | Basic | 2,875 | 2,874 | -1 | 0% | 49 | 29.5 |
| | Between EB Capitol Street On-Ramp and WB Benning Road Off-Ramp | Merge/Diverge | 3,180 | 3,178 | -2 | 0% | 51 | 20.5 |
| | Between WB Benning Road Off-Ramp and EB Benning Road/Kenilworth Avenue On-Ramp | Basic | 2,910 | 2,905 | -5 | 0% | 51 | 18.9 |
| | Between EB Benning Road/Kenilworth Avenue On-Ramp and Nannie Helen Burroughs Avenue Off-Ramp | Merge/Diverge | 3,240 | 3,224 | -16 | 0% | 50 | 20.2 |
| | Between Nannie Helen Burroughs Avenue Off-Ramp and Kenilworth Avenue On-Ramp | Basic | 2,795 | 2,792 | -3 | 0% | 52 | 18.0 |
| | Mainline north of Nannie Helen Burroughs Avenue | Merge/Basic | 3,330 | 3,328 | -2 | 0% | 43 | 21.0 |
| SB DC-295 | Mainline North of Deane Avenue Off-Ramp | Merge/Diverge | 3,145 | 3,120 | -25 | -1% | 8 | 114.9 |
| | Between Deane Avenue Off-Ramp and Kenilworth Avenue Off-Ramp | Basic/Diverge | 2,900 | 2,876 | -24 | -1% | 7 | 133.1 |
| | Between Kenilworth Avenue Off-Ramp and Kenilworth Avenue On-Ramp | Basic | 2,190 | 2,150 | -40 | -2% | 4 | 165.4 |
| | Between Kenilworth Avenue On-Ramp and EB Benning Road On-Ramp | Merge/Basic | 2,840 | 2,782 | -58 | -2% | 6 | 143.2 |
| | Between EB Benning Road On-Ramp and Baker Street Off-Ramp | Weave | 3,120 | 3,026 | -94 | -3% | 8 | 100.8 |
| | Between Baker Street Off-Ramp and WB Capitol Street Off-Ramp | Diverge | 3,095 | 3,013 | -82 | -3% | 11 | 90.5 |
| | Between WB Capitol Street Off-Ramp and EB Capitol Street On-Ramp | Basic | 2,600 | 2,535 | -65 | -3% | 12 | 102.7 |
| | Mainline south of EB Capitol Street On-Ramp | Merge/Basic | 2,990 | 2,909 | -81 | -3% | 15 | 89.9 |

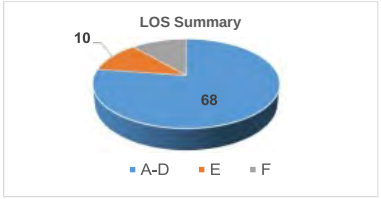
### 6.1.1.2 AM Calibration Summary

| Interchange | Ramp | | Balanced Count (vph) | VISSIM Throughput (vph) | Difference (vph) | Difference (%) | Average Speed (mph) | Average Density (vpmpl) |
|---|---|---|---|---|---|---|---|---|
| Capitol Street | EB Capitol Street to SB DC-295 | Ramp | 390 | 390 | 0 | 0% | 26 | 15.7 |
| | EB Capitol Street to NB DC-295 | Ramp | 305 | 305 | -1 | 0% | 33 | 9.6 |
| | SB DC-295 to WB Capitol Street | Ramp | 495 | 489 | -6 | -1% | 40 | 12.6 |
| Baker Street | SB DC-295 to WB Baker Street | Ramp | 25 | 21 | -4 | -15% | 20 | 1.1 |
| Benning Road | EB Benning Road to SB DC-295 | Ramp | 280 | 275 | -5 | -2% | 36 | 7.6 |
| | EB Benning Road to NB DC-295 or WB Benning Road (U-turns) | Ramp | 295 | 287 | -8 | -3% | 24 | 22.7 |
| | NB DC-295 to WB Benning Road | Ramp | 270 | 274 | 4 | 1% | 27 | 23.9 |
| | NB DC-295/EB Benning Road (U-turns) to WB Benning Road | Ramp | 280 | 280 | 0 | 0% | 2 | 136.9 |
| | SB Kenilworth Avenue NE to NB DC-295 | Ramp | 45 | 44 | -1 | -2% | 23 | 1.9 |
| | EB Benning Road/SB Kenilworth Avenue NE to NB DC-295 | Ramp | 330 | 320 | -11 | -3% | 39 | 8.2 |
| Kenilworth Avenue | SB Kenilworth Avenue to SB DC-295 (South) | Ramp | 650 | 640 | -10 | -1% | 5 | 123.1 |
| | SB DC-295 to SB Kenilworth Avenue | Ramp | 710 | 723 | 13 | 2% | 18 | 47.8 |
| | NB Kenilworth Avenue to NB DC-295 | Ramp | 535 | 537 | 2 | 0% | 23 | 22.6 |
| Nannie Helen Burroughs Avenue | NB DC-295 to Nannie Helen Burroughs Avenue/Kenilworth Avenue | Ramp | 445 | 432 | -13 | -3% | 47 | 9.1 |
| | SB DC-295 to Deane Avenue/Kenilworth Terrace/Kenilworth Avenue | Ramp | 245 | 232 | -13 | -5% | 39 | 6.1 |

## 6.1.1.3 Volume Calibration (Intersections)

### 6.1.1.3.1 AM Peak Hour (7:45 AM - 8:45 AM)

| | Volume Criteria | Subtotal | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|---|
| Approaches (n = 77) | Within ± 100 vph for < 700 vph | 61 | 86 | 99% | 85% | Yes |
| | Within ± 15% for ≥ 700 vph to < 2,700 vph | 24 | | | | |
| | Within ± 400 vph for ≥ 2,700 vph | 1 | | | | |




**Approaches:**

| LOS | Count |
|---|---|
| A-D | 68 |
| E | 10 |
| F | 10 |

g

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | Benning Road NE at Anacostia Avenue NE | NB | LT | 64 | 89 | 65 | 90 | 1 | 1 | 2% | 1% | 51.5 | 39.4 | 19 | 19 | 145 | 149 | D | D |
| | | | RT | 25 | | 24 | | -1 | | -3% | | 6.6 | | 15 | | 149 | | A | |
| | | SB | LT | 19 | 28 | 20 | 28 | 2 | 1 | 9% | 3% | 48.9 | 49.3 | 7 | 7 | 68 | 68 | D | D |
| | | | RT | 9 | | 8 | | -1 | | -10% | | 50.2 | | 7 | | 68 | | D | |
| | | EB | LT | 10 | 953 | 10 | 941 | 0 | -11 | 0% | -1% | 33.1 | 3.0 | 6 | 6 | 139 | 139 | C | A |
| | | | TH | 918 | | 907 | | -11 | | -1% | | 2.6 | | 6 | | 139 | | A | |
| | | | RT | 25 | | 25 | | -1 | | -2% | | 4.7 | | 0 | | 40 | | A | |
| | | WB | LT | 21 | 2,580 | 23 | 2,690 | 2 | 110 | 12% | 4% | 13.5 | 2.6 | 16 | 16 | 354 | 376 | B | A |
| | | | TH | 2,546 | | 2,655 | | 109 | | 4% | | 2.5 | | 16 | | 354 | | A | |
| | | | RT | 13 | | 11 | | -2 | | -16% | | 8.1 | | 10 | | 376 | | A | |
| | | Intersection | | 3,649 | | 3,749 | | 100 | | 3% | | 3.9 | | | | | | A | |
| 102 | Benning Road NE at 34th Street NE | NB | LT | 18 | 70 | 19 | 76 | 1 | 6 | 4% | 8% | 38.7 | 18.3 | 7 | 7 | 106 | 115 | D | B |
| | | | RT | 52 | | 56 | | 4 | | 8% | | 11.3 | | 6 | | 115 | | B | |
| | | SB | LT | 30 | 70 | 28 | 70 | -2 | 0 | -5% | 0% | 38.7 | 37.4 | 15 | 15 | 133 | 133 | D | D |
| | | | RT | 40 | | 42 | | 2 | | 4% | | 36.5 | | 15 | | 133 | | D | |
| | | EB | LT | 8 | 962 | 10 | 949 | 2 | -13 | 20% | -1% | 17.5 | 11.4 | 0 | 29 | 29 | 213 | B | B |
| | | | TH | 933 | | 918 | | -15 | | -2% | | 11.4 | | 23 | | 190 | | B | |
| | | | RT | 21 | | 21 | | 0 | | 1% | | 8.9 | | 29 | | 213 | | A | |
| | | WB | LT | 219 | 2,791 | 224 | 2,949 | 5 | 158 | 2% | 6% | 31.3 | 16.4 | 58 | 105 | 488 | 593 | C | B |
| | | | TH | 2,523 | | 2,622 | | 99 | | 4% | | 14.8 | | 102 | | 586 | | B | |
| | | | RT | 49 | | 45 | | -4 | | -8% | | 17.4 | | 105 | | 593 | | B | |
| | | | U | 76 | | 59 | | -17 | | -23% | | 33.1 | | 58 | | 488 | | C | |
| | | Intersection | | 3,893 | | 3,985 | | 92 | | 2% | | 15.9 | | | | | | B | |
| 103 | Benning Road NE Ramp to DC-295 at 36th Street NE | NB | RT | 171 | 171 | 169 | 169 | -2 | -2 | -1% | -1% | 2.2 | 2.2 | 0 | 0 | 44 | 44 | A | A |
| | | EB | TH | 404 | 410 | 395 | 400 | -8 | -9 | -2% | -2% | 1.6 | 1.6 | 2 | 2 | 138 | 138 | A | A |
| | | | RT | 6 | | 5 | | -1 | | -15% | | 1.2 | | 1 | | 119 | | A | |
| | | Intersection | | 581 | | 570 | | -11 | | -2% | | 1.7 | | | | | | A | |
| 104 | Benning Road NE at Minnesota Avenue NE | NB | LT | 307 | 637 | 302 | 645 | -5 | 7 | -2% | 1% | 35.1 | 30.9 | 83 | 83 | 454 | 454 | D | C |
| | | | TH | 296 | | 308 | | 12 | | 4% | | 27.8 | | 83 | | 454 | | C | |
| | | | RT | 34 | | 35 | | 1 | | 3% | | 23.2 | | 83 | | 454 | | C | |
| | | SB | LT | 50 | 510 | 61 | 547 | 11 | 37 | 21% | 7% | 48.2 | 41.2 | 15 | 115 | 243 | 537 | D | D |
| | | | TH | 323 | | 334 | | 11 | | 3% | | 43.8 | | 115 | | 537 | | D | |
| | | | RT | 137 | | 152 | | 15 | | 11% | | 32.6 | | 115 | | 537 | | C | |
| | | EB | LT | 129 | 681 | 133 | 643 | 4 | -38 | 3% | -6% | 123.8 | 68.3 | 177 | 177 | 554 | 554 | F | E |
| | | | TH | 306 | | 279 | | -27 | | -9% | | 56.6 | | 177 | | 554 | | E | |
| | | | RT | 245 | | 231 | | -15 | | -6% | | 50.5 | | 177 | | 554 | | D | |
| | | WB | LT | 16 | 692 | 11 | 777 | -5 | 84 | -32% | 12% | 86.7 | 72.6 | 221 | 221 | 411 | 411 | F | E |
| | | | TH | 629 | | 706 | | 76 | | 12% | | 71.6 | | 221 | | 411 | | E | |
| | | | RT | 47 | | 60 | | 13 | | 28% | | 81.4 | | 221 | | 411 | | F | |
| | | Intersection | | 2,521 | | 2,611 | | 90 | | 4% | | 54.7 | | | | | | D | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105 | Benning Road NE at 39th Street NE/Driveway | NB | LT | 10 | 20 | 10 | 20 | 0 | 0 | 1% | -2% | 80.4 | 52.8 | 5 | 5 | 76 | 76 | F | D |
| | | | RT | 10 | | 9 | | -1 | | -13% | | 18.6 | | 3 | | 76 | | B | |
| | | SB | LT | 5 | 10 | 5 | 8 | 0 | -2 | -2% | -20% | 55.0 | 44.0 | 1 | 1 | 29 | 29 | E | D |
| | | | RT | 5 | | 0 | | -5 | | -100% | | - | | 0 | | 0 | | - | |
| | | EB | LT | 10 | 390 | 11 | 374 | 0 | -16 | 3% | -4% | 2.6 | 5.0 | 10 | 10 | 175 | 175 | A | A |
| | | | TH | 359 | | 340 | | -19 | | -5% | | 5.1 | | 10 | | 175 | | A | |
| | | | RT | 21 | | 23 | | 3 | | 13% | | 4.9 | | 10 | | 175 | | A | |
| | | WB | LT | 20 | 708 | 17 | 782 | -3 | 74 | -14% | 10% | 64.8 | 61.1 | 251 | 251 | 756 | 756 | E | E |
| | | | TH | 678 | | 762 | | 84 | | 12% | | 61.1 | | 251 | | 756 | | E | |
| | | | RT | 10 | | 3 | | -7 | | -74% | | 38.2 | | 251 | | 756 | | D | |
| | | Intersection | | 1,127 | | 1,183 | | 56 | | 5% | | 43.1 | | | | | | D | |
| 106 | Benning Road NE at 40th Street NE | NB | LT | 7 | 121 | 6 | 118 | -1 | -4 | -15% | -3% | 33.2 | 10.2 | 7 | 7 | 114 | 115 | D | B |
| | | | RT | 114 | | 112 | | -2 | | -2% | | 8.9 | | 7 | | 115 | | A | |
| | | EB | TH | 354 | 373 | 334 | 352 | -21 | -21 | -6% | -6% | 0.7 | 0.7 | 0 | 3 | 127 | 127 | A | A |
| | | | RT | 19 | | 18 | | -1 | | -4% | | 0.8 | | 3 | | 124 | | A | |
| | | WB | LT | 311 | 1,010 | 311 | 1,086 | 0 | 75 | 0% | 7% | 19.5 | 22.9 | 94 | 94 | 423 | 423 | C | C |
| | | | TH | 699 | | 775 | | 75 | | 11% | | 24.3 | | 94 | | 423 | | C | |
| | | Intersection | | 1,505 | | 1,555 | | 51 | | 3% | | 16.9 | | | | | | B | |
| 107 | Benning Road NE at 41st Street NE | NB | LT | 7 | 31 | 6 | 27 | -1 | -4 | -10% | -12% | 16.5 | 9.1 | 1 | 1 | 49 | 51 | C | A |
| | | | RT | 24 | | 21 | | -3 | | -12% | | 7.0 | | 1 | | 51 | | A | |
| | | EB | TH | 459 | 468 | 436 | 444 | -24 | -24 | -5% | -5% | 0.4 | 0.4 | 0 | 0 | 39 | 39 | A | A |
| | | | RT | 9 | | 9 | | 0 | | -2% | | 0.8 | | 0 | | 15 | | A | |
| | | WB | LT | 99 | 1,102 | 91 | 1,175 | -9 | 72 | -9% | 7% | 9.5 | 9.2 | 39 | 39 | 291 | 291 | A | A |
| | | | TH | 1,003 | | 1,084 | | 81 | | 8% | | 9.2 | | 39 | | 291 | | A | |
| | | Intersection | | 1,601 | | 1,646 | | 45 | | 3% | | 6.8 | | | | | | A | |
| 108 | Benning Road NE at 42nd Street NE | NB | LT | 26 | 87 | 17 | 84 | -10 | -4 | -38% | -4% | 23.1 | 18.6 | 7 | 7 | 98 | 112 | C | B |
| | | | TH | 57 | | 47 | | -10 | | -18% | | 20.9 | | 7 | | 98 | | C | |
| | | | RT | 4 | | 20 | | 16 | | 410% | | 9.7 | | 6 | | 112 | | A | |
| | | SB | LT | 12 | 466 | 9 | 448 | -3 | -18 | -22% | -4% | 56.2 | 49.1 | 148 | 159 | 522 | 539 | E | D |
| | | | TH | 136 | | 134 | | -2 | | -1% | | 54.4 | | 148 | | 522 | | D | |
| | | | RT | 318 | | 304 | | -14 | | -4% | | 46.6 | | 159 | | 539 | | D | |
| | | EB | LT | 106 | 483 | 108 | 459 | 2 | -25 | 2% | -5% | 73.4 | 28.4 | 56 | 68 | 279 | 304 | E | C |
| | | | TH | 331 | | 311 | | -20 | | -6% | | 15.2 | | 56 | | 279 | | B | |
| | | | RT | 46 | | 40 | | -6 | | -14% | | 9.7 | | 68 | | 304 | | A | |
| | | WB | LT | 7 | 796 | 6 | 890 | -1 | 94 | -10% | 12% | 16.8 | 12.9 | 38 | 39 | 329 | 348 | B | B |
| | | | TH | 758 | | 852 | | 94 | | 12% | | 12.9 | | 38 | | 329 | | B | |
| | | | RT | 31 | | 32 | | 1 | | 3% | | 12.8 | | 39 | | 348 | | B | |
| | | Intersection | | 1,833 | | 1,880 | | 47 | | 3% | | 25.6 | | | | | | C | |
| 208 | Benning Road NE at 26th Street NE | SB | LT | 170 | 225 | 162 | 214 | -8 | -11 | -5% | -5% | 51.9 | 48.8 | 66 | 72 | 392 | 407 | D | D |
| | | | RT | 55 | | 52 | | -3 | | -5% | | 39.0 | | 72 | | 407 | | D | |
| | | EB | LT | 65 | 868 | 67 | 880 | 2 | 12 | 3% | 1% | 36.9 | 8.8 | 6 | 10 | 114 | 149 | D | A |
| | | | TH | 803 | | 813 | | 10 | | 1% | | 6.5 | | 10 | | 149 | | A | |
| | | WB | TH | 1,784 | 2,204 | 1,896 | 2,304 | 111 | 101 | 6% | 5% | 4.7 | 5.7 | 64 | 68 | 295 | 320 | A | A |
| | | | RT | 419 | | 409 | | -11 | | -3% | | 10.5 | | 68 | | 320 | | B | |
| | | Intersection | | 3,297 | | 3,399 | | 102 | | 3% | | 9.3 | | | | | | A | |
| 209 | Benning Road NE at Oklahoma Avenue NE | NB | LT | 68 | 120 | 67 | 118 | -1 | -2 | -1% | -2% | 56.3 | 33.7 | 21 | 21 | 147 | 147 | E | C |
| | | | RT | 52 | | 51 | | -1 | | -3% | | 3.9 | | 0 | | 45 | | A | |
| | | EB | TH | 900 | 973 | 906 | 977 | 6 | 4 | 1% | 0% | 7.5 | 7.7 | 29 | 29 | 240 | 254 | A | A |
| | | | RT | 73 | | 71 | | -2 | | -3% | | 9.8 | | 27 | | 254 | | A | |
| | | WB | LT | 483 | 2,619 | 490 | 2,726 | 7 | 107 | 1% | 4% | 49.3 | 22.4 | 128 | 128 | 704 | 704 | D | C |
| | | | TH | 2,136 | | 2,236 | | 100 | | 5% | | 16.6 | | 32 | | 479 | | B | |
| | | Intersection | | 3,712 | | 3,821 | | 108 | | 3% | | 19.0 | | | | | | B | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 210 | Minnesota Avenue NE at Dix Street NE | NB | LT | 5 | | 5 | | 0 | | -2% | | 9.9 | | 18 | | 192 | | A | |
| | | | TH | 586 | 677 | 594 | 687 | 7 | 10 | 1% | 2% | 8.7 | 8.5 | 18 | 18 | 192 | 239 | A | A |
| | | | RT | 86 | | 89 | | 3 | | 3% | | 7.2 | | 14 | | 239 | | A | |
| | | SB | LT | 41 | | 34 | | -7 | | -17% | | 14.7 | | 15 | | 215 | | B | |
| | | | TH | 528 | 584 | 527 | 574 | -2 | -10 | 0% | -2% | 7.6 | 8.0 | 15 | 18 | 215 | 238 | A | A |
| | | | RT | 15 | | 14 | | -1 | | -9% | | 5.8 | | 18 | | 238 | | A | |
| | | EB | LT | 4 | | 3 | | -1 | | -17% | | 45.0 | | 2 | | 41 | | D | |
| | | | TH | 3 | 10 | 4 | 10 | 1 | 0 | 23% | -2% | 37.2 | 40.7 | 2 | 2 | 41 | 41 | D | D |
| | | | RT | 3 | | 3 | | 0 | | -7% | | 40.4 | | 2 | | 41 | | D | |
| | | WB | LT | 93 | | 94 | | 1 | | 1% | | 48.0 | | 40 | | 237 | | D | |
| | | | TH | 18 | 158 | 16 | 159 | -2 | 1 | -11% | 0% | 49.7 | 43.6 | 40 | 40 | 237 | 243 | D | D |
| | | | RT | 47 | | 49 | | 1 | | 3% | | 33.1 | | 40 | | 243 | | C | |
| | | Intersection | | 1,430 | | 1,431 | | 1 | | 0% | | 12.4 | | | | | | B | |
| 211 | Minnesota Avenue NE at Bus Exit South | NB | TH | 473 | 473 | 500 | 500 | 27 | 27 | 6% | 6% | 19.7 | 19.7 | 42 | 42 | 518 | 518 | B | B |
| | | SB | TH | 480 | 480 | 497 | 497 | 16 | 16 | 3% | 3% | 4.2 | 4.2 | 8 | 8 | 93 | 93 | A | A |
| | | EB | LT | 19 | | 11 | | -8 | | -43% | | 55.6 | | 18 | | 160 | | E | |
| | | | RT | 31 | 50 | 46 | 57 | 15 | 7 | 50% | 14% | 22.3 | 28.6 | 16 | 18 | 161 | 161 | C | C |
| | | Intersection | | 1,003 | | 1,054 | | 51 | | 5% | | 12.9 | | | | | | B | |
| 212 | Minnesota Avenue NE at Grant Street NE and Bus Entrance North | NB | LT | 38 | | 16 | | -22 | | -58% | | 16.4 | | 2 | | 71 | | B | |
| | | | TH | 407 | 489 | 428 | 486 | 22 | -3 | 5% | -1% | 13.1 | 13.0 | 36 | 36 | 356 | 356 | B | B |
| | | | RT | 44 | | 42 | | -3 | | -7% | | 10.9 | | 36 | | 356 | | B | |
| | | SB | LT | 7 | | 8 | | 1 | | 10% | | 23.5 | | 16 | | 127 | | C | |
| | | | TH | 402 | 430 | 438 | 446 | 36 | 15 | 9% | 4% | 10.6 | 10.9 | 16 | 17 | 127 | 154 | B | B |
| | | | RT | 21 | | 0 | | -21 | | -100% | | - | | 17 | | 154 | | - | |
| | | WB | LT | 75 | | 73 | | -2 | | -3% | | 15.2 | | 6 | | 111 | | B | |
| | | | RT | 34 | 109 | 36 | 109 | 2 | 0 | 7% | 0% | 6.6 | 12.3 | 5 | 6 | 125 | 125 | A | B |
| | | Intersection | | 1,027 | | 1,040 | | 12 | | 1% | | 12.0 | | | | | | B | |
| 213 | Benning Road NE at Blaine Street NE | NB | LT | 1 | | 1 | | 0 | | -20% | | 41.2 | | 3 | | 63 | | E | |
| | | | RT | 52 | 53 | 52 | 53 | 0 | 0 | 1% | 0% | 15.9 | 16.2 | 4 | 4 | 68 | 68 | C | C |
| | | EB | TH | 345 | | 336 | | -9 | | -3% | | 36.6 | | 33 | | 150 | | E | |
| | | | RT | 2 | 347 | 3 | 338 | 0 | -9 | 17% | -3% | 13.3 | 30.4 | 44 | 44 | 196 | 196 | B | E |
| | | WB | LT | 228 | | 236 | | 8 | | 3% | | 8.9 | | 16 | | 279 | | A | |
| | | | TH | 795 | 1,023 | 886 | 1,122 | 91 | 99 | 11% | 10% | 1.7 | 3.2 | 12 | 16 | 248 | 279 | A | A |
| | | Intersection | | 1,423 | | 1,514 | | 90 | | 6% | | 11.1 | | | | | | B | |
| 214 | Benning Road NE at 44th Street NE | SB | LT | 130 | | 129 | | -2 | | -1% | | 76.0 | | 161 | | 576 | | E | |
| | | | RT | 248 | 378 | 241 | 370 | -7 | -8 | -3% | -2% | 59.2 | 65.1 | 165 | 165 | 583 | 583 | E | E |
| | | EB | LT | 109 | | 101 | | -8 | | -7% | | 121.7 | | 129 | | 357 | | F | |
| | | | TH | 288 | 397 | 282 | 383 | -6 | -14 | -2% | -3% | 34.0 | 57.1 | 129 | 129 | 357 | 357 | C | E |
| | | WB | TH | 775 | | 877 | | 102 | | 13% | | 15.2 | | 53 | | 327 | | B | |
| | | | RT | 159 | 934 | 148 | 1,026 | -11 | 91 | -7% | 10% | 11.7 | 14.7 | 25 | 53 | 371 | 371 | B | B |
| | | Intersection | | 1,709 | | 1,779 | | 69 | | 4% | | 34.3 | | | | | | C | |
| 215 | Benning Road NE at 45th Street NE | SB | LT | 48 | | 42 | | -7 | | -14% | | 406.4 | | 283 | | 537 | | F | |
| | | | RT | 69 | 117 | 52 | 93 | -17 | -24 | -25% | -20% | 364.4 | 383.1 | 286 | 286 | 541 | 541 | F | F |
| | | EB | LT | 19 | | 19 | | 0 | | -1% | | 112.0 | | 167 | | 389 | | F | |
| | | | TH | 399 | 418 | 385 | 404 | -14 | -14 | -3% | -3% | 115.4 | 115.2 | 167 | 167 | 389 | 389 | F | F |
| | | WB | TH | 864 | | 972 | | 108 | | 13% | | 1.1 | | 323 | | 594 | | A | |
| | | | RT | 62 | 926 | 66 | 1,037 | 4 | 112 | 6% | 12% | 3.4 | 1.3 | 9 | 323 | 237 | 594 | A | A |
| | | Intersection | | 1,460 | | 1,535 | | 74 | | 5% | | 54.4 | | | | | | D | |
| 216 | Benning Road NE at Central Avenue NE | WB | TH | 499 | | 538 | | 39 | | 8% | | 0.5 | | 0 | | 82 | | A | |
| | | | RT | 14 | 513 | 13 | 551 | -2 | 38 | -11% | 7% | 0.0 | 0.4 | 0 | 0 | 57 | 82 | A | A |
| | | EB | TH | 459 | 459 | 425 | 425 | -34 | -34 | -7% | -7% | 104.1 | 104.1 | 85 | 85 | 197 | 197 | F | F |
| | | SB | RT | 437 | 437 | 493 | 493 | 56 | 56 | 13% | 13% | 12.0 | 12.0 | 36 | 36 | 393 | 393 | B | B |
| | | Intersection | | 1,410 | | 1,470 | | 60 | | 4% | | 34.4 | | | | | | D | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 217 | Benning Road NE at East Capitol Street SE | NB | LT | 453 | | 418 | | -35 | | -8% | | 131.9 | | 294 | | 742 | | F | |
| | | | TH | 218 | 693 | 247 | 686 | 29 | -6 | 13% | -1% | 58.9 | 103.1 | 294 | 294 | 742 | 747 | E | F |
| | | | RT | 22 | | 21 | | -1 | | -3% | | 50.9 | | 294 | | 747 | | D | |
| | | SB | LT | 97 | | 87 | | -10 | | -10% | | 31.2 | | 0 | | 2 | | C | |
| | | | TH | 243 | 461 | 223 | 421 | -20 | -40 | -8% | -9% | 27.1 | 22.2 | 3 | 117 | 62 | 168 | C | C |
| | | | RT | 121 | | 112 | | -10 | | -8% | | 5.4 | | 117 | | 168 | | A | |
| | | EB | LT | 262 | | 273 | | 11 | | 4% | | 47.5 | | 104 | | 231 | | D | |
| | | | TH | 409 | 789 | 371 | 765 | -38 | -24 | -9% | -3% | 4.4 | 19.4 | 104 | 104 | 231 | 244 | A | B |
| | | | RT | 118 | | 122 | | 4 | | 3% | | 2.5 | | 37 | | 244 | | A | |
| | | WB | TH | 1,817 | 1,851 | 1,799 | 1,829 | -18 | -22 | -1% | -1% | 51.4 | 51.4 | 262 | 269 | 860 | 870 | D | D |
| | | | RT | 34 | | 30 | | -4 | | -11% | | 51.0 | | 269 | | 870 | | D | |
| | | Intersection | | 3,793 | | 3,701 | | -92 | | -2% | | 51.0 | | | | | | D | |
| 218 | East Capitol Street SE at Texas Avenue SE | NB | RT | 242 | 242 | 137 | 137 | -106 | -106 | -44% | -44% | 658.4 | 658.4 | 649 | 649 | 701 | 701 | F | F |
| | | EB | TH | 542 | | 617 | | 74 | | 14% | | 47.4 | | 72 | | 288 | | D | |
| | | | RT | 14 | 556 | 13 | 630 | -1 | 73 | -8% | 13% | 22.1 | 46.9 | 69 | 72 | 298 | 298 | C | D |
| | | WB | U | 4 | | 14 | | 10 | | 245% | | 64.1 | | 39 | | 300 | | E | |
| | | | LT | 117 | 2,391 | 111 | 2,370 | -6 | -21 | -5% | -1% | 50.0 | 3.4 | 40 | 40 | 299 | 300 | D | A |
| | | | TH | 2,270 | | 2,246 | | -25 | | -1% | | 0.8 | | 9 | | 200 | | A | |
| | | Intersection | | 3,190 | | 3,136 | | -54 | | -2% | | 40.7 | | | | | | D | |
| 310 | Deane Avenue NE at Lee St NE | SB | LT | 256 | | 239 | | -17 | | -6% | | 226.9 | | 291 | | 704 | | F | |
| | | | RT | 2 | 258 | 0 | 239 | -2 | -19 | -100% | -7% | - | 226.9 | 291 | 291 | 704 | 704 | - | F |
| | | EB | LT | 2 | | 3 | | 1 | | 35% | | 295.0 | | 5 | | 35 | | F | |
| | | | TH | 3 | 5 | 2 | 4 | -1 | -1 | -48% | -14% | 227.7 | 271.0 | 5 | 5 | 35 | 35 | F | F |
| | | WB | TH | 2 | | 3 | | 1 | | 31% | | 2.0 | | 0 | | 11 | | A | |
| | | | RT | 65 | 67 | 68 | 70 | 3 | 3 | 4% | 5% | 0.9 | 0.9 | 0 | 0 | 11 | 11 | A | A |
| | | Intersection | | 329 | | 313 | | -16 | | -5% | | 177.0 | | | | | | F | |
| 311 | Deane Avenue NE at Kenilworth Terrace NE | NB | LT | 8 | | 9 | | 1 | | 6% | | 51.5 | | 35 | | 321 | | D | |
| | | | RT | 272 | 280 | 272 | 280 | 0 | 0 | 0% | 0% | 33.5 | 34.1 | 27 | 35 | 302 | 321 | C | C |
| | | SB | LT | 387 | | 394 | | 7 | | 2% | | 232.4 | | 779 | | 1,507 | | F | |
| | | | TH | 153 | 547 | 158 | 552 | 5 | 5 | 3% | 1% | 217.4 | 228.1 | 805 | 805 | 1,535 | 1,535 | F | F |
| | | | RT | 7 | | 0 | | -7 | | -100% | | - | | 0 | | 0 | | - | |
| | | EB | TH | 193 | 261 | 186 | 250 | -8 | -12 | -4% | -5% | 66.1 | 56.5 | 171 | 197 | 286 | 316 | E | E |
| | | | RT | 68 | | 64 | | -4 | | -6% | | 36.2 | | 197 | | 316 | | D | |
| | | WB | LT | 194 | 249 | 188 | 249 | -6 | 0 | -3% | 0% | 3.7 | 3.4 | 3 | 3 | 66 | 66 | A | A |
| | | | TH | 55 | | 61 | | 6 | | 11% | | 2.6 | | 3 | | 66 | | A | |
| | | Intersection | | 1,337 | | 1,330 | | -7 | | -1% | | 113.4 | | | | | | F | |
| 312 | Deane Avenue NE at Kenilworth Avenue NE | SB | LT | 174 | | 137 | | -37 | | -21% | | 284.8 | | 355 | | 550 | | F | |
| | | | TH | 50 | 224 | 38 | 175 | -13 | -49 | -25% | -22% | 286.1 | 285.1 | 355 | 355 | 550 | 550 | F | F |
| | | EB | TH | 645 | | 653 | | 8 | | 1% | | 10.2 | | 79 | | 174 | | B | |
| | | | RT | 207 | 852 | 199 | 852 | -8 | 0 | -4% | 0% | 4.9 | 9.0 | 85 | 85 | 181 | 181 | A | A |
| | | WB | LT | 604 | | 594 | | -10 | | -2% | | 11.0 | | 31 | | 283 | | B | |
| | | | TH | 238 | 842 | 249 | 843 | 11 | 1 | 5% | 0% | 17.4 | 12.9 | 31 | 31 | 283 | 283 | B | B |
| | | Intersection | | 1,918 | | 1,870 | | -49 | | -3% | | 36.5 | | | | | | D | |
| 313 | Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC-295 U-turns | NB | U | 127 | | 125 | | -3 | | -2% | | 19.6 | | 67 | | 371 | | B | |
| | | | LT | 20 | 445 | 19 | 432 | -1 | -13 | -5% | -3% | 51.0 | 10.4 | 121 | 121 | 439 | 439 | D | B |
| | | | TH | 21 | | 22 | | 0 | | 1% | | 50.7 | | 0 | | 0 | | D | |
| | | | RT | 276 | 276 | 267 | 267 | -9 | -9 | -3% | -3% | 62.6 | 62.6 | 29 | 29 | 459 | 459 | E | E |
| | | EB | LT | 165 | 819 | 161 | 819 | -5 | -1 | -3% | 0% | 38.4 | 21.6 | 44 | 44 | 276 | 276 | D | C |
| | | | TH | 654 | | 658 | | 4 | | 1% | | 17.5 | | 44 | | 276 | | B | |
| | | WB | TH | 822 | 1,354 | 825 | 1,364 | 3 | 10 | 0% | 1% | 32.4 | 29.6 | 186 | 208 | 354 | 380 | C | C |
| | | | RT | 532 | | 538 | | 6 | | 1% | | 25.2 | | 208 | | 380 | | C | |
| | | Intersection | | 2,894 | | 2,614 | | -280 | | -10% | | 30.3 | | | | | | C | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 314 | Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | NB | LT | 314 | | 319 | | 5 | | 2% | | 55.3 | | 110 | | 469 | | E | |
| | | | TH | 78 | 436 | 80 | 447 | 2 | 11 | 3% | 3% | 24.4 | 44.3 | 9 | 110 | 91 | 469 | C | D |
| | | | RT | 44 | | 48 | | 4 | | 8% | | 4.4 | | 6 | | 95 | | A | |
| | | SB | TH | 166 | 538 | 170 | 534 | 4 | -4 | 3% | -1% | 73.9 | 211.9 | 623 | 644 | 979 | 1,000 | E | F |
| | | | RT | 372 | | 364 | | -9 | | -2% | | 276.5 | | 644 | | 1,000 | | F | |
| | | EB | LT | 70 | 928 | 71 | 923 | 1 | -5 | 1% | -1% | 42.1 | 22.2 | 102 | 108 | 341 | 350 | D | C |
| | | | TH | 478 | | 476 | | -3 | | -1% | | 25.3 | | 102 | | 341 | | C | |
| | | | RT | 381 | | 377 | | -4 | | -1% | | 14.7 | | 108 | | 350 | | B | |
| | | WB | LT | 36 | 669 | 31 | 719 | -5 | 50 | -14% | 7% | 72.0 | 61.7 | 18 | 154 | 185 | 416 | E | E |
| | | | TH | 666 | | 678 | | 12 | | 2% | | 61.2 | | 153 | | 413 | | E | |
| | | | RT | 3 | | 10 | | 7 | | 230% | | 62.4 | | 154 | | 416 | | E | |
| | | Intersection | | 2,571 | | 2,623 | | 51 | | 2% | | 75.4 | | | | | | E | |
| 315 | Nannie Helen Burroughs Avenue NE at 44th Street NE and Hunt Place NE | NB | LT | 132 | | 132 | | 0 | | 0% | | 67.3 | | 64 | | 328 | | E | |
| | | | TH | 53 | 227 | 53 | 223 | 0 | -4 | -1% | -2% | 47.7 | 56.3 | 64 | 64 | 328 | 330 | D | E |
| | | | RT | 42 | | 38 | | -4 | | -9% | | 30.1 | | 64 | | 330 | | C | |
| | | SB | LT | 6 | | 6 | | -1 | | -8% | | 42.9 | | 88 | | 429 | | D | |
| | | | TH | 205 | | 203 | | -2 | | -1% | | 39.6 | | 88 | | 429 | | D | |
| | | | SBR - NHB EB | 52 | 359 | 50 | 354 | -3 | -6 | -5% | -2% | 32.5 | 39.0 | 101 | 101 | 462 | 462 | C | D |
| | | | SBR - Hunt | 96 | | 96 | | 0 | | 0% | | 40.7 | | 88 | | 429 | | D | |
| | | EB | LT | 15 | | 14 | | -1 | | -5% | | 16.7 | | 24 | | 271 | | B | |
| | | | TH | 364 | | 378 | | 13 | | 4% | | 10.2 | | 24 | | 271 | | B | |
| | | | EBR - Hunt Street | 4 | 526 | 4 | 525 | 0 | -1 | -3% | 0% | 16.9 | 10.9 | 24 | 24 | 271 | 271 | B | B |
| | | | EBR - 44th Street | 142 | | 129 | | -13 | | -9% | | 12.2 | | 24 | | 271 | | B | |
| | | Hunt Street | NBL- NHB EB | 30 | | 28 | | -2 | | -8% | | 44.9 | | 12 | | 87 | | D | |
| | | | NBT - 44th SB | 11 | 50 | 10 | 47 | -1 | -3 | -9% | -6% | 46.0 | 45.0 | 12 | 12 | 87 | 87 | D | D |
| | | | NBR - NHB WB | 9 | | 9 | | 0 | | -3% | | 42.8 | | 12 | | 87 | | D | |
| | | WB | WBL - Hunt Street | 52 | | 52 | | 0 | | 0% | | 37.7 | | 73 | | 506 | | D | |
| | | | WBL - 44th Street | 5 | | 5 | | 0 | | -4% | | 40.1 | | 73 | | 506 | | D | |
| | | | TH | 490 | 559 | 493 | 560 | 3 | 1 | 1% | 0% | 26.9 | 27.9 | 73 | 81 | 506 | 520 | C | C |
| | | | RT | 12 | | 11 | | -1 | | -12% | | 18.3 | | 81 | | 520 | | B | |
| | | Intersection | | 1,721 | | 1,708 | | -13 | | -1% | | 29.1 | | | | | | C | |
| 316 | Kenilworth Avenue NE at Foote Street NE | SB | TH | 1,317 | 1,373 | 1,308 | 1,364 | -10 | -9 | -1% | -1% | 184.5 | 182.9 | 0 | 0 | 0 | 0 | F | D |
| | | | RT | 56 | | 56 | | 0 | | 1% | | 145.6 | | 0 | | 0 | | F | |
| | | EB | RT | 240 | 240 | 239 | 239 | -1 | -1 | 0% | 0% | 16.6 | 16.6 | 27 | 27 | 188 | 188 | B | B |
| | | Intersection | | 1,613 | | 1,603 | | -10 | | -1% | | 158.1 | | | | | | F | |

**Simulated level of service is approximated based on delay but is not equivalent to that produced using Highway Capacity Manual methodology.*
**The intersections are numbered based on their inclusion in both the Streetcar and IMR projects (100s), the Streetcar project (200s), and the IMR project (300s).*

### 6.1.1.4 Travel Time Calibration

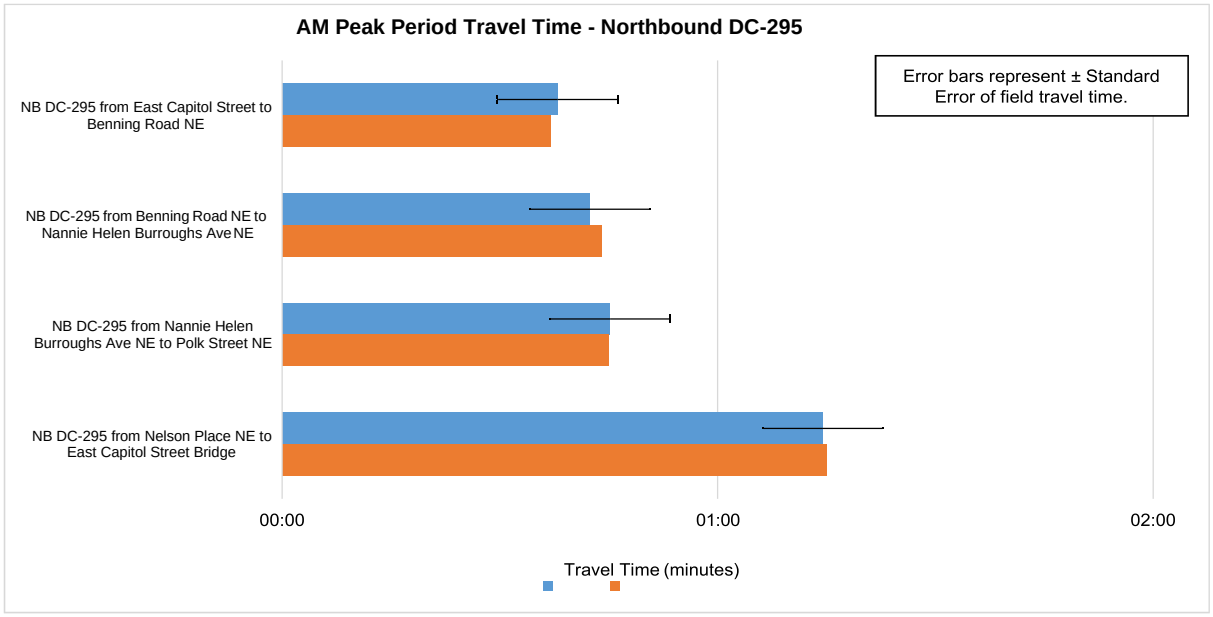
#### 6.1.1.4.1 AM Peak Period (7:00 AM - 9:00 AM)

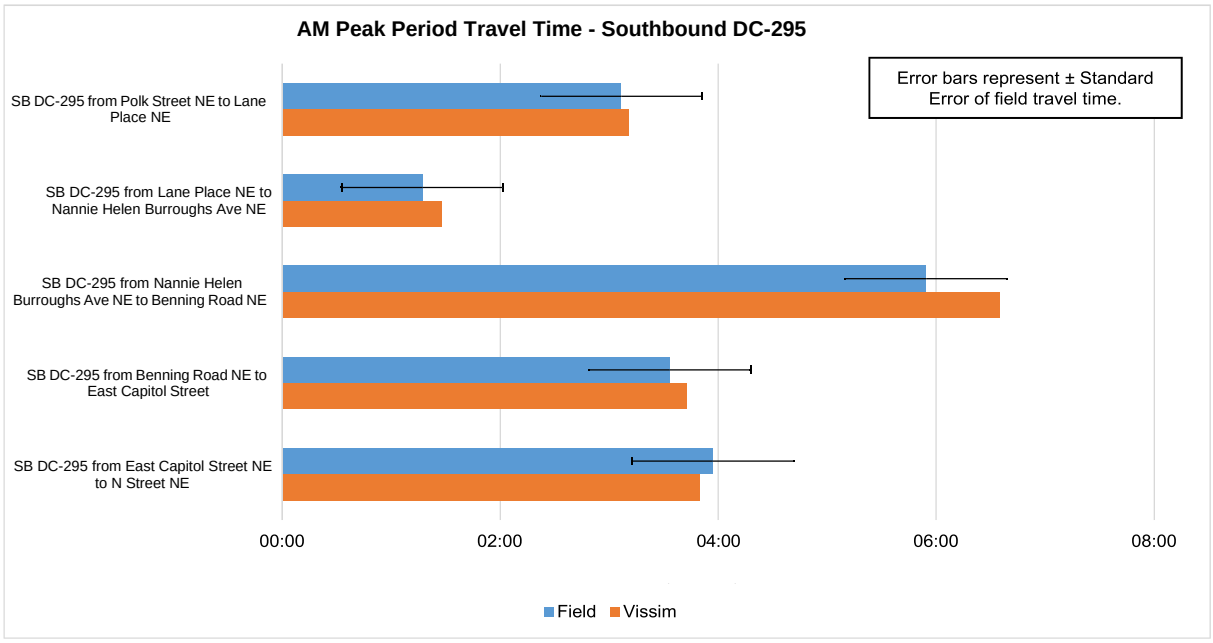
| | Travel Time Criteria | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|
| **NB 295** | Within ± 15% for average travel time on freeways | 1 | 100% | 85% | Yes |
| **SB 295** | Within ± 15% for average travel time on freeways | 1 | 100% | 85% | Yes |
| **EB Benning** | Within ± 15% for average travel time on arterials | 1 | 100% | 85% | Yes |
| **WB Benning** | Within ± 15% for average travel time on arterials | 1 | 100% | 85% | Yes |
| **Total (n = 4)** | Within ± 15% for average travel time | 4 | 100% | 85% | Yes |

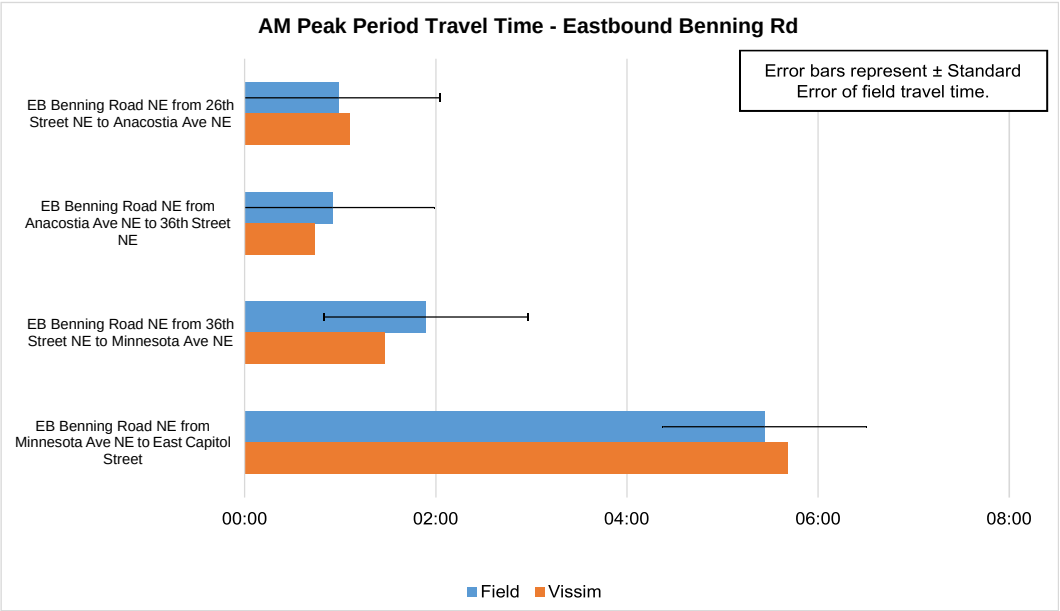
*** MOE of Vissim Travel Time represents the average from 10 simulation runs.**

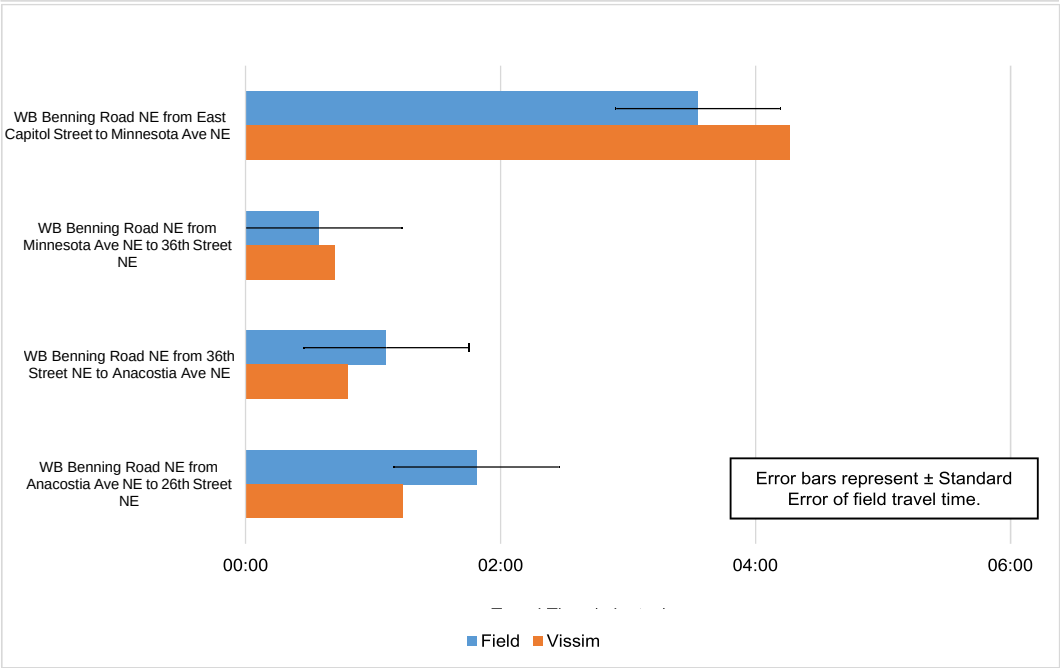
| Segment ID | Route | Peak Period Travel Time | | | | |
|---|---|---|---|---|---|---|
| | | Field (MM:SS) | VISSIM (MM:SS) | Difference (MM:SS) | Difference (%) | VISSIM STDEV (MM:SS) |
| 5 | NB DC-295 from East Capitol Street to Benning Road NE | 00:38 | 00:37 | -00:01 | -3% | 00:00 |
| 6 | NB DC-295 from Benning Road NE to Nannie Helen Burroughs Ave NE | 00:42 | 00:44 | 00:02 | 4% | 00:00 |
| 7 | NB DC-295 from Nannie Helen Burroughs Ave NE to Polk Street NE | 00:45 | 00:45 | -00:00 | 0% | 00:00 |
| 18 | NB DC-295 from Nelson Place NE to East Capitol Street Bridge | 01:15 | 01:15 | 00:00 | 1% | 00:01 |
| ***Total*** | **NB DC-295** | **03:20** | **03:21** | **00:01** | **0%** | |
| 8 | SB DC-295 from Polk Street NE to Lane Place NE | 03:07 | 03:11 | 00:04 | 2% | 00:24 |
| 9 | SB DC-295 from Lane Place NE to Nannie Helen Burroughs Ave NE | 01:17 | 01:28 | 00:11 | 14% | 00:12 |
| 10 | SB DC-295 from Nannie Helen Burroughs Ave NE to Benning Road NE | 05:54 | 06:35 | 00:41 | 11% | 00:43 |
| 11 | SB DC-295 from Benning Road NE to East Capitol Street | 03:33 | 03:43 | 00:10 | 5% | 00:20 |
| 12 | SB DC-295 from East Capitol Street NE to N Street NE | 03:57 | 03:50 | -00:07 | -3% | 00:05 |
| ***Total*** | **SB DC-295** | **17:49** | **18:47** | **00:58** | **5%** | |
| 14 | WB Benning Road NE from East Capitol Street to Minnesota Ave NE | 03:33 | 04:16 | 00:43 | 20% | 01:37 |
| 15 | WB Benning Road NE from Minnesota Ave NE to 36th Street NE | 00:35 | 00:42 | 00:07 | 21% | 00:00 |
| 16 | WB Benning Road NE from 36th Street NE to Anacostia Ave NE | 01:06 | 00:48 | -00:18 | -27% | 00:02 |
| 17 | WB Benning Road NE from Anacostia Ave NE to 26th Street NE | 01:49 | 01:14 | -00:35 | -32% | 00:07 |
| ***Total*** | **WB Benning Road NE** | **07:03** | **07:00** | **-00:03** | **-1%** | |
| 1 | EB Benning Road NE from 26th Street NE to Anacostia Ave NE | 00:59 | 01:06 | 00:07 | 12% | 00:02 |
| 2 | EB Benning Road NE from Anacostia Ave NE to 36th Street NE | 00:55 | 00:44 | -00:11 | -20% | 00:02 |
| 3 | EB Benning Road NE from 36th Street NE to Minnesota Ave NE | 01:54 | 01:28 | -00:26 | -23% | 00:31 |
| 4 | EB Benning Road NE from Minnesota Ave NE to East Capitol Street | 05:26 | 05:41 | 00:15 | 4% | 02:41 |
| ***Total*** | **EB Benning Road NE** | **09:14** | **08:59** | **-00:15** | **-3%** | |

### 6.1.1.5 AM Calibration Summary




AM Peak Period Travel Time - Eastbound Benning Rd
Error bars represent ± Standard Error of field travel time.
EB Benning Road NE from 26th Street NE to Anacostia Ave NE
EB Benning Road NE from Anacostia Ave NE to 36th Street NE
EB Benning Road NE from 36th Street NE to Minnesota Ave NE
EB Benning Road NE from Minnesota Ave NE to East Capitol Street
00:00
02:00
04:00
06:00
08:00
Field
Vissim


WB Benning Road NE from East Capitol Street to Minnesota Ave NE
WB Benning Road NE from Minnesota Ave NE to 36th Street NE
WB Benning Road NE from 36th Street NE to Anacostia Ave NE
WB Benning Road NE from Anacostia Ave NE to 26th Street NE
Error bars represent ± Standard Error of field travel time.
00:00
02:00
04:00
06:00
Field
Vissim

## 6.1.1.6 Queue Length Calibration

### 6.1.1.6.1 AM Peak Period (7:00 AM - 9:00 AM)

| | Queue Criteria | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|
| **Approaches (n = 14)** | Modeled queues qualitatively reflect the impacts of observed queues (e.g., spillback from ramp intersections, turn bay, or downstream intersection) | 11 | 92% | 85% | Yes |

### 6.1.1.6.2 Freeway Ramps

*** MOE of Vissim Max Queue Length represents the average from 10 simulation runs.**

| Interchange | Location | Observed Max Queue (feet) | VISSIM Max Queue (feet) | Max Queue Difference (feet) | Max Queue Difference (%) | Field Conditions Represented (Yes/No) | Vissim Max Queue Standard Deviation (feet) | Field-Observed Queue Description | Queue Calibration Justification |
|---|---|---|---|---|---|---|---|---|---|
| Benning Road | Eastbound Benning Road NE to Southbound DC-295 | 250 | 0 | -250 | -100% | N | 0 | Slowdown from Google Maps typical traffic conditions estimated to extend 650 feet | The Vissim model displayed consistently reduced speeds on this ramp; however, the reduced speeds did not result in a queue being measured in Vissim. |
| | Eastbound Benning Road NE/ Southbound Kenilworth Avenue NE to Northbound DC-295 | - | 7 | - | - | Y | 8 | Slowdown from Google Maps typical traffic conditions estimated to extend 0 feet | |
| | Southbound Kenilworth Avenue NE to Northbound DC-295 | - | 18 | - | - | Y | 13 | Queue from Google Maps typical traffic conditions estimated to be 0 feet | |
| | Northbound DC-295 to Westbound Benning Road NE | - | 380 | - | - | Y | 129 | Queue from Google Maps typical traffic conditions estimated to be 200 feet | Traffic was observed to occupy two lanes' space approaching the stop sign after the weaving area, which results in shorter queue length than VISSIM output; however, such yield behavior is difficult to model and therefore was not coded. The resultant queue impact does not affect operations at other locations because average queue is much shorter. |
| | Northbound DC-295/Southbound Kenilworth Avenue NE to Westbound Benning Road NE | - | 0 | - | - | Y | 0 | Slowdown from Google Maps typical traffic conditions estimated to extend 800 feet | The westbound service road merges with Benning Road without needing to stop; Google data represents a slowdown due to traffic friction, not queuing. |

### 6.1.1.7 PM Calibration Summary

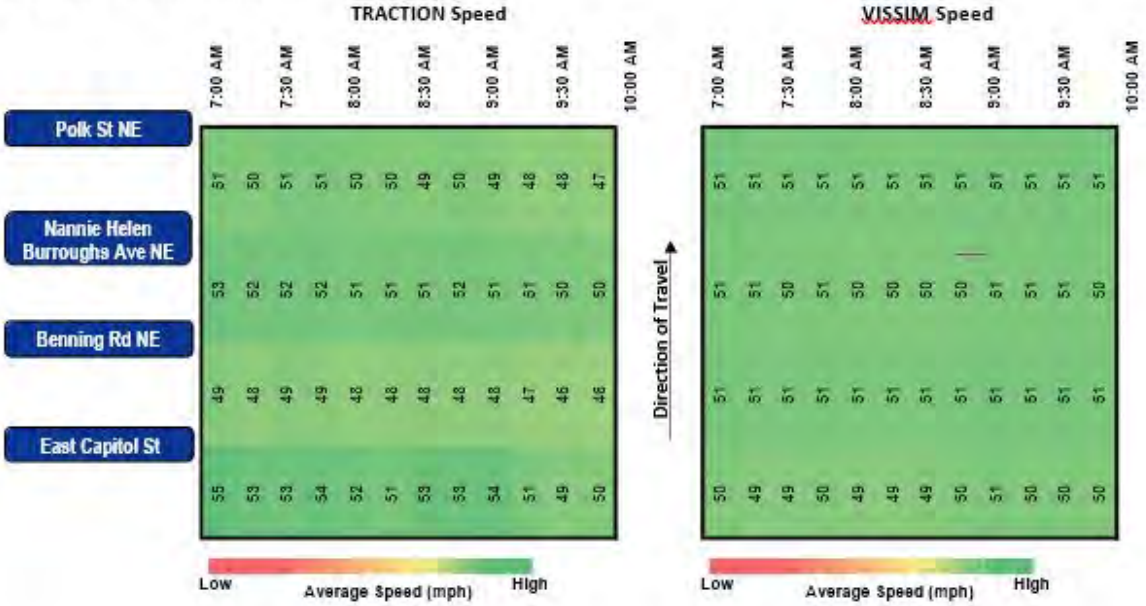
#### 6.1.1.7.1 Arterial Queue Counters

*** MOE of Vissim Max Queue Length represents the average from 10 simulation runs.**

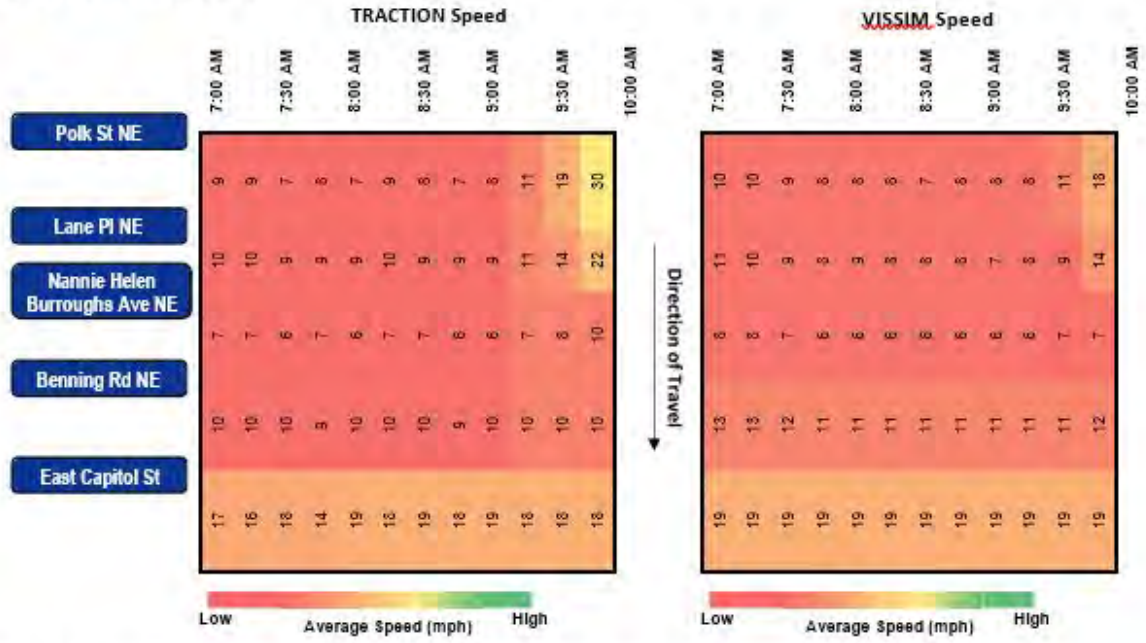
| Interchange | Location | Observed Max Queue (feet) | VISSIM Max Queue (feet) | Max Queue Difference (feet) | Max Queue Difference (%) | Field Conditions Represented (Yes/No) | Vissim Max Queue Standard Deviation (feet) | Field-Observed Queue Description | Queue Calibration Justification |
|---|---|---|---|---|---|---|---|---|---|
| Benning Road and East Capitol Street Intersection | Southbound Benning Road NE at East Capitol Street | 550 | 1,059 | 509 | 93% | Y | 429 | Queue spillback from East Capital Street intersection was observed to impact 44th and 45th Street intersections | The queue spillback impact was reasonably modeled |
| | Northbound Benning Road NE at East Capitol Street | 475+ | 726 | - | - | Y | 281 | Slowdown from Google Maps typical traffic conditions estimated to extend 1900 feet | The queue spillback impact was reasonably modeled; field measured queue data was limited to adjacent driveways (e.g., A Street SE, B Street SE) |
| | Westbound East Capitol Street at Benning Road NE | 750+ | 776 | - | - | Y | 171 | Slowdown from Google Maps typical traffic conditions estimated to extend 550 feet | The queue spillback impact was reasonably modeled |
| | Eastbound East Capitol Street at Benning Road NE | 200 | 279 | 79 | 40% | Y | 55 | Queue spillback from Benning Road intersection was observed to fill the short block between Texas Avenue and Benning Road all the time | The queue spillback impact was reasonably modeled; field measured queue data was limited to Texas Avenue |
| Benning Road and Oklahoma Avenue Intersection | Westbound Benning Road at Oklahoma Avenue | 300+ | 704 | - | - | Y | 235 | Queue spillback from the intersection extends out of the turn lane frequently and as far as Anacostia Avenue intersection; Slowdown from Google Maps typical traffic conditions estimated to extend 2600 feet | The queue spillback impact was reasonably modeled; field measured queue data was limited. |
| Benning Road and Minnesota Avenue | Eastbound Benning Road NE at Minnesota Avenue NE | 300+ | 554 | - | - | Y | 112 | Slowdown from Google Maps typical traffic conditions estimated to extend 725 feet | The queue spillback impact was reasonably modeled |
| | Westbound Benning Road NE at Minnesota Avenue NE | 300+ | 411 | - | - | Y | 47 | Queue spillback from Minnesota Avenue intersection was observed to extend east of 39th Street | The queue spillback impact was reasonably modeled; field measured queue data was limited to adjacent intersections |
| | Northbound Minnesota Avenue NE at Benning Road NE | 475 | 454 | -21 | -5% | Y | 66 | Slowdown from Google Maps typical traffic conditions estimated to extend 700 feet | The queue spillback impact was reasonably modeled |
| | Southbound Minnesota Avenue NE at Benning Road NE | 400 | 537 | 137 | 34% | Y | 101 | Slowdown from Google Maps typical traffic conditions estimated to extend 1000 feet | The queue spillback impact was reasonably modeled |

AM Calibration Summary

## Freeway Average Speed Comparison: DC-295 - Northbound




## Freeway Average Speed Comparison: DC-295 - Southbound




* MOE of Speed represents the average from 10 simulation runs.

* All speeds reported in MPH.

### 6.1.1.8 Volume Calibration (Freeways)

#### 6.1.1.8.1 PM Peak Period (4:30 PM - 5:30 PM)

| | | Subtotal | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|---|
| **Segments (n = 29)** | Within ± 100 vph for < 700 vph | 11 | 29 | 100% | 85% | Yes |
| | Within ± 15% for ≥ 700 vph to < 2,700 vph | 5 | | | | |
| | Within ± 400 vph for ≥ 2,700 vph | 13 | | | | |

*** MOEs of Throughput, Speed, and Density represent an average of 10 simulation runs.**

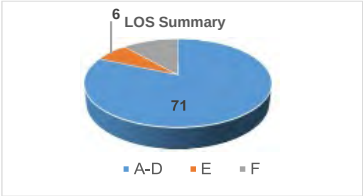
| Facility | Segment | Type | Balanced Count (vph) | VISSIM Throughput (vph) | Difference (vph) | Difference (%) | Average Speed (mph) | Average Density (vpmpl) |
|---|---|---|---|---|---|---|---|---|
| **NB DC-295** | Mainline south of EB E Capitol Street On-Ramp | Basic | 2,660 | 2,895 | 235 | 9% | 16 | 91.9 |
| | Between EB E Capitol Street On-Ramp and WB Benning Road NE Off-Ramp | Merge/Diverge | 3,585 | 3,836 | 251 | 7% | 14 | 93.5 |
| | Between WB Benning Road Off-Ramp and EB Benning Road/Kenilworth Avenue NE On-Ramp | Basic | 3,490 | 3,737 | 247 | 7% | 12 | 106.4 |
| | Between EB Benning Road NE/Kenilworth Avenue NE On-Ramp and Nannie Helen Burroughs Avenue NE Off-Ramp | Merge/Diverge | 4,375 | 4,572 | 197 | 4% | 19 | 75.2 |
| | Between Nannie Helen Burroughs Avenue NE Off-Ramp and Kenilworth Avenue NE On-Ramp | Basic | 3,560 | 3,773 | 213 | 6% | 12 | 102.0 |
| | Mainline north of Nannie Helen Burroughs Avenue | Merge/Basic | 3,865 | 4,057 | 192 | 5% | 13 | 86.1 |
| **SB DC-295** | Mainline North of Deane Avenue NE Off-Ramp | Merge/Diverge | 3,345 | 3,466 | 121 | 4% | 51 | 20.0 |
| | Between Deane Avenue NE Off-Ramp and Kenilworth Avenue NE Off-Ramp | Basic/Diverge | 3,005 | 3,122 | 117 | 4% | 51 | 19.5 |
| | Between Kenilworth Avenue NE Off-Ramp and Kenilworth Avenue NE On-Ramp | Basic | 2,775 | 2,887 | 112 | 4% | 52 | 18.5 |
| | Between Kenilworth Avenue NE On-Ramp and EB Benning Road NE On-Ramp | Merge/Basic | 3,025 | 3,110 | 85 | 3% | 50 | 20.0 |
| | Between EB Benning Road NE On-Ramp and Baker Street Off-Ramp | Weave | 3,300 | 3,368 | 68 | 2% | 36 | 34.4 |
| | Between Baker Street Off-Ramp and WB E Capitol Street Off-Ramp | Diverge | 3,245 | 3,330 | 85 | 3% | 21 | 70.5 |
| | Between WB E Capitol Street Off-Ramp and EB E Capitol Street On-Ramp | Basic | 2,925 | 3,008 | 83 | 3% | 20 | 79.4 |
| | Mainline south of EB E Capitol Street On-Ramp | Merge/Basic | 3,080 | 3,170 | 90 | 3% | 25 | 68.9 |

| Interchange | Ramp | | Balanced Count (vph) | VISSIM Throughput (vph) | Difference (vph) | Difference (%) | Average Speed (mph) | Average Density (vpmpl) |
|---|---|---|---|---|---|---|---|---|
| **Capitol Street** | EB E Capitol Street to SB DC-295 | Ramp | 155 | 156 | 1 | 0% | 29 | 5.5 |
| | EB E Capitol Street to NB DC-295 | Ramp | 925 | 920 | -5 | 0% | 27 | 35.0 |
| | SB DC-295 to WB E Capitol Street | Ramp | 320 | 330 | 10 | 3% | 40 | 8.5 |
| **Baker Street** | SB DC-295 to WB Baker Street | Ramp | 55 | 56 | 1 | 1% | 20 | 2.8 |
| **Benning Road** | EB Benning Road NE to SB DC-295 | Ramp | 275 | 266 | -9 | -3% | 36 | 7.6 |
| | EB Benning Road NE to NB DC-295 or WB Benning Road NE (U-turns) | Ramp | 840 | 798 | -42 | -5% | 15 | 64.3 |
| | NB DC-295 to WB Benning Road NE | Ramp | 95 | 97 | 2 | 2% | 30 | 3.6 |
| | NB DC-295/EB Benning Road NE (U-turns) to WB Benning Road NE | Ramp | 85 | 97 | 12 | 14% | 13 | 8.7 |
| | SB Kenilworth Avenue NE to NB DC-295 | Ramp | 35 | 32 | -3 | -8% | 18 | 2.2 |
| | EB Benning Road NE/SB Kenilworth Avenue NE to NB DC-295 | Ramp | 885 | 833 | -52 | -6% | 10 | 88.1 |
| **Kenilworth Avenue** | SB Kenilworth Avenue NE to SB DC-295 (South) | Ramp | 250 | 229 | -21 | -8% | 25 | 8.9 |
| | SB DC-295 to SB Kenilworth Avenue NE | Ramp | 230 | 234 | 4 | 2% | 39 | 6.0 |
| | NB Kenilworth Avenue NE to NB DC-295 | Ramp | 305 | 289 | -16 | -5% | 20 | 16.0 |
| **Nannie Helen Burroughs Avenue** | NB DC-295 to Nannie Helen Burroughs Avenue NE/Kenilworth Avenue NE | Ramp | 815 | 805 | -10 | -1% | 39 | 22.1 |
| | SB DC-295 to Deane Avenue NE/Kenilworth Terrace NE/Kenilworth Avenue NE | Ramp | 340 | 342 | 2 | 1% | 41 | 8.1 |

## 6.1.1.9 Volume Calibration (Intersections)

### 6.1.1.9.1 PM Peak Period (4:30 PM - 5:30 PM)

| | Volume Criteria | Subtotal | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|---|
| Approaches (n = 77) | Within ± 100 vph for < 700 vph | 64 | 85 | 98% | 85% | Yes |
| | Within ± 15% for ≥ 700 vph to < 2,700 vph | 21 | | | | |
| | Within ± 400 vph for ≥ 2,700 vph | 0 | | | | |




Approaches:

| LOS | Count |
|---|---|
| A-D | 71 |
| E | 6 |
| F | 10 |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 101 | Benning Road NE at Anacostia Avenue NE | NB | LT | 63 | 86 | 55 | 73 | -8 | -12 | -13% | -14% | 56.1 | 44.0 | 17 | 17 | 120 | 124 | E | D |
| | | | RT | 23 | | 19 | | -4 | | -17% | | 8.8 | | 13 | | 124 | | A | |
| | | SB | LT | 1 | 3 | 2 | 6 | 1 | 2 | 59% | 76% | 82.2 | 58.8 | 2 | 2 | 33 | 33 | F | E |
| | | | RT | 2 | | 4 | | 2 | | 85% | | 47.5 | | 2 | | 33 | | D | |
| | | EB | LT | 1 | 2,073 | 1 | 1,881 | 0 | -191 | -10% | -9% | 205.8 | 190.9 | 851 | 869 | 1,892 | 1,956 | F | F |
| | | | TH | 1,768 | | 1,610 | | -158 | | -9% | | 205.1 | | 851 | | 1,892 | | F | |
| | | | RT | 304 | | 271 | | -33 | | -11% | | 106.6 | | 869 | | 1,956 | | F | |
| | | WB | LT | 9 | 953 | 7 | 918 | -2 | -35 | -21% | -4% | 20.4 | 2.6 | 5 | 5 | 89 | 89 | C | A |
| | | | TH | 944 | | 910 | | -34 | | -4% | | 2.5 | | 5 | | 89 | | A | |
| | | Intersection | | 3,115 | | 2,878 | | -237 | | -8% | | 126.9 | | | | | | F | |
| 102 | Benning Road NE at 34th Street NE | NB | LT | 30 | 120 | 30 | 121 | -1 | 1 | -2% | 1% | 36.3 | 19.3 | 12 | 12 | 168 | 178 | D | B |
| | | | TH | 2 | | 0 | | -2 | | -100% | | - | | 12 | | 168 | | - | |
| | | | RT | 88 | | 91 | | 3 | | 4% | | 13.8 | | 12 | | 178 | | B | |
| | | SB | LT | 19 | 30 | 9 | 14 | -10 | -16 | -52% | -54% | 52.5 | 45.4 | 2 | 2 | 48 | 48 | D | D |
| | | | TH | 4 | | 1 | | -3 | | -73% | | 30.2 | | 2 | | 48 | | C | |
| | | | RT | 7 | | 4 | | -4 | | -50% | | 31.9 | | 2 | | 48 | | C | |
| | | EB | TH | 1,772 | 1,792 | 1,576 | 1,592 | -197 | -200 | -11% | -11% | 166.5 | 165.6 | 741 | 763 | 861 | 883 | F | F |
| | | | RT | 20 | | 17 | | -3 | | -17% | | 76.2 | | 763 | | 883 | | E | |
| | | WB | LT | 141 | 1,064 | 136 | 1,036 | -5 | -28 | -3% | -3% | 117.9 | 25.5 | 102 | 102 | 351 | 351 | F | C |
| | | | TH | 917 | | 885 | | -32 | | -4% | | 10.1 | | 40 | | 302 | | B | |
| | | | RT | 6 | | 4 | | -2 | | -34% | | 9.0 | | 40 | | 309 | | A | |
| | | | U | 16 | | 11 | | -6 | | -34% | | 129.3 | | 102 | | 351 | | F | |
| | | Intersection | | 3,006 | | 2,752 | | -254 | | -8% | | 106.5 | | | | | | F | |
| 103 | Benning Road NE Ramp to DC-295 at 36th Street NE | NB | RT | 241 | 241 | 240 | 240 | -1 | -1 | 0% | 0% | 6.8 | 6.8 | 3 | 3 | 129 | 129 | A | A |
| | | EB | TH | 874 | 876 | 758 | 760 | -116 | -116 | -13% | -13% | 58.7 | 58.6 | 824 | 824 | 998 | 998 | F | F |
| | | | RT | 2 | | 2 | | 0 | | 0% | | 34.5 | | 743 | | 851 | | D | |
| | | Intersection | | 1,117 | | 1,000 | | -117 | | -11% | | 46.2 | | | | | | E | |
| 104 | Benning Road NE at Minnesota Avenue NE | NB | LT | 132 | 411 | 137 | 469 | 5 | 58 | 3% | 14% | 147.3 | 138.8 | 349 | 349 | 581 | 581 | F | F |
| | | | TH | 257 | | 314 | | 57 | | 22% | | 135.5 | | 349 | | 581 | | F | |
| | | | RT | 22 | | 18 | | -4 | | -16% | | 131.9 | | 349 | | 581 | | F | |
| | | SB | LT | 52 | 429 | 52 | 416 | 0 | -13 | 0% | -3% | 52.9 | 38.8 | 12 | 88 | 187 | 424 | D | D |
| | | | TH | 306 | | 287 | | -19 | | -6% | | 42.6 | | 88 | | 424 | | D | |
| | | | RT | 71 | | 78 | | 7 | | 9% | | 15.8 | | 88 | | 424 | | B | |
| | | EB | LT | 203 | 1,020 | 185 | 875 | -19 | -144 | -9% | -14% | 600.8 | 386.9 | 1,611 | 1,611 | 1,676 | 1,676 | F | F |
| | | | TH | 561 | | 470 | | -91 | | -16% | | 346.8 | | 1,611 | | 1,676 | | F | |
| | | | RT | 256 | | 221 | | -35 | | -14% | | 293.7 | | 1,611 | | 1,676 | | F | |
| | | WB | LT | 14 | 357 | 11 | 349 | -3 | -8 | -22% | -2% | 130.7 | 82.0 | 103 | 103 | 297 | 297 | F | F |
| | | | TH | 256 | | 243 | | -13 | | -5% | | 82.7 | | 103 | | 297 | | F | |
| | | | RT | 87 | | 95 | | 8 | | 10% | | 74.6 | | 103 | | 297 | | E | |
| | | Intersection | | 2,216 | | 2,109 | | -107 | | -5% | | 212.7 | | | | | | F | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 105 | Benning Road NE at 39th Street NE/Driveway | NB | LT | 10 | 19 | 11 | 20 | 1 | 1 | 10% | 6% | 71.7 | 49.4 | 4 | 4 | 74 | 75 | E | D |
| | | | RT | 9 | | 9 | | 0 | | 1% | | 21.3 | | 2 | | 75 | | C | |
| | | SB | LT | 4 | 9 | 3 | 8 | -1 | -1 | -33% | -13% | 51.8 | 33.1 | 1 | 1 | 28 | 28 | D | C |
| | | | RT | 5 | | 0 | | -5 | | -100% | | - | | 0 | | 0 | | - | |
| | | EB | LT | 10 | 634 | 9 | 539 | -1 | -95 | -8% | -15% | 6.8 | 8.2 | 25 | 25 | 401 | 401 | A | A |
| | | | TH | 604 | | 516 | | -88 | | -15% | | 8.2 | | 25 | | 401 | | A | |
| | | | RT | 20 | | 14 | | -6 | | -31% | | 8.1 | | 25 | | 401 | | A | |
| | | WB | LT | 19 | 370 | 15 | 359 | -4 | -11 | -22% | -3% | 8.6 | 3.2 | 3 | 3 | 85 | 85 | A | A |
| | | | TH | 342 | | 336 | | -6 | | -2% | | 2.9 | | 3 | | 85 | | A | |
| | | | RT | 9 | | 9 | | -1 | | -10% | | 4.4 | | 3 | | 85 | | A | |
| | | Intersection | | 1,032 | | 926 | | -107 | | -10% | | 7.4 | | | | | | A | |
| 106 | Benning Road NE at 40th Street NE | NB | LT | 31 | 292 | 33 | 310 | 2 | 18 | 5% | 6% | 19.9 | 16.9 | 29 | 29 | 206 | 206 | C | C |
| | | | RT | 261 | | 277 | | 17 | | 6% | | 16.6 | | 29 | | 206 | | C | |
| | | EB | TH | 592 | 617 | 506 | 528 | -86 | -89 | -15% | -14% | 0.7 | 0.7 | 0 | 3 | 128 | 128 | A | A |
| | | | RT | 25 | | 22 | | -3 | | -12% | | 1.4 | | 3 | | 123 | | A | |
| | | WB | LT | 138 | 477 | 127 | 453 | -11 | -25 | -8% | -5% | 5.5 | 2.6 | 5 | 5 | 125 | 125 | A | A |
| | | | TH | 339 | | 326 | | -14 | | -4% | | 1.5 | | 5 | | 125 | | A | |
| | | Intersection | | 1,386 | | 1,290 | | -96 | | -7% | | 5.3 | | | | | | A | |
| 107 | Benning Road NE at 41st Street NE | NB | LT | 4 | 102 | 2 | 89 | -3 | -13 | -63% | -13% | 11.3 | 8.4 | 3 | 3 | 63 | 64 | B | A |
| | | | RT | 98 | | 87 | | -11 | | -11% | | 8.4 | | 3 | | 64 | | A | |
| | | EB | TH | 847 | 853 | 778 | 784 | -69 | -69 | -8% | -8% | 0.5 | 0.5 | 0 | 0 | 63 | 63 | A | A |
| | | | RT | 6 | | 6 | | 0 | | -3% | | 0.7 | | 0 | | 5 | | A | |
| | | WB | LT | 41 | 515 | 44 | 495 | 3 | -20 | 7% | -4% | 7.3 | 1.4 | 4 | 4 | 106 | 106 | A | A |
| | | | TH | 473 | | 451 | | -23 | | -5% | | 0.8 | | 3 | | 106 | | A | |
| | | Intersection | | 1,469 | | 1,367 | | -102 | | -7% | | 1.4 | | | | | | A | |
| 108 | Benning Road NE at 42nd Street NE | NB | LT | 32 | 123 | 38 | 148 | 6 | 25 | 18% | 21% | 31.3 | 29.6 | 21 | 22 | 157 | 171 | C | C |
| | | | TH | 79 | | 96 | | 17 | | 22% | | 30.5 | | 21 | | 157 | | C | |
| | | | RT | 12 | | 14 | | 2 | | 19% | | 19.3 | | 22 | | 171 | | B | |
| | | SB | LT | 23 | 221 | 20 | 198 | -3 | -23 | -15% | -10% | 30.5 | 21.5 | 20 | 22 | 179 | 196 | C | C |
| | | | TH | 70 | | 65 | | -5 | | -8% | | 29.4 | | 20 | | 179 | | C | |
| | | | RT | 128 | | 114 | | -14 | | -11% | | 15.5 | | 22 | | 196 | | B | |
| | | EB | LT | 316 | 945 | 297 | 864 | -19 | -81 | -6% | -9% | 20.9 | 14.9 | 51 | 62 | 311 | 336 | C | B |
| | | | TH | 574 | | 515 | | -58 | | -10% | | 12.1 | | 51 | | 311 | | B | |
| | | | RT | 55 | | 52 | | -4 | | -6% | | 8.7 | | 62 | | 336 | | A | |
| | | WB | LT | 4 | 393 | 3 | 378 | -1 | -16 | -26% | -4% | 13.1 | 8.0 | 11 | 11 | 149 | 168 | B | A |
| | | | TH | 355 | | 342 | | -12 | | -3% | | 8.2 | | 11 | | 149 | | A | |
| | | | RT | 35 | | 32 | | -3 | | -7% | | 5.7 | | 10 | | 168 | | A | |
| | | Intersection | | 1,682 | | 1,588 | | -94 | | -6% | | 15.5 | | | | | | B | |
| 208 | Benning Road NE at 26th Street NE | SB | LT | 264 | 328 | 259 | 321 | -4 | -6 | -2% | -2% | 67.5 | 65.6 | 143 | 153 | 552 | 567 | E | E |
| | | | RT | 64 | | 62 | | -2 | | -3% | | 57.6 | | 153 | | 567 | | E | |
| | | EB | LT | 40 | 1,781 | 41 | 1,872 | 1 | 91 | 3% | 5% | 19.1 | 16.6 | 1 | 68 | 100 | 439 | B | B |
| | | | TH | 1,741 | | 1,831 | | 90 | | 5% | | 16.6 | | 68 | | 439 | | B | |
| | | WB | TH | 811 | 968 | 782 | 930 | -29 | -39 | -4% | -4% | 4.3 | 4.4 | 13 | 13 | 178 | 184 | A | A |
| | | | RT | 158 | | 148 | | -10 | | -6% | | 4.9 | | 11 | | 184 | | A | |
| | | Intersection | | 3,077 | | 3,123 | | 46 | | 1% | | 18.0 | | | | | | B | |
| 209 | Benning Road NE at Oklahoma Avenue NE | NB | LT | 71 | 347 | 68 | 306 | -3 | -41 | -5% | -12% | 49.3 | 18.3 | 18 | 18 | 154 | 154 | D | B |
| | | | RT | 276 | | 238 | | -37 | | -14% | | 9.5 | | 7 | | 134 | | A | |
| | | EB | TH | 1,797 | 2,004 | 1,882 | 2,095 | 85 | 91 | 5% | 5% | 5.0 | 5.1 | 37 | 37 | 272 | 285 | A | A |
| | | | RT | 207 | | 214 | | 7 | | 3% | | 6.1 | | 35 | | 285 | | A | |
| | | WB | LT | 113 | 1,009 | 113 | 974 | 1 | -35 | 1% | -3% | 37.8 | 8.4 | 10 | 10 | 121 | 121 | D | A |
| | | | TH | 896 | | 861 | | -35 | | -4% | | 4.6 | | 4 | | 104 | | A | |
| | | Intersection | | 3,360 | | 3,376 | | 16 | | 0% | | 7.3 | | | | | | A | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 210 | Minnesota Avenue NE at Dix Street NE | NB | LT | 5 | | 6 | | 1 | | 28% | | 73.9 | | 193 | | 815 | | E | |
| | | | TH | 350 | 434 | 454 | 556 | 104 | 122 | 30% | 28% | 79.9 | 86.8 | 193 | 197 | 815 | 823 | E | F |
| | | | RT | 79 | | 95 | | 16 | | 21% | | 120.6 | | 197 | | 823 | | F | |
| | | SB | LT | 58 | | 53 | | -5 | | -9% | | 24.7 | | 20 | | 250 | | C | |
| | | | TH | 502 | 576 | 455 | 519 | -48 | -57 | -9% | -10% | 10.1 | 11.6 | 20 | 25 | 250 | 273 | B | B |
| | | | RT | 15 | | 11 | | -4 | | -29% | | 7.2 | | 25 | | 273 | | A | |
| | | EB | LT | 19 | | 17 | | -2 | | -11% | | 48.0 | | 11 | | 105 | | D | |
| | | | TH | 30 | 66 | 29 | 63 | -1 | -4 | -4% | -6% | 34.3 | 38.4 | 11 | 11 | 105 | 105 | C | D |
| | | | RT | 17 | | 17 | | 0 | | -2% | | 35.8 | | 11 | | 105 | | D | |
| | | WB | LT | 150 | | 161 | | 11 | | 7% | | 98.4 | | 141 | | 543 | | F | |
| | | | TH | 29 | 220 | 28 | 231 | -1 | 11 | -4% | 5% | 99.8 | 97.8 | 141 | 144 | 543 | 549 | F | F |
| | | | RT | 41 | | 42 | | 1 | | 2% | | 94.6 | | 144 | | 549 | | F | |
| | | Intersection | | 1,297 | | 1,368 | | 71 | | 6% | | 57.9 | | | | | | E | |
| 211 | Minnesota Avenue NE at Bus Exit South | NB | TH | 546 | 546 | 593 | 593 | 47 | 47 | 9% | 9% | 21.9 | 21.9 | 71 | 71 | 609 | 609 | C | C |
| | | SB | TH | 385 | 385 | 383 | 383 | -2 | -2 | -1% | -1% | 3.0 | 3.0 | 5 | 5 | 78 | 78 | A | A |
| | | EB | LT | 20 | 63 | 19 | 51 | -1 | -12 | -7% | -19% | 42.4 | 31.7 | 19 | 19 | 152 | 152 | D | C |
| | | | RT | 43 | | 33 | | -10 | | -24% | | 25.6 | | 15 | | 141 | | C | |
| | | Intersection | | 994 | | 1,027 | | 33 | | 3% | | 15.3 | | | | | | B | |
| 212 | Minnesota Avenue NE at Grant Street NE and Bus Entrance North | NB | LT | 40 | | 16 | | -24 | | -60% | | 20.0 | | 3 | | 78 | | C | |
| | | | TH | 470 | 565 | 517 | 582 | 47 | 17 | 10% | 3% | 17.0 | 17.0 | 59 | 59 | 375 | 375 | B | B |
| | | | RT | 55 | | 49 | | -7 | | -12% | | 16.6 | | 59 | | 375 | | B | |
| | | SB | LT | 11 | | 10 | | -1 | | -6% | | 25.4 | | 15 | | 135 | | C | |
| | | | TH | 345 | 370 | 361 | 372 | 17 | 2 | 5% | 1% | 11.9 | 12.3 | 15 | 15 | 135 | 162 | B | B |
| | | | RT | 14 | | 0 | | -14 | | -100% | | - | | 15 | | 162 | | - | |
| | | WB | LT | 39 | 68 | 34 | 60 | -5 | -8 | -12% | -12% | 16.5 | 11.7 | 3 | 3 | 64 | 97 | B | B |
| | | | RT | 29 | | 26 | | -3 | | -11% | | 5.2 | | 2 | | 97 | | A | |
| | | Intersection | | 1,003 | | 1,014 | | 11 | | 1% | | 15.0 | | | | | | B | |
| 213 | Benning Road NE at Blaine Street NE | NB | LT | 3 | 54 | 1 | 53 | -2 | -1 | -70% | -2% | 11.8 | 9.2 | 2 | 2 | 54 | 60 | B | A |
| | | | RT | 51 | | 52 | | 1 | | 2% | | 9.1 | | 2 | | 60 | | A | |
| | | EB | TH | 603 | 608 | 543 | 549 | -60 | -59 | -10% | -10% | 1.6 | 1.6 | 0 | 0 | 3 | 34 | A | A |
| | | | RT | 5 | | 6 | | 1 | | 14% | | 1.9 | | 0 | | 34 | | A | |
| | | WB | LT | 44 | 434 | 40 | 416 | -4 | -18 | -8% | -4% | 6.3 | 0.9 | 1 | 1 | 84 | 84 | A | A |
| | | | TH | 390 | | 376 | | -15 | | -4% | | 0.4 | | 0 | | 53 | | A | |
| | | Intersection | | 1,097 | | 1,018 | | -79 | | -7% | | 1.7 | | | | | | A | |
| 214 | Benning Road NE at 44th Street NE | SB | LT | 186 | 270 | 176 | 254 | -10 | -16 | -5% | -6% | 36.5 | 33.1 | 50 | 50 | 275 | 282 | D | C |
| | | | RT | 84 | | 78 | | -6 | | -7% | | 25.5 | | 50 | | 282 | | C | |
| | | EB | LT | 165 | 656 | 149 | 595 | -16 | -61 | -10% | -9% | 26.2 | 16.5 | 41 | 41 | 319 | 319 | C | B |
| | | | TH | 491 | | 445 | | -45 | | -9% | | 13.2 | | 41 | | 319 | | B | |
| | | WB | TH | 351 | 543 | 337 | 524 | -14 | -19 | -4% | -4% | 11.0 | 11.2 | 24 | 24 | 249 | 286 | B | B |
| | | | RT | 192 | | 187 | | -5 | | -3% | | 11.5 | | 19 | | 286 | | B | |
| | | Intersection | | 1,468 | | 1,373 | | -96 | | -7% | | 17.5 | | | | | | B | |
| 215 | Benning Road NE at 45th Street NE | SB | LT | 14 | 28 | 8 | 15 | -5 | -12 | -40% | -45% | 19.2 | 14.0 | 1 | 1 | 38 | 42 | B | B |
| | | | RT | 14 | | 7 | | -7 | | -49% | | 7.8 | | 0 | | 42 | | A | |
| | | EB | LT | 28 | 676 | 26 | 624 | -2 | -52 | -9% | -8% | 11.4 | 8.7 | 16 | 16 | 246 | 246 | B | A |
| | | | TH | 648 | | 599 | | -50 | | -8% | | 8.6 | | 16 | | 246 | | A | |
| | | WB | TH | 527 | 578 | 518 | 571 | -9 | -8 | -2% | -1% | 1.0 | 1.2 | 1 | 6 | 138 | 224 | A | A |
| | | | RT | 51 | | 53 | | 2 | | 3% | | 3.0 | | 6 | | 224 | | A | |
| | | Intersection | | 1,283 | | 1,210 | | -72 | | -6% | | 5.2 | | | | | | A | |
| 216 | Benning Road NE at Central Avenue NE | WB | TH | 481 | 504 | 471 | 491 | -10 | -13 | -2% | -3% | 0.4 | 0.4 | 0 | 0 | 63 | 79 | A | A |
| | | | RT | 23 | | 20 | | -2 | | -11% | | 0.0 | | 0 | | 79 | | A | |
| | | EB | TH | 671 | 671 | 607 | 607 | -64 | -64 | -10% | -10% | 49.9 | 49.9 | 100 | 100 | 322 | 322 | E | E |
| | | SB | RT | 100 | 100 | 100 | 100 | -1 | -1 | -1% | -1% | 3.9 | 3.9 | 3 | 3 | 67 | 67 | A | A |
| | | Intersection | | 1,275 | | 1,198 | | -78 | | -6% | | 25.8 | | | | | | D | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 217 | Benning Road NE at East Capitol Street SE | NB | LT | 172 | 507 | 161 | 505 | -11 | -2 | -6% | 0% | 65.0 | 63.7 | 80 | 86 | 300 | 313 | E | E |
| | | | TH | 291 | | 302 | | 10 | | 4% | | 64.8 | | 80 | | 300 | | E | |
| | | | RT | 44 | | 42 | | -2 | | -4% | | 51.1 | | 86 | | 313 | | D | |
| | | SB | LT | 192 | 672 | 169 | 607 | -24 | -65 | -12% | -10% | 1.3 | 0.8 | 0 | 85 | 0 | 166 | A | A |
| | | | TH | 380 | | 351 | | -29 | | -8% | | 0.6 | | 0 | | 12 | | A | |
| | | | RT | 100 | | 87 | | -13 | | -13% | | 0.8 | | 85 | | 166 | | A | |
| | | EB | LT | 126 | 2,002 | 109 | 2,042 | -17 | 40 | -13% | 2% | 47.8 | 4.7 | 34 | 36 | 203 | 220 | D | A |
| | | | TH | 1,653 | | 1,687 | | 34 | | 2% | | 2.2 | | 34 | | 203 | | A | |
| | | | RT | 223 | | 246 | | 23 | | 10% | | 3.2 | | 36 | | 220 | | A | |
| | | WB | TH | 648 | 735 | 644 | 724 | -5 | -11 | -1% | -2% | 39.8 | 38.5 | 68 | 81 | 285 | 315 | D | D |
| | | | RT | 87 | | 80 | | -7 | | -8% | | 28.5 | | 81 | | 315 | | C | |
| | | Intersection | | 3,916 | | 3,878 | | -39 | | -1% | | 18.1 | | | | | | B | |
| 218 | East Capitol Street SE at Texas Avenue Se | EB | RT | 218 | 218 | 218 | 218 | 0 | 0 | 0% | 0% | 70.5 | 70.5 | 70 | 70 | 320 | 320 | E | E |
| | | NB | TH | 1,779 | 1,802 | 1,812 | 1,833 | 33 | 32 | 2% | 2% | 47.2 | 47.3 | 234 | 243 | 728 | 740 | D | D |
| | | | RT | 23 | | 21 | | -2 | | -7% | | 51.4 | | 243 | | 740 | | D | |
| | | SB | U | 5 | 920 | 18 | 906 | 13 | -14 | 254% | -2% | 32.2 | 7.4 | 35 | 35 | 224 | 224 | C | A |
| | | | LT | 213 | | 205 | | -8 | | -4% | | 28.4 | | 35 | | 224 | | C | |
| | | | TH | 702 | | 683 | | -19 | | -3% | | 0.4 | | 4 | | 119 | | A | |
| | | Intersection | | 2,940 | | 2,957 | | 17 | | 1% | | 36.8 | | | | | | D | |
| 310 | Deane Avenue NE at Lee St NE | SB | LT | 73 | 74 | 68 | 68 | -5 | -6 | -7% | -8% | 1.5 | 1.5 | 0 | 0 | 21 | 21 | A | A |
| | | | RT | 1 | | 0 | | -1 | | -100% | | - | | 0 | | 21 | | - | |
| | | EB | LT | 0 | 2 | 0 | 0 | 0 | -2 | - | -100% | - | - | - | 0 | - | 0 | - | - |
| | | | TH | 2 | | 0 | | -2 | | -100% | | - | | 0 | | 0 | | - | |
| | | WB | TH | 1 | 107 | 5 | 105 | 4 | -2 | 386% | -2% | 0.9 | 1.0 | 0 | 0 | 11 | 11 | A | A |
| | | | RT | 106 | | 101 | | -6 | | -5% | | 1.0 | | 0 | | 11 | | A | |
| | | Intersection | | 183 | | 173 | | -10 | | -5% | | 1.2 | | | | | | A | |
| 311 | Deane Avenue NE at Kenilworth Terrace NE | NB | LT | 13 | 275 | 10 | 239 | -3 | -36 | -23% | -13% | 49.1 | 18.6 | 17 | 17 | 214 | 214 | D | B |
| | | | RT | 262 | | 229 | | -33 | | -13% | | 17.3 | | 13 | | 194 | | B | |
| | | SB | LT | 208 | 281 | 171 | 243 | -38 | -38 | -18% | -13% | 47.3 | 45.4 | 41 | 51 | 216 | 244 | D | D |
| | | | TH | 70 | | 73 | | 3 | | 4% | | 41.0 | | 51 | | 244 | | D | |
| | | | RT | 3 | | 0 | | -3 | | -100% | | - | | 0 | | 0 | | - | |
| | | EB | TH | 68 | 78 | 63 | 72 | -5 | -6 | -7% | -8% | 46.2 | 44.0 | 14 | 15 | 90 | 120 | D | D |
| | | | RT | 10 | | 9 | | -1 | | -11% | | 28.3 | | 15 | | 120 | | C | |
| | | WB | LT | 125 | 219 | 121 | 215 | -4 | -4 | -4% | -2% | 1.9 | 1.2 | 1 | 1 | 21 | 21 | A | A |
| | | | TH | 94 | | 94 | | 0 | | 0% | | 0.4 | | 1 | | 21 | | A | |
| | | Intersection | | 853 | | 769 | | -84 | | -10% | | 24.6 | | | | | | C | |
| 312 | Deane Avenue NE at Kenilworth Avenue NE | SB | LT | 265 | 284 | 270 | 293 | 5 | 9 | 2% | 3% | 53.3 | 53.3 | 52 | 52 | 217 | 217 | D | D |
| | | | TH | 19 | | 23 | | 4 | | 19% | | 53.2 | | 52 | | 217 | | D | |
| | | EB | TH | 524 | 538 | 452 | 463 | -72 | -76 | -14% | -14% | 9.9 | 9.8 | 32 | 36 | 169 | 176 | A | A |
| | | | RT | 14 | | 10 | | -4 | | -28% | | 3.2 | | 36 | | 176 | | A | |
| | | WB | LT | 282 | 493 | 275 | 490 | -7 | -3 | -2% | -1% | 15.1 | 15.4 | 20 | 20 | 226 | 226 | B | B |
| | | | TH | 211 | | 215 | | 4 | | 2% | | 15.9 | | 20 | | 226 | | B | |
| | | Intersection | | 1,315 | | 1,246 | | -70 | | -5% | | 22.2 | | | | | | C | |
| 313 | Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC-295 U-turns | NB | U | 147 | 337 | 137 | 327 | -11 | -10 | -7% | -3% | 121.9 | 134.3 | 1,038 | 1,038 | 2,816 | 2,859 | F | F |
| | | | LT | 36 | | 32 | | -4 | | -10% | | 140.9 | | 1,024 | | 2,859 | | F | |
| | | | TH | 153 | | 158 | | 5 | | 3% | | 143.8 | | 0 | | 22 | | F | |
| | | | RT | 478 | 478 | 457 | 457 | -21 | -21 | -4% | -4% | 161.1 | 161.1 | 1,026 | 1,026 | 2,859 | 2,859 | F | F |
| | | EB | LT | 131 | 791 | 121 | 733 | -10 | -58 | -8% | -7% | 10.4 | 16.6 | 15 | 15 | 233 | 233 | B | B |
| | | | TH | 660 | | 612 | | -48 | | -7% | | 17.9 | | 15 | | 233 | | B | |
| | | WB | TH | 459 | 1,043 | 458 | 1,011 | -1 | -32 | 0% | -3% | 29.4 | 29.3 | 127 | 149 | 347 | 376 | C | C |
| | | | RT | 584 | | 553 | | -31 | | -5% | | 29.2 | | 149 | | 376 | | C | |
| | | Intersection | | 2,649 | | 2,528 | | -121 | | -5% | | 63.0 | | | | | | E | |

| # | Intersection | Approach | Movement | Balanced Count (vph) | | VISSIM Throughput (vph) | | Difference (vph) | | Difference (%) | | Average Delay (sec/veh) | | Average Queue Length (feet) | | Max Queue Length (feet) | | LOS* | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 314 | Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | NB | LT | 383 | 570 | 406 | 619 | 24 | 49 | 6% | 9% | 43.7 | 35.8 | 121 | 121 | 575 | 575 | D | D |
| | | | TH | 135 | | 150 | | 15 | | 11% | | 27.3 | | 18 | | 164 | | C | |
| | | | RT | 52 | | 63 | | 11 | | 21% | | 5.5 | | 16 | | 168 | | A | |
| | | SB | TH | 59 | 211 | 56 | 193 | -3 | -18 | -5% | -9% | 50.2 | 34.8 | 24 | 31 | 153 | 174 | D | C |
| | | | RT | 152 | | 136 | | -16 | | -10% | | 28.5 | | 31 | | 174 | | C | |
| | | EB | LT | 137 | 1,137 | 130 | 1,070 | -7 | -67 | -5% | -6% | 47.0 | 30.9 | 139 | 146 | 344 | 354 | D | C |
| | | | TH | 695 | | 659 | | -36 | | -5% | | 30.3 | | 139 | | 344 | | C | |
| | | | RT | 305 | | 282 | | -24 | | -8% | | 24.8 | | 146 | | 354 | | C | |
| | | WB | LT | 41 | 526 | 50 | 535 | 9 | 8 | 22% | 2% | 75.6 | 61.2 | 25 | 113 | 162 | 439 | E | E |
| | | | TH | 507 | | 466 | | -42 | | -8% | | 59.8 | | 112 | | 437 | | E | |
| | | | RT | 19 | | 19 | | 0 | | -2% | | 59.0 | | 113 | | 439 | | E | |
| | | Intersection | | 2,444 | | 2,416 | | -28 | | -1% | | 39.2 | | | | | | D | |
| 315 | Nannie Helen Burroughs Avenue NE at 44th Street NE and Hunt Place NE | NB | NBU-onto Hunt | 0 | 320 | 0 | 257 | 0 | -64 | - | -20% | - | 33.3 | - | 35 | - | 257 | - | C |
| | | | LT | 142 | | 113 | | -29 | | -20% | | 40.0 | | 35 | | 254 | | D | |
| | | | TH | 84 | | 69 | | -15 | | -18% | | 36.4 | | 35 | | 254 | | D | |
| | | | RT | 94 | | 74 | | -20 | | -21% | | 20.2 | | 33 | | 257 | | C | |
| | | SB | LT | 13 | 142 | 14 | 135 | 1 | -8 | 5% | -5% | 37.2 | 32.6 | 24 | 25 | 180 | 196 | D | C |
| | | | TH | 69 | | 65 | | -5 | | -7% | | 34.8 | | 24 | | 180 | | C | |
| | | | SBR - NHB EB | 32 | | 29 | | -3 | | -8% | | 24.2 | | 25 | | 196 | | C | |
| | | | SBR - Hunt | 28 | | 27 | | -1 | | -3% | | 34.2 | | 24 | | 180 | | C | |
| | | EB | LT | 31 | 752 | 28 | 721 | -3 | -31 | -8% | -4% | 12.5 | 13.3 | 39 | 39 | 415 | 415 | B | B |
| | | | TH | 446 | | 430 | | -16 | | -4% | | 10.7 | | 39 | | 415 | | B | |
| | | | EBR - Hunt Street | 2 | | 0 | | -2 | | -100% | | - | | 39 | | 415 | | - | |
| | | | EBR - 44th Street | 273 | | 263 | | -10 | | -4% | | 17.7 | | 39 | | 415 | | B | |
| | | Hunt Street | NBL- NHB EB | 87 | 196 | 93 | 218 | 6 | 22 | 7% | 11% | 43.6 | 43.6 | 55 | 55 | 276 | 276 | D | D |
| | | | NBT - 44th SB | 51 | | 56 | | 5 | | 9% | | 44.4 | | 55 | | 276 | | D | |
| | | | NBR - NHB WB | 58 | | 68 | | 10 | | 17% | | 42.8 | | 55 | | 276 | | D | |
| | | WB | WBL - Hunt Street | 38 | 365 | 38 | 345 | 0 | -20 | 0% | -6% | 72.1 | 36.2 | 48 | 56 | 263 | 278 | E | D |
| | | | WBL - 44th Street | 4 | | 4 | | 0 | | -10% | | 72.6 | | 48 | | 263 | | E | |
| | | | TH | 307 | | 287 | | -20 | | -7% | | 32.1 | | 48 | | 263 | | C | |
| | | | RT | 16 | | 16 | | 0 | | 2% | | 18.2 | | 56 | | 278 | | B | |
| | | Intersection | | 1,775 | | 1,674 | | -101 | | -6% | | 26.6 | | | | | | C | |
| 316 | Kenilworth Avenue NE at Foote Street NE | SB | TH | 495 | 566 | 464 | 527 | -32 | -39 | -6% | -7% | 2.2 | 2.2 | 0 | 0 | 0 | 5 | A | A |
| | | | RT | 71 | | 64 | | -7 | | -10% | | 2.8 | | 0 | | 5 | | A | |
| | | EB | RT | 76 | 76 | 52 | 52 | -24 | -24 | -31% | -31% | 5.6 | 5.6 | 2 | 2 | 57 | 57 | A | A |
| | | Intersection | | 642 | | 579 | | -63 | | -10% | | 2.5 | | | | | | A | |

**Simulated level of service is approximated based on delay but is not equivalent to that produced using Highway Capacity Manual methodology.*
**The intersections are numbered based on their inclusion in both the Streetcar and IMR projects (100s), the Streetcar project (200s), and the IMR project (300s*

### 6.1.1.10 Travel Time Calibration

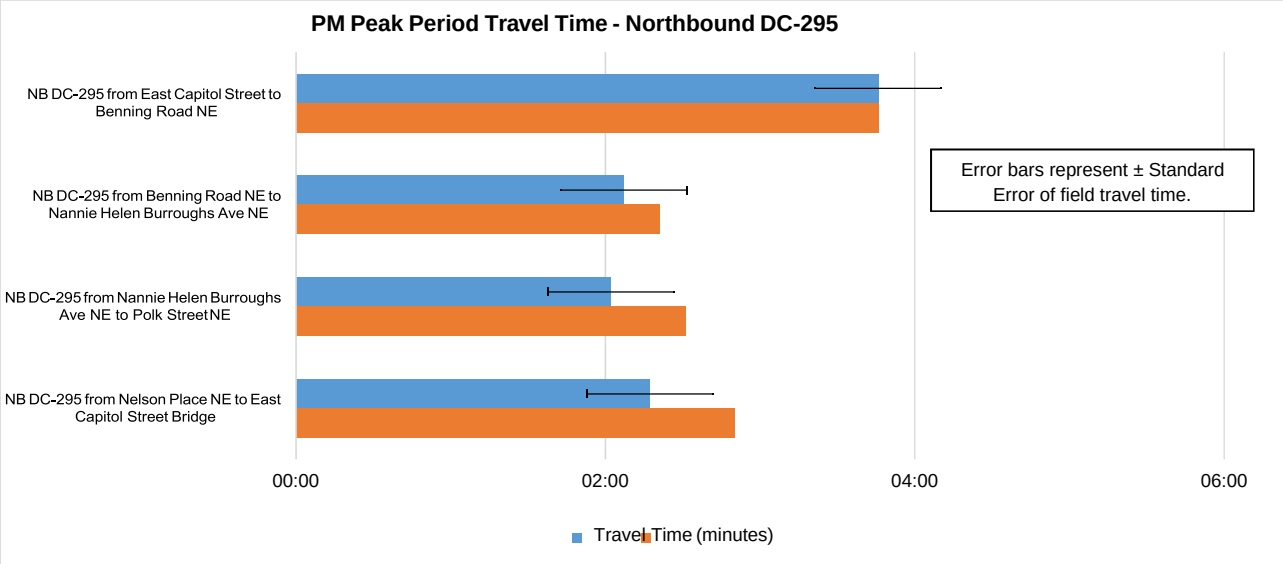
#### 6.1.1.10.1 PM Peak Period (4:30 PM - 6:30 PM)

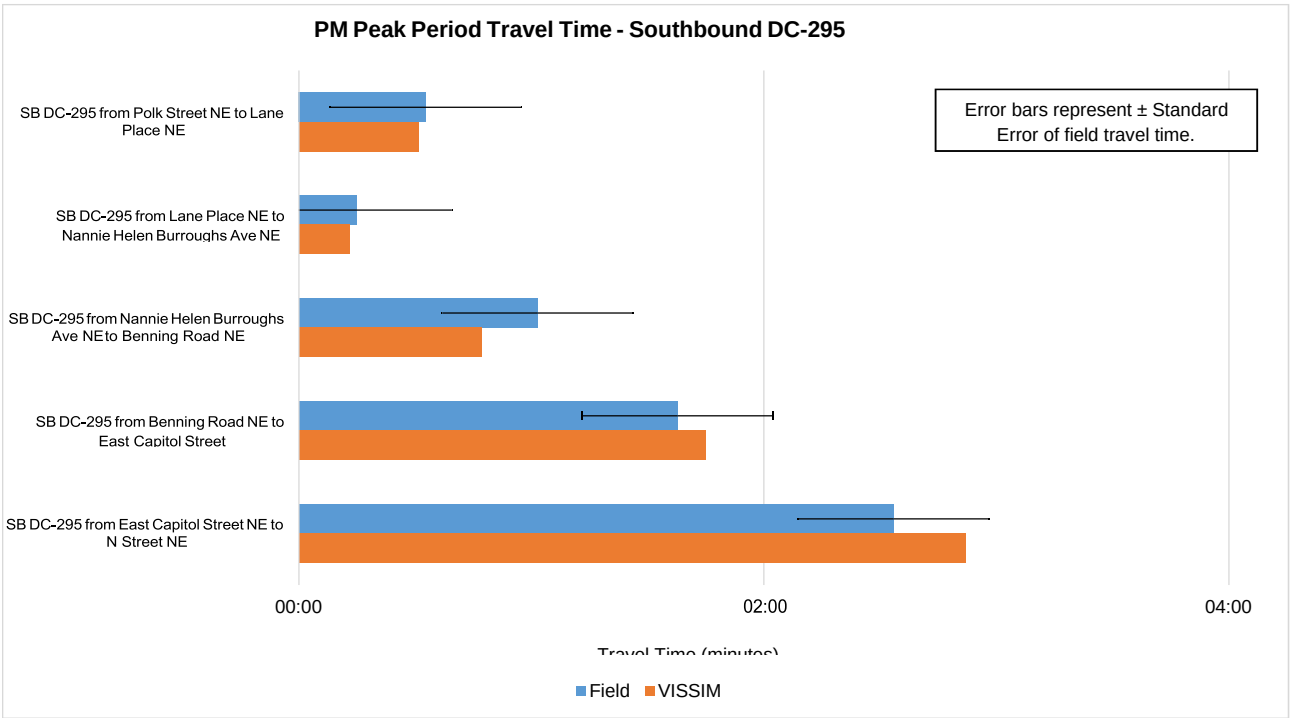
| | Travel Time Criteria | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|
| **NB 295 (n = 1)** | Within ± 15% for average travel time on freeways | 1 | 100% | 85% | Yes |
| **SB 295 (n = 1)** | Within ± 15% for average travel time on freeways | 1 | 100% | 85% | Yes |
| **EB Benning (n = 1)** | Within ± 15% for average travel time on arterials | 1 | 100% | 85% | Yes |
| **WB Benning (n = 1)** | Within ± 15% for average travel time on arterials | 1 | 100% | 85% | Yes |
| **Total (n = 4)** | Within ± 15% for average travel time | 4 | 100% | 85% | Yes |

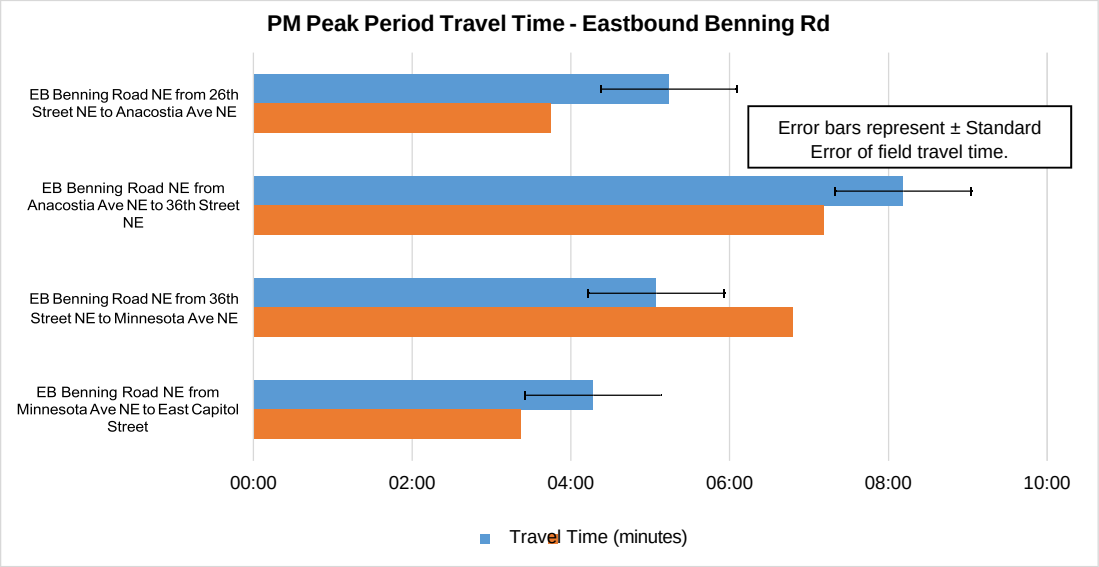
*** MOE of Vissim Travel Time represents the average from 10 simulation runs.**

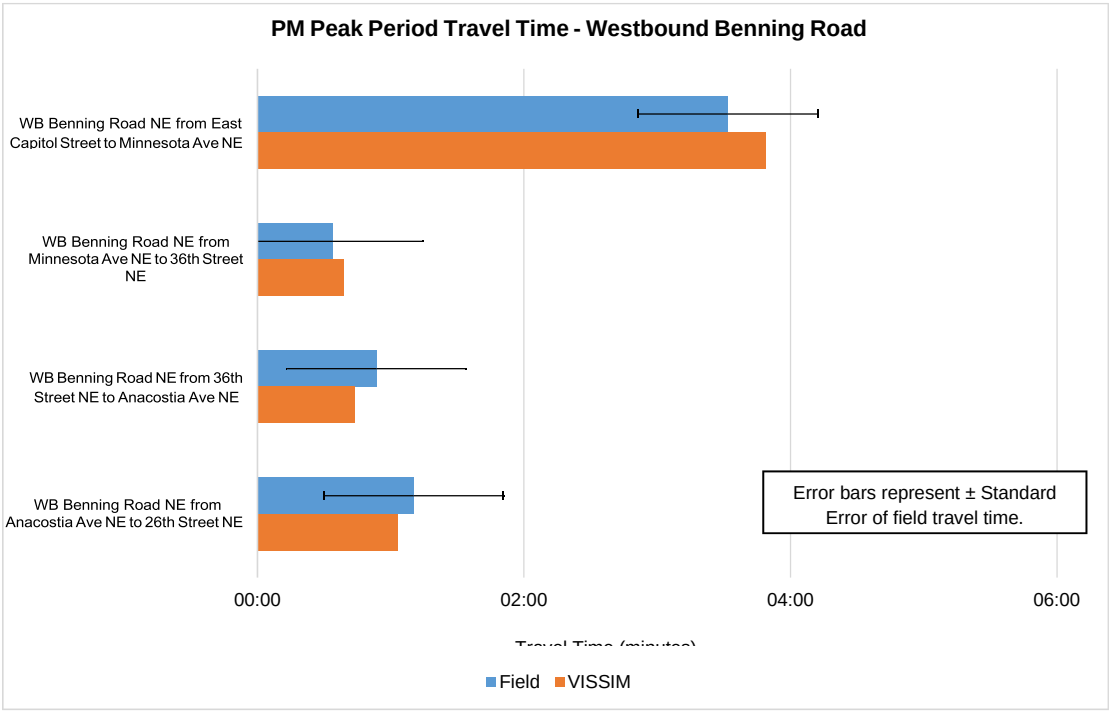
| Segment ID | Route | Peak Period Travel Time | | | | |
|---|---|---|---|---|---|---|
| | | Field (MM:SS) | VISSIM (MM:SS) | Difference (MM:SS) | Difference (%) | VISSIM STDEV (MM:SS) |
| 18 | NB DC-295 from East Capitol Street to Benning Road NE | 03:46 | 03:46 | 00:00 | 0% | 00:51 |
| 5 | NB DC-295 from Benning Road NE to Nannie Helen Burroughs Ave NE | 02:07 | 02:21 | 00:14 | 11% | 00:14 |
| 6 | NB DC-295 from Nannie Helen Burroughs Ave NE to Polk Street NE | 02:02 | 02:31 | 00:29 | 24% | 00:09 |
| 7 | NB DC-295 from Nelson Place NE to East Capitol Street Bridge | 02:17 | 02:50 | 00:33 | 24% | 00:08 |
| ***Total*** | **NB DC-295** | **10:13** | **11:28** | **01:15** | **12%** | |
| 8 | SB DC-295 from Polk Street NE to Lane Place NE | 00:33 | 00:31 | -00:02 | -5% | 00:00 |
| 9 | SB DC-295 from Lane Place NE to Nannie Helen Burroughs Ave NE | 00:15 | 00:13 | -00:02 | -13% | 00:00 |
| 10 | SB DC-295 from Nannie Helen Burroughs Ave NE to Benning Road NE | 01:02 | 00:47 | -00:15 | -24% | 00:07 |
| 11 | SB DC-295 from Benning Road NE to East Capitol Street | 01:38 | 01:45 | 00:07 | 7% | 00:38 |
| 12 | SB DC-295 from East Capitol Street NE to N Street NE | 02:33 | 02:52 | 00:19 | 12% | 00:14 |
| ***Total*** | **SB DC-295** | **06:01** | **06:08** | **00:07** | **2%** | |
| 14 | WB Benning Road NE from East Capitol Street to Minnesota Ave NE | 03:32 | 03:49 | 00:17 | 8% | 00:21 |
| 15 | WB Benning Road NE from Minnesota Ave NE to 36th Street NE | 00:34 | 00:39 | 00:05 | 15% | 00:01 |
| 16 | WB Benning Road NE from 36th Street NE to Anacostia Ave NE | 00:53 | 00:44 | -00:10 | -18% | 00:01 |
| 17 | WB Benning Road NE from Anacostia Ave NE to 26th Street NE | 01:10 | 01:03 | -00:07 | -10% | 00:01 |
| ***Total*** | **WB Benning Road NE** | **06:09** | **06:15** | **00:05** | **1%** | |
| 1 | EB Benning Road NE from 26th Street NE to Anacostia Ave NE | 05:14 | 03:45 | -01:29 | -28% | 00:42 |
| 2 | EB Benning Road NE from Anacostia Ave NE to 36th Street NE | 08:11 | 07:11 | -01:00 | -12% | 03:15 |
| 3 | EB Benning Road NE from 36th Street NE to Minnesota Ave NE | 05:05 | 06:48 | 01:43 | 34% | 00:59 |
| 4 | EB Benning Road NE from Minnesota Ave NE to East Capitol Street | 04:17 | 03:22 | -00:55 | -21% | 00:31 |
| ***Total*** | **EB Benning Road NE** | **22:46** | **21:06** | **-01:40** | **-7%** | |

### 6.1.1.11 PM Calibration Summary




PM Peak Period Travel Time - Eastbound Benning Rd
EB Benning Road NE from 26th Street NE to Anacostia Ave NE
EB Benning Road NE from Anacostia Ave NE to 36th Street NE
EB Benning Road NE from 36th Street NE to Minnesota Ave NE
EB Benning Road NE from Minnesota Ave NE to East Capitol Street
Error bars represent ± Standard Error of field travel time.
00:00
02:00
04:00
06:00
08:00
10:00
Travel Time (minutes)


PM Peak Period Travel Time - Westbound Benning Road
WB Benning Road NE from East Capitol Street to Minnesota Ave NE
WB Benning Road NE from Minnesota Ave NE to 36th Street NE
WB Benning Road NE from 36th Street NE to Anacostia Ave NE
WB Benning Road NE from Anacostia Ave NE to 26th Street NE
Error bars represent ± Standard Error of field travel time.
00:00
02:00
04:00
06:00
Field
VISSIM

### 6.1.1.12 Queue Length Calibration

#### 6.1.1.12.1 PM Peak Period (4:30 PM - 5:30 PM)

| | Queue Criteria | Total | Percent | Target | Target Met |
|---|---|---|---|---|---|
| **Approaches (n = 14)** | Modeled queues qualitatively reflect the impacts of observed queues (e.g., spillback from ramp intersections, turn bay, or downstream intersection) | 13 | 93% | 85% | Yes |

#### 6.1.1.12.2 Freeway Ramps

*** MOE of Vissim Max Queue Length represents the average from 10 simulation runs.**

| Interchange | Location | Observed Max Queue (feet) | VISSIM Max Queue (feet) | Max Queue Difference (feet) | Max Queue Difference (%) | Field Conditions Represented (Yes/No) | Vissim Max Queue Standard Deviation (feet) | Field-Observed Queue Description | Queue Calibration Justification |
|---|---|---|---|---|---|---|---|---|---|
| Benning Road NE | Eastbound Benning Road NE to Southbound DC-295 | 75 | 291 | 216 | 288% | Y | 46 | | The queue spillback impact was reasonably modeled. |
| | Eastbound Benning Road NE/Southbound Kenilworth Avenue NE to Northbound DC-295 | - | 4,603 | - | - | Y | 1142 | Slowdown from Google Maps typical traffic conditions estimated to spill back to Benning Road (> 1500 feet) | Vissim queues extend back to Benning Road, as estimated by Google Maps typical traffic conditions; queue length output is likely overestimated due to queue spillback on eastbound Benning Road NE from Minnesota Avenue NE. |
| | Southbound Kenilworth Avenue NE to Northbound DC-295 | - | 49 | - | - | Y | 15 | Slowdown from Google Mapstypical traffic conditions estimated to extend 100 feet | The queue spillback impact was reasonably modeled. |
| | Northbound DC-295 to Westbound Benning Road NE | - | 79 | - | - | N | 62 | Slowdown from Google Maps typical traffic conditions estimated to extend 0 feet | Queue length output is not reflective of observed conditions in the simulation and may be overestimated due to queue spillback from other movements; measured throughput at this location exceeds volume targets. |
| | Northbound DC-295/Southbound Kenilworth Avenue NE to Westbound Benning Road NE | - | 0 | - | - | Y | 0 | Slowdown from Google Maps typical traffic conditions estimated to extend 0 feet | |

### 6.1.1.12.3 Arterial Queue Counters

*** MOE of Vissim Max Queue Length represents the average from 10 simulation runs.**

| Intersection | Location | Observed Max Queue (feet) | VISSIM Max Queue (feet) | Max Queue Difference (feet) | Max Queue Difference (%) | Field Conditions Represented (Yes/No) | Vissim Max Queue Standard Deviation (feet) | Field-Observed Queue Description | Queue Calibration Justification |
|---|---|---|---|---|---|---|---|---|---|
| Benning Road NE at E Capitol Street | Eastbound Benning Road NE at E Capitol Street | 400 | 337 | -63 | -16% | Y | 123 | Slowdown from Google Mapstypical traffic conditions estimated to extend 800 feet | The queue spillback impact was reasonably modeled. |
| | Westbound Benning Road NE at E Capitol Street | 475 | 278 | -197 | -42% | Y | 46 | Slowdown from Google Mapstypical traffic conditions estimated to extend 200 feet | The queue spillback impact was reasonably modeled. |
| | Southbound E Capitol Street at Benning Road NE | 375 | 276 | -99 | -26% | Y | 35 | Slowdown from Google Maps typical traffic conditions estimated to extend 0 feet | The queue spillback impact was reasonably modeled. |
| | Northbound E Capitol Street at Benning Road NE | 150 | 708 | 558 | 372% | Y | 71 | Slowdown from Google Mapstypical traffic conditions estimated to extend 2000 feet | The queue spillback impact was reasonably modeled; queue length at this location is highly variable, as shown by the difference in queue lengths reported from field measurements and Google Maps typical traffic conditions. |
| Benning Road NE at Oklahoma Avenue NE | Westbound Benning Road NE at Oklahoma Avenue NE | 125 | 121 | -4 | -3% | Y | 17 | Slowdown from Google Maps typical traffic conditions estimated to extend 0 feet | The queue spillback impact was reasonably modeled. |
| Benning Road NE at Minnesota Avenue NE | Eastbound Benning Road NE at Minnesota Avenue NE | 300+ | 5057 | - | - | Y | 889 | Slowdown from Google Mapstypical traffic conditions estimated to extend 4200 feet | The queue spillback impact was reasonably modeled and aligns with the length of slowdown estimated by Google Maps typical traffic conditions; slightly longer queue lengths are attributable to the lane closure present during data collection. |
| | Westbound Benning Road NE at Minnesota Avenue NE | 300 | 297 | -3 | -1% | Y | 30 | Slowdown from Google Mapstypical traffic conditions estimated to extend 600 feet | The queue spillback impact was reasonably modeled. |
| | Northbound Minnesota Avenue NE at Benning Road NE | 325+ | 581 | - | - | Y | 9 | Slowdown from Google Mapstypical traffic conditions estimated to extend 700 feet | The queue spillback impact was reasonably modeled. |
| | Southbound Minnesota Avenue NE at Benning Road NE | 425 | 424 | -1 | 0% | Y | 40 | Slowdown from Google Mapstypical traffic conditions estimated to extend 1000 feet | The queue spillback impact was reasonably modeled. |
| | | | | | | | | | |

PM Calibration Summary

## Freeway Average Speed Comparison: DC-295 - Northbound

TRACTION Speed

| Polk St NE | Nannie Helen Burroughs Ave NE | Benning Rd NE | East Capitol St | |
|---|---|---|---|---|
| 15 | 15 | 12 | 13 | 4:30 PM |
| 16 | 17 | 13 | 14 | |
| 16 | 18 | 14 | 18 | 5:00 PM |
| 16 | 16 | 14 | 18 | |
| 16 | 17 | 14 | 17 | 5:30 PM |
| 17 | 19 | 15 | 18 | |
| 18 | 20 | 17 | 23 | 6:00 PM |
| 22 | 24 | 20 | 26 | |
| 30 | 32 | 27 | 31 | 6:30 PM |
| 38 | 41 | 39 | 33 | |
| 46 | 49 | 46 | 39 | 7:00 PM |
| 47 | 48 | 45 | 40 | |
| | | | | 7:30 PM |

Low — Average Speed (mph) — High

Direction of Travel

VISSIM Speed

| Polk St NE | Nannie Helen Burroughs Ave NE | Benning Rd NE | East Capitol St | |
|---|---|---|---|---|
| 16 | 19 | 13 | 17 | 4:30 PM |
| 16 | 20 | 13 | 15 | |
| 16 | 20 | 12 | 15 | 5:00 PM |
| 16 | 19 | 12 | 15 | |
| 16 | 19 | 13 | 15 | 5:30 PM |
| 16 | 19 | 14 | 18 | |
| 16 | 18 | 15 | 27 | 6:00 PM |
| 14 | 18 | 14 | 36 | |
| 18 | 20 | 16 | 36 | 6:30 PM |
| 32 | 43 | 38 | 46 | |
| 50 | 48 | 51 | 50 | 7:00 PM |
| 51 | 48 | 51 | 50 | |
| | | | | 7:30 PM |

Low — Average Speed (mph) — High

## Freeway Average Speed Comparison: DC-295 - Southbound

TRACTION Speed

| Polk St NE | Lane Pl NE | Nannie Helen Burroughs Ave NE | Benning Rd NE | East Capitol St | |
|---|---|---|---|---|---|
| 46 | 48 | 43 | 19 | 33 | 4:30 PM |
| 47 | 43 | 31 | 17 | 25 | |
| 47 | 49 | 42 | 19 | 23 | 5:00 PM |
| 46 | 50 | 42 | 24 | 30 | |
| 46 | 48 | 32 | 22 | 27 | 5:30 PM |
| 47 | 51 | 36 | 22 | 25 | |
| 46 | 48 | 45 | 24 | 27 | 6:00 PM |
| 45 | 49 | 42 | 24 | 29 | |
| 45 | 49 | 38 | 19 | 27 | 6:30 PM |
| 45 | 49 | 36 | 17 | 30 | |
| 47 | 51 | 44 | 26 | 34 | 7:00 PM |
| 47 | 51 | 51 | 43 | 41 | |
| | | | | | 7:30 PM |

Low — Average Speed (mph) — High

Direction of Travel

VISSIM Speed

| Polk St NE | Lane Pl NE | Nannie Helen Burroughs Ave NE | Benning Rd NE | East Capitol St | |
|---|---|---|---|---|---|
| 51 | 52 | 42 | 10 | 26 | 4:30 PM |
| 51 | 52 | 50 | 17 | 21 | |
| 51 | 52 | 51 | 30 | 21 | 5:00 PM |
| 51 | 51 | 51 | 26 | 24 | |
| 51 | 51 | 50 | 21 | 26 | 5:30 PM |
| 51 | 51 | 51 | 37 | 22 | |
| 51 | 51 | 51 | 31 | 21 | 6:00 PM |
| 51 | 51 | 50 | 21 | 23 | |
| 51 | 51 | 50 | 28 | 26 | 6:30 PM |
| 51 | 52 | 51 | 42 | 30 | |
| 51 | 52 | 52 | 51 | 38 | 7:00 PM |
| 51 | 52 | 52 | 51 | 42 | |
| | | | | | 7:30 PM |

Low — Average Speed (mph) — High

* MOE of Speed represents the average from 10 simulation runs.
* All speeds reported in MPH.

# 7.0 Attachment B – Opening Year 2025 Results

### 7.1.1.1 Freeway and Ramp MOEs Comparison

#### 7.1.1.1.1 AM Peak Hour (7:45 AM - 8:45 AM); PM Peak Hour (4:30 PM - 5:30 PM)

| Facility | Segment | Type | 2025 NB AM | | | 2025 Build AM | | | 2025 NB PM | | | 2025 Build PM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) |
| NB DC-295 | Mainline south of EB Capitol Street On-Ramp | Basic | 2,895 | 49 | 30 | 2,895 | 49 | 30 | 2,942 | 17 | 89 | 2,900 | 16 | 90 |
| | Between EB Capitol Street On-Ramp and WB Benning Road Off-Ramp | Merge/Diverge | 3,260 | 51 | 21 | 3,260 | 51 | 21 | 3,846 | 14 | 91 | 3,865 | 14 | 91 |
| | Between WB Benning Road Off-Ramp and EB Benning Road/Kenilworth Avenue On-Ramp | Basic | 2,990 | 51 | 19 | 2,990 | 51 | 19 | 3,751 | 12 | 105 | 3,760 | 12 | 104 |
| | Between EB Benning Road/Kenilworth Avenue On-Ramp and Nannie Helen Burroughs Avenue Off-Ramp | Merge/Diverge | 3,475 | 50 | 21 | 3,475 | 50 | 21 | 4,635 | 20 | 74 | 4,705 | 20 | 73 |
| | Between Nannie Helen Burroughs Avenue Off-Ramp and Kenilworth Avenue On-Ramp | Basic | 2,795 | 52 | 18 | 2,795 | 52 | 18 | 3,769 | 12 | 103 | 3,710 | 12 | 102 |
| | Mainline north of Nannie Helen Burroughs Avenue | Merge/Basic | 3,330 | 43 | 21 | 3,330 | 43 | 21 | 4,060 | 13 | 86 | 4,015 | 13 | 86 |
| SB DC-295 | Mainline North of Deane Avenue Off-Ramp | Merge/Diverge | 3,290 | 8 | 116 | 3,290 | 8 | 115 | 3,445 | 51 | 20 | 3,405 | 51 | 20 |
| | Between Deane Avenue Off-Ramp and Kenilworth Avenue Off-Ramp | Basic/Diverge | 3,000 | 7 | 134 | 3,000 | 7 | 135 | 3,100 | 51 | 19 | 3,015 | 51 | 19 |
| | Between Kenilworth Avenue Off-Ramp and Kenilworth Avenue On-Ramp | Basic | 2,190 | 4 | 166 | 2,250 | 4 | 164 | 2,866 | 52 | 18 | 2,805 | 52 | 18 |
| | Between Kenilworth Avenue On-Ramp and EB Benning Road On-Ramp | Merge/Basic | 2,930 | 6 | 143 | 3,050 | 7 | 139 | 3,107 | 51 | 19 | 3,100 | 51 | 20 |
| | Between EB Benning Road On-Ramp and Baker Street Off-Ramp | Weave | 3,245 | 8 | 100 | 3,365 | 8 | 99 | 3,368 | 51 | 17 | 3,410 | 51 | 17 |
| | Between Baker Street Off-Ramp and WB Capitol Street Off-Ramp | Diverge | 3,205 | 11 | 91 | 3,265 | 12 | 90 | 3,326 | 49 | 23 | 3,345 | 48 | 24 |
| | Between WB Capitol Street Off-Ramp and EB Capitol Street On-Ramp | Basic | 2,690 | 12 | 103 | 2,690 | 12 | 103 | 2,972 | 44 | 35 | 2,925 | 41 | 39 |
| | Mainline south of EB Capitol Street On-Ramp | Merge/Basic | 3,145 | 15 | 90 | 3,145 | 15 | 90 | 3,103 | 33 | 50 | 3,080 | 31 | 52 |

| Facility | Segment | Type | 2025 NB AM | | | 2025 Build AM | | | 2025 NB PM | | | 2025 Build PM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) |
| East Capitol Street | EB Capitol Street to SB DC-295 | Ramp | 402 | 25 | 17 | 402 | 25 | 17 | 155 | 29 | 5 | 161 | 29 | 6 |
| | EB Capitol Street to NB DC-295 | Ramp | 325 | 32 | 10 | 325 | 32 | 10 | 915 | 28 | 34 | 954 | 27 | 37 |
| | SB DC-295 to WB Capitol Street | Ramp | 492 | 40 | 13 | 544 | 40 | 14 | 355 | 43 | 9 | 362 | 43 | 9 |
| Baker Street | SB DC-295 to WB Baker Street | Ramp | 28 | 20 | 1 | 74 | 20 | 4 | 52 | 20 | 3 | 55 | 20 | 3 |
| Benning Road | EB Benning Road to SB DC-295 | Ramp | 283 | 36 | 8 | 283 | 36 | 8 | 273 | 36 | 8 | 251 | 36 | 7 |
| | EB Benning Road to NB DC-295 | Ramp | 302 | 25 | 17 | 316 | 28 | 12 | 848 | 12 | 83 | 816 | 13 | 76 |
| | NB DC-295 to WB Benning Road | Ramp | 274 | 31 | 12 | 273 | 32 | 9 | 95 | 29 | 4 | 102 | 30 | 4 |
| | NB DC-295/EB Benning Road (U-turns) to WB Benning Road | Ramp | 274 | 3 | 118 | 288 | 4 | 77 | 94 | 13 | 8 | 103 | 13 | 9 |
| | SB Kenilworth Avenue NE to NB DC-295 | Ramp | 49 | 23 | 2 | 50 | 23 | 2 | 35 | 17 | 3 | 40 | 16 | 4 |
| | EB Benning Road/SB Kenilworth Avenue NE to NB DC-295 | Ramp | 350 | 38 | 9 | 352 | 39 | 9 | 885 | 10 | 95 | 864 | 11 | 91 |
| Kenilworth Avenue | SB Kenilworth Avenue to SB DC-295 (South) | Ramp | 644 | 5 | 130 | 681 | 5 | 140 | 243 | 25 | 9 | 267 | 25 | 10 |
| | SB DC-295 to SB Kenilworth Avenue | Ramp | 714 | 17 | 51 | 661 | 16 | 49 | 235 | 39 | 6 | 212 | 39 | 5 |
| | NB Kenilworth Avenue to NB DC-295 | Ramp | 533 | 23 | 22 | 537 | 24 | 22 | 296 | 17 | 20 | 289 | 17 | 20 |
| Nannie Helen Burroughs Avenue | NB DC-295 to Nannie Helen Burroughs Avenue/Kenilworth Avenue | Ramp | 488 | 47 | 10 | 492 | 47 | 10 | 882 | 41 | 21 | 895 | 41 | 23 |
| | SB DC-295 to Deane Avenue/Kenilworth Terrace/Kenilworth Avenue | Ramp | 246 | 35 | 9 | 247 | 35 | 10 | 342 | 40 | 9 | 346 | 40 | 9 |

## 7.1.1.2 Intersection MOE Comparison

### 7.1.1.2.1 AM Peak Hour (7:45 AM - 8:45 AM); PM Peak Hour (4:30 PM - 5:30 PM)

| No. | Intersection ID | Approach | Movement | 2025 NB AM | | | | | | 2025 Build AM | | | | | | 2025 NB PM | | | | | | 2025 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 101 | Benning Road NE at Anacostia Avenue NE | NB | LT | 79 | 115 | 50 | 37 | D | D | 121 | 157 | 52 | 43 | D | D | 41 | 65 | 61 | 40 | E | D | 39 | 64 | 60 | 38 | E | D |
| | | | RT | 36 | | 8 | | A | | 36 | | 12 | | B | | 24 | | 6 | | A | | 26 | | 6 | | A | |
| | | SB | LT | 20 | 28 | 52 | 51 | D | D | 20 | 28 | 48 | 48 | D | D | 0 | 0 | - | - | - | - | 0 | 0 | - | - | - | - |
| | | | RT | 8 | | 48 | | D | | 8 | | 48 | | D | | 0 | | - | | - | | 0 | | - | | - | |
| | | EB | LT | 12 | 1,008 | 19 | 3 | B | A | 11 | 1,006 | 40 | 9 | D | A | 5 | 2,239 | 10 | 7 | - | A | 4 | 2,161 | 29 | 20 | - | C |
| | | | TH | 971 | | 3 | | A | | 971 | | 8 | | A | | 2,136 | | 7 | | A | | 2,062 | | 20 | | C | |
| | | | RT | 26 | | 6 | | A | | 24 | | 11 | | B | | 98 | | 7 | | A | | 94 | | 21 | | C | |
| | | WB | LT | 20 | 2,797 | 9 | 2 | A | A | 17 | 2,594 | 15 | 9 | B | A | 5 | 1,195 | 16 | 1 | B | A | 5 | 1,150 | 34 | 5 | C | A |
| | | | TH | 2,764 | | 2 | | A | | 2,565 | | 9 | | A | | 1,180 | | 1 | | A | | 1,140 | | 4 | | A | |
| | | | RT | 13 | | 6 | | A | | 12 | | 12 | | B | | 10 | | 3 | | - | | 5 | | 6 | | - | |
| | | Intersection | | 3,949 | | 3 | | A | | 3,785 | | 11 | | B | | 3,499 | | 6 | | A | | 3,375 | | 15 | | B | |
| 102 | Benning Road NE at 34th Street NE | NB | LT | 20 | 79 | 41 | 20 | D | C | 20 | 79 | 3 | 7 | A | A | 29 | 104 | 37 | 19 | D | B | 22 | 94 | 36 | 17 | D | B |
| | | | RT | 55 | | 12 | | B | | 56 | | 6 | | A | | 75 | | 12 | | B | | 72 | | 11 | | B | |
| | | SB | LT | 30 | 70 | 36 | 35 | D | C | 28 | 64 | 35 | 35 | C | D | 43 | 55 | 37 | 36 | D | D | 41 | 55 | 35 | 35 | C | D |
| | | | RT | 40 | | 34 | | C | | 36 | | 35 | | D | | 10 | | 34 | | C | | 12 | | 36 | | D | |
| | | EB | LT | 12 | 1,025 | 21 | 22 | C | C | 8 | 1,020 | 25 | 24 | C | C | 3 | 2,153 | 13 | 12 | B | B | 0 | 2,085 | 38 | 24 | D | C |
| | | | TH | 992 | | 22 | | C | | 992 | | 24 | | C | | 2,115 | | 12 | | B | | 2,049 | | 24 | | C | |
| | | | RT | 21 | | 17 | | B | | 20 | | 21 | | C | | 35 | | 7 | | A | | 35 | | 29 | | C | |
| | | WB | LT | 251 | 3,111 | 23 | 16 | C | B | 249 | 2,920 | 20 | 17 | B | B | 172 | 1,373 | 27 | 11 | C | B | 159 | 1,315 | 25 | 12 | C | B |
| | | | TH | 2,734 | | 15 | | B | | 2,534 | | 17 | | B | | 1,158 | | 9 | | A | | 1,112 | | 10 | | B | |
| | | | RT | 48 | | 21 | | C | | 57 | | 19 | | B | | 21 | | 9 | | A | | 21 | | 8 | | A | |
| | | | U | 78 | | 26 | | C | | 80 | | 22 | | C | | 23 | | 28 | | C | | 22 | | 24 | | C | |
| | | Intersection | | 4,208 | | 18 | | B | | 4,002 | | 20 | | B | | 3,662 | | 13 | | B | | 3,526 | | 20 | | B | |
| 103 | Benning Road NE Ramp to DC-295 at 36th Street NE | NB | RT | 132 | 132 | 2 | 2 | A | A | 132 | 132 | 2 | 2 | A | A | 249 | 249 | 58 | 58 | F | F | 254 | 254 | 7 | 7 | A | A |
| | | EB | TH | 453 | 458 | 2 | 2 | A | A | 468 | 475 | 9 | 9 | A | A | 881 | 881 | 28 | 28 | D | D | 841 | 841 | 21 | 21 | C | C |
| | | | RT | 5 | | 2 | | A | | 7 | | 3 | | A | | 0 | | 1 | | - | | 0 | | - | | - | |
| | | Intersection | | 590 | | 2 | | A | | 607 | | 7 | | A | | 1,130 | | 35 | | D | | 1,094 | | 18 | | C | |
| 104 | Benning Road NE at Minnesota Avenue NE | NB | LT | 301 | 764 | 65 | 38 | E | D | 252 | 693 | 46 | 27 | D | C | 203 | 795 | 50 | 26 | D | C | 195 | 801 | 38 | 30 | D | C |
| | | | TH | 427 | | 21 | | C | | 412 | | 16 | | B | | 526 | | 17 | | B | | 539 | | 28 | | C | |
| | | | RT | 37 | | 19 | | B | | 30 | | 15 | | B | | 65 | | 24 | | C | | 67 | | 26 | | C | |
| | | SB | LT | 58 | 951 | 55 | 47 | E | D | 57 | 924 | 46 | 38 | D | D | 55 | 728 | 64 | 32 | E | C | 55 | 722 | 53 | 38 | D | D |
| | | | TH | 522 | | 45 | | D | | 529 | | 36 | | D | | 473 | | 32 | | C | | 475 | | 41 | | D | |
| | | | RT | 372 | | 49 | | D | | 338 | | 39 | | D | | 199 | | 24 | | C | | 192 | | 27 | | C | |
| | | EB | LT | 193 | 691 | 36 | 24 | D | C | 186 | 669 | 32 | 17 | C | B | 250 | 1,375 | 15 | 17 | B | B | 236 | 1,356 | 26 | 23 | C | C |
| | | | TH | 298 | | 18 | | B | | 289 | | 10 | | B | | 811 | | 17 | | B | | 796 | | 21 | | C | |
| | | | RT | 201 | | 20 | | C | | 194 | | 14 | | B | | 314 | | 20 | | B | | 324 | | 25 | | C | |
| | | | TH | 687 | | 37 | | D | | 661 | | 37 | | D | | 314 | 0 | 39 | 0 | D | 0 | 308 | 0 | 42 | 0 | D | 0 |
| | | | RT | 47 | | 40 | | D | | 48 | | 49 | | D | | 95 | | 44 | | D | | 89 | | 60 | | E | |
| | | Intersection | | 3,140 | | 37 | | D | | 2,996 | | 31 | | C | | 3,306 | | 26 | | C | | 3,276 | | 31 | | C | |
| 105 | Benning Road NE at 39th Street NE/Driveway | NB | LT | 13 | 81 | 59 | 59 | E | E | 6 | 69 | 50 | 54 | D | D | 0 | 141 | - | 57 | - | E | 11 | 148 | 56 | 57 | E | E |
| | | | RT | 67 | | 59 | | E | | 61 | | 55 | | D | | 141 | | 57 | | E | | 136 | | 58 | | E | |
| | | SB | LT | 3 | 8 | 61 | 62 | E | E | 3 | 8 | 60 | 61 | E | E | 4 | 4 | 47 | 50 | D | D | 3 | 8 | 39 | 40 | D | D |
| | | | RT | 0 | | - | | - | | 4 | | 67 | | E | | 0 | | - | | - | | 4 | | 39 | | D | |
| | | EB | LT | 10 | 392 | 14 | 5 | B | A | 10 | 376 | 15 | 3 | B | A | 12 | 901 | 7 | 2 | A | A | 11 | 918 | 10 | 7 | A | A |
| | | | TH | 363 | | 5 | | A | | 349 | | 3 | | A | | 889 | | 2 | | A | | 877 | | 7 | | A | |
| | | | RT | 19 | | 7 | | A | | 18 | | 4 | | A | | 0 | | - | | - | | 30 | | 8 | | A | |
| | | WB | LT | 139 | 864 | 9 | 7 | A | A | 140 | 849 | 9 | 7 | A | A | 87 | 96 | 18 | 17 | B | B | 94 | 477 | 14 | 8 | B | A |
| | | | TH | 715 | | 7 | | A | | 698 | | 7 | | A | | 0 | | - | | - | | 373 | | 7 | | A | |
| | | | RT | 10 | | 6 | | A | | 11 | | 6 | | A | | 9 | | 6 | | A | | 10 | | 7 | | A | |
| | | Intersection | | 1,344 | | 10 | | B | | 1,302 | | 9 | | A | | 1,142 | | 10 | | B | | 1,551 | | 12 | | B | |
| 106 | Benning Road NE at 40th Street NE | NB | LT | 6 | 73 | 12 | 6 | B | A | 5 | 69 | 13 | 7 | B | A | 40 | 183 | 21 | 15 | C | B | 42 | 183 | 18 | 14 | C | B |
| | | | RT | 67 | | 6 | | A | | 64 | | 6 | | A | | 143 | | 13 | | B | | 141 | | 13 | | B | |
| | | EB | TH | 407 | 432 | 1 | 1 | A | A | 387 | 413 | 1 | 1 | A | A | 986 | 1,033 | 1 | 1 | A | A | 965 | 1,015 | 2 | 2 | A | A |
| | | | RT | 25 | | 2 | | A | | 26 | | 1 | | A | | 47 | | 2 | | A | | 50 | | 2 | | A | |
| | | WB | LT | 194 | 1,051 | 4 | 2 | A | A | 190 | 1,034 | 4 | 2 | A | A | 99 | 548 | 9 | 3 | A | A | 96 | 530 | 9 | 3 | A | A |
| | | | TH | 857 | | 2 | | A | | 844 | | 2 | | A | | 449 | | 2 | | A | | 434 | | 2 | | A | |
| | | Intersection | | 1,556 | | 2 | | A | | 1,516 | | 2 | | A | | 1,765 | | 3 | | A | | 1,728 | | 3 | | A | |

| No. | Intersection ID | Approach | Movement | 2025 NB AM | | | | | | 2025 Build AM | | | | | | 2025 NB PM | | | | | | 2025 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 107 | Benning Road NE at 41st Street NE | NB | LT | 4 | 27 | 11 | 7 | B | A | 5 | 27 | 11 | 7 | B | A | 3 | 103 | 16 | 10 | C | A | 3 | 103 | 14 | 10 | B | A |
| | | | RT | 23 | | 6 | | A | | 22 | | 6 | | A | | 100 | | 10 | | A | | 99 | | 10 | | A | |
| | | EB | TH | 464 | 474 | 0 | 0 | A | A | 441 | 451 | 0 | 0 | A | A | 1,123 | 1,127 | 1 | 1 | A | A | 1,094 | 1,099 | 1 | 1 | A | A |
| | | | RT | 10 | | 1 | | A | | 10 | | 1 | | A | | 5 | | 1 | | A | | 6 | | 1 | | A | |
| | | WB | LT | 109 | 1,156 | 5 | 2 | A | A | 106 | 1,133 | 4 | 2 | A | A | 39 | 584 | 12 | 2 | B | A | 39 | 566 | 10 | 2 | A | A |
| | | | TH | 1,047 | | 2 | | A | | 1,027 | | 2 | | A | | 545 | | 1 | | A | | 527 | | 1 | | A | |
| | | Intersection | | 1,657 | | 2 | | A | | 1,611 | | 2 | | A | | 1,813 | | 2 | | A | | 1,767 | | 2 | | A | |
| 108 | Benning Road NE at 42nd Street NE | NB | LT | 25 | 89 | 26 | 22 | C | C | 24 | 89 | 25 | 23 | C | C | 26 | 144 | 31 | 28 | C | C | 23 | 138 | 32 | 27 | C | C |
| | | | TH | 60 | | 21 | | C | | 61 | | 23 | | C | | 106 | | 28 | | C | | 105 | | 27 | | C | |
| | | | RT | 4 | | 12 | | B | | 4 | | 13 | | B | | 12 | | 18 | | B | | 10 | | 17 | | B | |
| | | SB | LT | 9 | 483 | 48 | 45 | D | D | 9 | 478 | 52 | 49 | D | D | 20 | 254 | 38 | 26 | D | C | 20 | 255 | 41 | 30 | D | C |
| | | | TH | 141 | | 51 | | D | | 141 | | 55 | | D | | 89 | | 33 | | C | | 92 | | 37 | | D | |
| | | | RT | 333 | | 43 | | D | | 328 | | 47 | | D | | 145 | | 20 | | B | | 143 | | 23 | | C | |
| | | EB | LT | 97 | 487 | 18 | 12 | B | B | 95 | 462 | 16 | 7 | B | A | 420 | 1,222 | 21 | 16 | C | B | 427 | 1,187 | 25 | 18 | C | B |
| | | | TH | 347 | | 11 | | B | | 327 | | 4 | | A | | 737 | | 13 | | B | | 700 | | 14 | | B | |
| | | | RT | 43 | | 7 | | A | | 41 | | 9 | | A | | 65 | | 10 | | A | | 60 | | 10 | | A | |
| | | WB | LT | 4 | 830 | 14 | 12 | B | B | 6 | 814 | 15 | 11 | B | B | 4 | 444 | 24 | 13 | C | B | 5 | 431 | 15 | 7 | B | A |
| | | | TH | 793 | | 12 | | B | | 775 | | 11 | | B | | 414 | | 13 | | B | | 399 | | 7 | | A | |
| | | | RT | 33 | | 12 | | B | | 34 | | 11 | | B | | 27 | 0 | 10 | | B | | 27 | | 5 | | A | |
| | | Intersection | | 1,889 | | 21 | | C | | 1,843 | | 20 | | C | | 2,064 | | 17 | | B | | 2,010 | | 17 | | B | |
| 208 | Benning Road NE at 26th Street NE | SB | LT | 174 | 228 | 60 | 56 | E | E | 176 | 229 | 55 | 53 | E | D | 148 | 164 | 50 | 48 | D | D | 154 | 167 | 48 | 47 | D | D |
| | | | RT | 55 | | 46 | | D | | 53 | | 44 | | D | | 16 | | 30 | | C | | 14 | | 34 | | C | |
| | | EB | LT | 71 | 947 | 37 | 11 | D | B | 71 | 927 | 45 | 10 | D | B | 11 | 2,070 | 11 | 8 | B | A | 10 | 2,035 | 14 | 7 | B | A |
| | | | TH | 877 | | 9 | | A | | 857 | | 7 | | A | | 2,059 | | 8 | | A | | 2,026 | | 7 | | A | |
| | | WB | TH | 1,948 | 2,410 | 7 | 8 | A | A | 1,826 | 2,289 | 7 | 8 | A | A | 1,069 | 1,194 | 4 | 4 | A | A | 1,033 | 1,166 | 4 | 4 | A | A |
| | | | RT | 463 | | 12 | | B | | 464 | | 13 | | B | | 126 | | 6 | | A | | 133 | | 6 | | A | |
| | | Intersection | | 3,586 | | 12 | | B | | 3,445 | | 12 | | B | | 3,428 | | 8 | | A | | 3,369 | | 8 | | A | |
| 209 | Benning Road NE at Oklahoma Avenue NE | NB | LT | 73 | 123 | 55 | 34 | E | C | 76 | 129 | 57 | 35 | E | C | 36 | 118 | 55 | 21 | D | C | 51 | 80 | 54 | 36 | D | D |
| | | | RT | 50 | | 4 | | A | | 53 | | 4 | | A | | 82 | | 7 | | A | | 29 | | 4 | | A | |
| | | EB | TH | 974 | 1,053 | 10 | 10 | A | A | 957 | 1,035 | 8 | 8 | A | A | 2,165 | 2,217 | 2 | 2 | A | A | 2,137 | 2,190 | 1 | 1 | A | A |
| | | | RT | 78 | | 14 | | B | | 78 | | 11 | | B | | 52 | | 3 | | A | | 53 | | 1 | | A | |
| | | WB | LT | 523 | 2,863 | 42 | 29 | D | C | 463 | 2,679 | 41 | 28 | D | C | 70 | 1,228 | 24 | 4 | C | A | 61 | 1,178 | 26 | 7 | C | A |
| | | | TH | 2,340 | | 26 | | C | | 2,216 | | 25 | | C | | 1,158 | | 3 | | A | | 1,117 | | 6 | | A | |
| | | Intersection | | 4,038 | | 24 | | C | | 3,843 | | 23 | | C | | 3,563 | | 3 | | A | | 3,448 | | 4 | | A | |
| 210 | Minnesota Avenue NE at Dix Street NE | | TH | 650 | | 20 | | C | | 586 | | 10 | | B | | 653 | 0 | 24 | 0 | C | 0 | 659 | 0 | 26 | 0 | C | 0 |
| | | | RT | 63 | | 25 | | C | | 59 | | 11 | | B | | 108 | | 25 | | C | | 112 | | 26 | | C | |
| | | SB | LT | 50 | 722 | 15 | 7 | B | A | 54 | 722 | 4 | 3 | A | A | 110 | 788 | 22 | 16 | C | B | 112 | 801 | 27 | 15 | C | B |
| | | | TH | 651 | | 7 | | A | | 649 | | 3 | | A | | 652 | | 15 | | B | | 661 | | 13 | | B | |
| | | | RT | 20 | | 8 | | A | | 19 | | 8 | | A | | 26 | | 11 | | B | | 28 | | 16 | | B | |
| | | EB | LT | 12 | 49 | 51 | 46 | D | D | 10 | 43 | 44 | 44 | D | D | 23 | 73 | 31 | 31 | C | C | 26 | 79 | 33 | 32 | C | C |
| | | | TH | 13 | | 43 | | D | | 11 | | 38 | | D | | 18 | | 30 | | C | | 20 | | 30 | | C | |
| | | | RT | 24 | | 45 | | D | | 23 | | 46 | | D | | 31 | | 33 | | C | | 33 | | 32 | | C | |
| | | WB | LT | 96 | 208 | 63 | 64 | E | E | 96 | 202 | 58 | 58 | E | E | 177 | 333 | 45 | 42 | D | D | 174 | 325 | 46 | 46 | D | D |
| | | | TH | 12 | | 68 | | E | | 11 | | 58 | | E | | 32 | | 41 | | D | | 31 | | 47 | | D | |
| | | | RT | 99 | | 64 | | E | | 95 | | 58 | | E | | 124 | | 37 | | D | | 120 | | 47 | | D | |
| | | Intersection | | 1,692 | | 21 | | C | | 1,615 | | 14 | | B | | 1,963 | | 24 | | C | | 1,982 | | 25 | | C | |
| 211 | Minnesota Avenue NE at Bus Exit South | NB | TH | 560 | 560 | 14 | 14 | B | B | 540 | 540 | 15 | 15 | B | B | 873 | 873 | 13 | 13 | B | B | 876 | 876 | 13 | 13 | B | B |
| | | SB | TH | 928 | 928 | 9 | 9 | A | A | 903 | 903 | 9 | 9 | A | A | 579 | 579 | 5 | 5 | A | A | 564 | 564 | 5 | 5 | A | A |
| | | EB | LT | 0 | 21 | - | 15 | - | B | 0 | 20 | - | 17 | - | B | 1 | 18 | 2 | 9 | A | A | 10 | 40 | 52 | 34 | D | C |
| | | | RT | 21 | | 15 | | B | | 20 | | 17 | | B | | 17 | | 10 | | A | | 30 | | 28 | | C | |
| | | Intersection | | 1,509 | | 11 | | B | | 1,463 | | 11 | | B | | 1,470 | | 10 | | A | | 1,480 | | 11 | | B | |
| 212 | Minnesota Avenue NE at Grant Street NE and Bus Entrance North | NB | LT | 0 | 543 | - | 31 | - | C | 0 | 531 | - | 32 | - | C | 0 | 854 | - | 13 | - | B | 13 | 868 | 23 | 15 | C | B |
| | | | TH | 488 | | 31 | | C | | 485 | | 32 | | C | | 745 | | 13 | | B | | 750 | | 14 | | B | |
| | | | RT | 55 | | 32 | | C | | 46 | | 32 | | C | | 110 | | 16 | | B | | 105 | | 17 | | B | |
| | | SB | LT | 17 | 769 | 20 | 15 | B | B | 15 | 749 | 20 | 14 | B | B | 33 | 471 | 23 | 13 | C | B | 29 | 462 | 24 | 13 | C | B |
| | | | TH | 752 | | 15 | | B | | 734 | | 14 | | B | | 438 | 0 | 13 | 0 | B | 0 | 432 | 0 | 13 | 0 | B | 0 |
| | | | RT | 0 | | - | | - | | 0 | | - | | - | | 0 | 0 | - | 0 | - | 0 | 0 | 0 | - | 0 | - | 0 |
| | | WB | LT | 169 | 208 | 18 | 17 | B | B | 170 | 208 | 18 | 17 | B | B | 139 | 174 | 17 | 16 | B | B | 144 | 179 | 17 | 16 | B | B |
| | | | RT | 40 | | 11 | | B | | 38 | | 12 | | B | | 35 | | 10 | | B | | 35 | | 10 | | A | |
| | | Intersection | | 1,520 | | 21 | | C | | 1,489 | | 21 | | C | | 1,499 | | 14 | | B | | 1,508 | | 14 | | | |
| 213 | Benning Road NE at Blaine Street NE | | RT | 48 | | 8 | | A | | 48 | | 7 | | A | | 30 | 0 | 10 | 0 | A | 0 | 29 | 0 | 10 | 0 | A | 0 |
| | | EB | TH | 359 | 360 | 3 | 3 | A | A | 336 | 339 | 1 | 1 | A | A | 765 | 769 | 1 | 1 | A | A | 725 | 729 | 1 | 1 | A | A |
| | | WB | LT | 237 | 1,063 | 4 | 1 | A | A | 235 | 1,046 | 5 | 2 | A | A | 29 | 469 | 8 | 1 | A | A | 25 | 451 | 5 | 1 | A | A |
| | | | TH | 826 | | 1 | | A | | 811 | | 1 | | A | | 440 | | 0 | | A | | 426 | | 0 | | A | |
| | | Intersection | | 1,471 | | 2 | | A | | 1,433 | | 2 | | A | | 1,272 | | 1 | | A | | 1,214 | | 1 | | A | |

| No. | Intersection ID | Approach | Movement | 2025 NB AM | | | | | | 2025 Build AM | | | | | | 2025 NB PM | | | | | | 2025 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 214 | Benning Road NE at 44th Street NE | SB | LT | 135 | 400 | 30 | 24 | C | C | 129 | 396 | 36 | 30 | D | C | 132 | 211 | 39 | 35 | D | C | 132 | 206 | 38 | 33 | D | C |
| | | | RT | 265 | | 21 | | C | | 267 | | 27 | | C | | 79 | | 28 | | C | | 74 | | 25 | | C | |
| | | EB | LT | 99 | 405 | 95 | 38 | F | D | 92 | 383 | 23 | 13 | C | B | 131 | 796 | 13 | 6 | B | A | 139 | 753 | 14 | 9 | B | A |
| | | | TH | 306 | | 20 | | C | | 291 | | 11 | | B | | 665 | | 4 | | A | | 615 | | 7 | | A | |
| | | WB | TH | 794 | 960 | 14 | 15 | B | B | 777 | 940 | 15 | 16 | B | B | 390 | 556 | 4 | 4 | A | A | 377 | 535 | 5 | 5 | A | A |
| | | | RT | 166 | | 15 | | B | | 164 | | 23 | | C | | 167 | | 4 | | A | | 158 | | 5 | | A | |
| | | Intersection | | 1,765 | | 22 | | C | | 1,719 | | 19 | | B | | 1,563 | | 9 | | A | | 1,494 | | 11 | | B | |
| 215 | Benning Road NE at 45th Street NE | SB | LT | 55 | 97 | 93 | 85 | F | F | 54 | 95 | 80 | 68 | F | E | 14 | 29 | 16 | 12 | B | B | 14 | 29 | 44 | 27 | D | C |
| | | | RT | 42 | | 76 | | E | | 41 | | 52 | | D | | 15 | | 8 | | A | | 15 | | 11 | | B | |
| | | EB | LT | 24 | 443 | 37 | 31 | D | C | 23 | 417 | 28 | 23 | C | C | 20 | 797 | 8 | 6 | A | A | 20 | 742 | 10 | 8 | A | A |
| | | | TH | 419 | | 31 | | C | | 394 | | 23 | | C | | 777 | | 6 | | A | | 723 | | 7 | | A | |
| | | WB | TH | 916 | 979 | 1 | 2 | A | A | 891 | 949 | 8 | 8 | A | A | 542 | 592 | 1 | 1 | A | A | 516 | 565 | 3 | 3 | A | A |
| | | | RT | 63 | | 3 | | A | | 57 | | 10 | | A | | 50 | | 2 | | A | | 50 | | 5 | | A | |
| | | Intersection | | 1,519 | | 16 | | B | | 1,460 | | 16 | | B | | 1,418 | | 4 | | A | | 1,337 | | 6 | | A | |
| 216 | Benning Road NE at Central Avenue NE | WB | TH | 591 | 610 | 1 | 1 | A | A | 565 | 589 | 3 | 3 | A | A | 499 | 520 | 1 | 1 | A | A | 472 | 491 | 1 | 1 | A | A |
| | | | RT | 20 | | 0 | | A | | 24 | | 0 | | A | | 21 | | 0 | | A | | 19 | | 0 | | A | |
| | | EB | TH | 359 | 359 | 79 | 79 | F | F | 350 | 350 | 61 | 61 | F | F | 618 | 618 | 27 | 27 | D | D | 559 | 559 | 21 | 21 | C | C |
| | | SB | RT | 384 | 384 | 9 | 9 | A | A | 380 | 380 | 17 | 17 | C | C | 92 | 92 | 4 | 4 | A | A | 93 | 93 | 4 | 4 | A | A |
| | | Intersection | | 1,353 | | 24 | | C | | 1,319 | | 22 | | C | | 1,230 | | 14 | | B | | 1,143 | | 11 | | B | |
| 217 | Benning Road NE at East Capitol Street SE | NB | LT | 122 | 569 | 36 | 12 | D | B | 131 | 576 | 34 | 12 | C | B | 90 | 1,855 | 87 | 10 | F | A | 66 | 1,830 | 93 | 9 | F | A |
| | | | TH | 318 | | 7 | | A | | 315 | | 7 | | A | | 1,433 | | 7 | | A | | 1,433 | | 7 | | A | |
| | | | RT | 130 | | 2 | | A | | 130 | | 2 | | A | | 332 | | 2 | | A | | 331 | | 3 | | A | |
| | | SB | LT | 13 | 1,278 | 201 | 214 | F | F | 14 | 1,295 | 263 | 210 | F | F | 42 | 739 | 61 | 33 | E | C | 53 | 741 | 64 | 34 | E | C |
| | | | TH | 1,254 | | 214 | | F | | 1,269 | | 210 | | F | | 644 | | 32 | | C | | 634 | | 33 | | C | |
| | | | RT | 11 | | 210 | | F | | 12 | | 198 | | F | | 53 | | 19 | | B | | 54 | | 21 | | C | |
| | | EB | LT | 111 | 470 | 25 | 19 | C | B | 96 | 445 | 25 | 19 | C | B | 173 | 791 | 17 | 10 | B | B | 178 | 737 | 19 | 13 | B | B |
| | | | TH | 278 | | 21 | | C | | 279 | | 21 | | C | | 356 | | 12 | | B | | 339 | | 15 | | B | |
| | | | RT | 80 | | 3 | | A | | 71 | | 2 | | A | | 262 | | 3 | | A | | 220 | | 4 | | A | |
| | | WB | LT | 297 | 789 | 49 | 48 | D | D | 322 | 785 | 56 | 50 | E | D | 50 | 483 | 115 | 51 | F | D | 43 | 468 | 97 | 48 | F | D |
| | | | TH | 472 | | 47 | | D | | 443 | | 47 | | D | | 377 | | 43 | | D | | 371 | | 44 | | D | |
| | | | RT | 20 | | 42 | | D | | 20 | | 42 | | D | | 56 | | 41 | | D | | 55 | | 39 | | D | |
| | | Intersection | | 3,106 | | 105 | | F | | 3,101 | | 106 | | F | | 3,867 | | 19 | | B | | 3,776 | | 20 | | B | |
| 218 | East Capitol Street SE at Texas Avenue SE | NB | RT | 73 | 330 | 12 | 38 | B | D | 69 | 323 | 13 | 39 | B | D | 40 | 157 | 86 | 82 | F | F | 30 | 145 | 117 | 87 | F | F |
| | | | RT2 | | | | | | | | | | | | | 0 | | 0 | | 0 | | 0 | | 0 | | 0 | |
| | | | LT | 236 | | 49 | | D | | 233 | | 50 | | D | | 103 | | 77 | | E | | 115 | | 79 | | E | |
| | | EB | TH | 372 | 389 | 33 | 33 | C | C | 484 | 495 | 26 | 26 | C | C | 1,543 | 1,601 | 114 | 114 | F | F | 1,555 | 1,633 | 113 | 113 | F | F |
| | | | RT | 18 | | 17 | | B | | 12 | | 21 | | C | | 58 | | 109 | | F | | 79 | | 109 | | F | |
| | | WB | U | 0 | 1,881 | - | 2 | - | A | 0 | 1,920 | - | 2 | - | A | 0 | 959 | - | 8 | - | A | 0 | 899 | - | 6 | - | A |
| | | | LT | 80 | | 10 | | B | | 84 | | 11 | | B | | 255 | | 27 | | C | | 222 | | 23 | | C | |
| | | | TH | 1,801 | | 2 | | A | | 1,836 | | 2 | | A | | 704 | | 0 | | A | | 677 | | 0 | | A | |
| | | Intersection | | 2,601 | | 11 | | B | | 2,738 | | 11 | | B | | 2,718 | | 74 | | E | | 2,677 | | 75 | | E | |
| 310 | Deane Avenue NE at Lee St NE | SB | LT | 224 | 224 | 398 | 398 | F | F | 212 | 212 | 426 | 426 | F | F | 77 | 77 | 2 | 2 | A | A | 79 | 79 | 2 | 2 | A | A |
| | | | RT | | | | | | | | | | | | | | | | | | | | | | | | |
| | | EB | LT | 0 | 4 | - | 321 | - | F | 0 | 4 | 674 | 387 | - | F | 0 | 0 | - | - | - | - | 0 | 0 | - | - | - | - |
| | | | TH | | | | | | | | | | | | | | | | | | | | | | | | |
| | | WB | TH | 5 | 88 | 2 | 1 | - | A | 6 | 86 | 4 | 1 | - | A | 0 | 118 | - | 1 | - | A | 0 | 122 | - | 1 | - | A |
| | | | RT | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Intersection | | 316 | | 287 | | F | | 302 | | 304 | | F | | 195 | | 1 | | A | | 201 | | 1 | | A | |
| 311 | Deane Avenue NE at Kenilworth Terrace NE | NB | LT | 11 | 281 | 119 | 91 | F | F | 11 | 280 | 183 | 154 | F | F | 13 | 319 | 79 | 47 | E | D | 11 | 244 | 72 | 39 | E | D |
| | | | RT | 270 | | 89 | | F | | 269 | | 153 | | F | | 306 | | 46 | | D | | 232 | | 37 | | D | |
| | | SB | LT | 581 | 753 | 70 | 71 | E | E | 599 | 779 | 105 | 107 | F | F | 219 | 307 | 44 | 45 | D | D | 264 | 355 | 55 | 53 | E | D |
| | | | TH | 172 | | 74 | | E | | 181 | | 111 | | F | | 88 | | 45 | | D | | 91 | | 47 | | D | |
| | | EB | TH | 178 | 235 | 68 | 61 | E | E | 169 | 223 | 70 | 63 | E | E | 72 | 84 | 50 | 46 | D | D | 73 | 86 | 48 | 43 | D | D |
| | | | RT | 57 | | 39 | | D | | 54 | | 41 | | D | | 12 | | 20 | | C | 0 | 13 | | 18 | | B | |
| | | WB | LT | 198 | 252 | 5 | 4 | A | A | 188 | 240 | 5 | 4 | A | A | 131 | 239 | 1 | 1 | A | A | 128 | 246 | 1 | 1 | A | A |
| | | | TH | 54 | | 0 | | A | | 52 | | 0 | | A | | 108 | | 0 | | A | | 117 | | 0 | | A | |
| | | Intersection | | 1,521 | | 62 | | E | | 1,522 | | 93 | | F | | 949 | | 34 | | C | | 930 | | 35 | | C | |

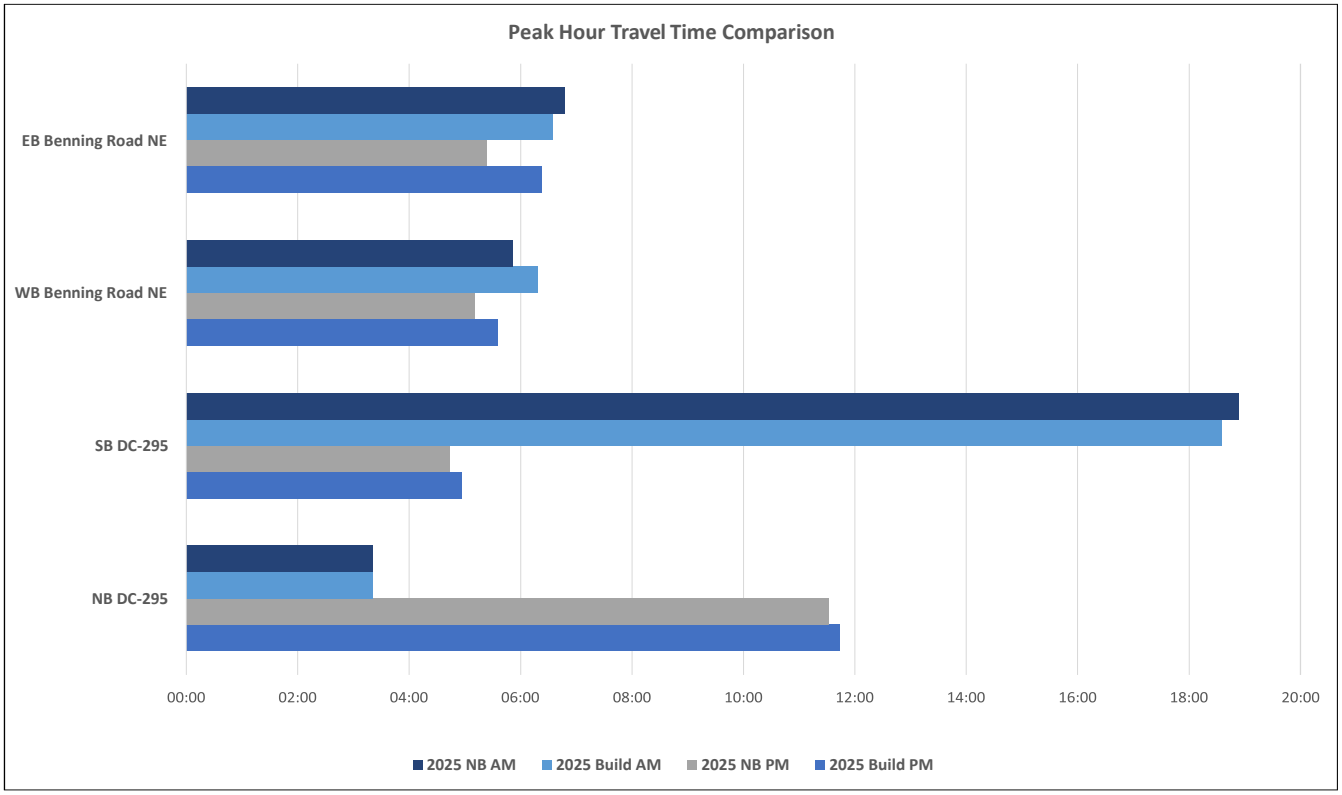
| No. | Intersection ID | Approach | Movement | 2025 NB AM | | | | | | 2025 Build AM | | | | | | 2025 NB PM | | | | | | 2025 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 312 | Deane Avenue NE at Kenilworth Avenue NE | SB | LT | 105 | 198 | 288 | 291 | F | F | 105 | 199 | 288 | 291 | F | F | 307 | 328 | 53 | 53 | D | D | 313 | 335 | 57 | 58 | E | E |
| | | | TH | 93 | | 294 | | F | | 93 | | 293 | | F | | 22 | | 50 | | D | | 22 | | 60 | | E | |
| | | EB | TH | 715 | 1,038 | 10 | 8 | A | A | 722 | 1,046 | 11 | 9 | B | A | 560 | 597 | 14 | 13 | B | B | 534 | 569 | 14 | 14 | B | B |
| | | | RT | 322 | | 3 | | A | | 324 | | 3 | | A | | 38 | | 4 | | A | | 35 | | 3 | | A | |
| | | WB | LT | 572 | 825 | 72 | 59 | E | E | 581 | 821 | 77 | 66 | E | E | 344 | 583 | 15 | 18 | B | B | 339 | 585 | 37 | 30 | D | C |
| | | | TH | 252 | | 30 | | C | | 240 | | 40 | | D | | 239 | | 23 | | C | | 246 | | 21 | | C | |
| | | Intersection | | 2,060 | | 55 | | E | | 2,066 | | 58 | | E | | 1,508 | | 24 | | C | | 1,489 | | 30 | | C | |
| 313 | Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC-295 U-turns | NB | U | 122 | 483 | 20 | 12 | B | B | 124 | 488 | 17 | 11 | B | B | 158 | 474 | 145 | 152 | F | F | 156 | 472 | 148 | 154 | F | F |
| | | | LT | 30 | | 63 | | E | | 32 | | 59 | | E | | 37 | | 160 | | F | | 42 | | 159 | | F | |
| | | | TH | 27 | | 54 | | D | | 26 | | 53 | | D | | 279 | | 155 | | F | | 274 | | 157 | | F | |
| | | | RT | 305 | 305 | 36 | 36 | D | D | 306 | 306 | 33 | 33 | C | C | 408 | 408 | 175 | 175 | F | F | 405 | 405 | 170 | 170 | F | F |
| | | EB | LT | 170 | 841 | 42 | 36 | D | D | 170 | 848 | 48 | 38 | D | D | 155 | 870 | 38 | 30 | D | C | 158 | 853 | 42 | 31 | D | C |
| | | | TH | 671 | | 35 | | C | | 678 | | 36 | | D | | 715 | | 28 | | C | | 695 | | 28 | | C | |
| | | WB | TH | 811 | 1,343 | 30 | 28 | C | C | 810 | 1,342 | 35 | 31 | C | C | 546 | 1,164 | 24 | 24 | C | C | 541 | 1,151 | 24 | 23 | C | C |
| | | | RT | 532 | | 26 | | C | | 532 | | 26 | | C | | 618 | | 24 | | C | | 609 | | 23 | | C | |
| | | Intersection | | 2,667 | | 32 | | C | | 2,678 | | 34 | | C | | 2,916 | | 68 | | E | | 2,881 | | 67 | | E | |
| 314 | Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | NB | LT | 263 | 455 | 318 | 249 | F | F | 232 | 392 | 421 | 349 | F | F | 442 | 1,004 | 47 | 36 | D | D | 449 | 1,005 | 50 | 38 | D | D |
| | | | TH | 130 | | 159 | | F | | 110 | | 251 | | F | | 445 | | 33 | | C | | 437 | | 34 | | C | |
| | | | RT | 62 | | 147 | | F | | 51 | | 232 | | F | | 118 | | 10 | | B | | 120 | | 10 | | A | |
| | | SB | TH | 341 | 718 | 48 | 80 | D | E | 328 | 716 | 52 | 100 | D | F | 130 | 304 | 79 | 76 | E | E | 132 | 300 | 80 | 77 | F | E |
| | | | RT | 377 | | 109 | | F | | 389 | | 140 | | F | | 174 | | 75 | | E | | 168 | | 74 | | E | |
| | | EB | LT | 86 | 975 | 45 | 24 | D | C | 90 | 983 | 46 | 24 | D | C | 124 | 1,125 | 22 | 27 | C | C | 120 | 1,101 | 22 | 26 | C | C |
| | | | TH | 482 | | 29 | | C | | 483 | | 29 | | C | | 683 | | 32 | | C | | 673 | | 31 | | C | |
| | | | RT | 408 | | 14 | | B | | 411 | | 14 | | B | | 318 | | 19 | | B | | 308 | | 19 | | B | |
| | | WB | LT | 48 | 733 | 82 | 43 | F | D | 46 | 743 | 85 | 43 | F | D | 66 | 629 | 96 | 104 | F | F | 68 | 617 | 91 | 91 | F | F |
| | | | TH | 679 | | 41 | | D | | 686 | | 40 | | D | | 543 | | 104 | | F | | 528 | | 91 | | F | |
| | | | RT | 6 | | 45 | | - | | 11 | | 44 | | - | | 20 | | 126 | | F | | 21 | | 103 | | F | |
| | | Intersection | | 2,880 | | 78 | | E | | 2,834 | | 93 | | F | | 3,063 | | 51 | | D | | 3,024 | | 48 | | D | |
| 315 | Nannie Helen Burroughs Avenue NE at 44th Street NE/Hunt Place NE | NB | LT | 132 | 224 | 71 | 57 | E | E | 133 | 226 | 69 | 56 | E | E | 155 | 337 | 42 | 39 | D | D | 151 | 340 | 40 | 34 | D | C |
| | | | TH | 54 | | 42 | | D | | 56 | | 43 | | D | | 84 | | 38 | | D | | 87 | | 35 | | D | |
| | | | RT | 37 | | 29 | | C | | 37 | | 29 | | C | | 98 | | 37 | | D | | 102 | | 23 | | C | |
| | | SB | LT | 4 | 354 | 30 | 32 | C | C | 4 | 350 | 32 | 32 | C | C | 17 | 145 | 32 | 27 | C | C | 16 | 141 | 31 | 28 | C | C |
| | | | TH | 205 | | 32 | | C | | 202 | | 32 | | C | | 73 | | 29 | | C | | 69 | | 28 | | C | |
| | | | SBR - NHB EB | 48 | | 27 | | C | | 47 | | 26 | | C | | 31 | | 18 | | B | | 29 | | 20 | | C | |
| | | | SBR - Hunt | 96 | | 34 | | C | | 96 | | 33 | | C | | 25 | | 28 | | C | | 28 | | 32 | | C | |
| | | EB | LT | 14 | 547 | 25 | 13 | C | B | 13 | 542 | 26 | 13 | C | B | 27 | 799 | 21 | 20 | C | B | 27 | 790 | 22 | 20 | C | B |
| | | | TH | 393 | | 12 | | B | | 388 | | 11 | | B | | 489 | | 18 | | B | | 489 | | 18 | | B | |
| | | | EBR - Hunt Street | 3 | | 11 | | B | | 4 | | 14 | | B | | 2 | | 20 | | B | | 2 | | 34 | | C | |
| | | | EBR - 44th Street | 136 | | 16 | | B | | 136 | | 15 | | B | | 281 | | 23 | | C | | 272 | | 23 | | C | |
| | | Hunt Street | NBL- NHB EB | 29 | 49 | 46 | 44 | D | D | 29 | 49 | 46 | 44 | D | D | 96 | 204 | 66 | 66 | E | E | 93 | 203 | 65 | 64 | E | E |
| | | | NBU - 44th NB | 1 | | 54 | | - | | 0 | | 54 | | - | | 0 | | - | | - | | 0 | | - | | - | |
| | | | NBT - 44th SB | 11 | | 47 | | D | | 11 | | 47 | | D | | 53 | | 66 | | E | | 46 | | 64 | | E | |
| | | WB | WBL - Hunt Street | 56 | 578 | 60 | 43 | E | D | 54 | 586 | 73 | 51 | E | D | 42 | 397 | 63 | 33 | E | C | 43 | 398 | 88 | 39 | F | D |
| | | | WBL - 44th Street | 5 | | 52 | | D | | 5 | | 59 | | E | | 4 | | 50 | | D | | 4 | | 69 | | E | |
| | | | TH | 508 | | 41 | | D | | 519 | | 49 | | D | | 335 | | 29 | | C | | 334 | | 33 | | C | |
| | | | RT | 10 | | 36 | | D | | 9 | | 46 | | D | | 16 | | 18 | | B | | 17 | | 23 | | C | |
| | | Intersection | | 1,751 | | 33 | | C | | 1,753 | | 36 | | D | | 1,882 | | 32 | | C | | 1,873 | | 32 | | C | |
| 316 | Kenilworth Avenue NE at Foote Street NE | SB | TH | 1,277 | 1,330 | 191 | 189 | F | D | 1,187 | 1,236 | 192 | 190 | F | D | 492 | 562 | 2 | 2 | A | A | 461 | 529 | 2 | 2 | A | A |
| | | | RT | 53 | | 151 | | F | | 50 | | 141 | | F | | 70 | | 2 | | A | | 68 | | 2 | | A | |
| | | EB | RT | 237 | 237 | 17 | 17 | B | B | 225 | 225 | 14 | 14 | B | B | 104 | 104 | 6 | 6 | A | A | 105 | | 6 | 6 | A | A |
| | | Intersection | | 1,566 | | 163 | | F | | 1,462 | | 163 | | F | | 666 | | 3 | | A | | 634 | | 3 | | A | |
| 219 | Minnesota Avenue NE at DOES Parking Garage | NB | LT | 105 | 667 | 23 | 12 | C | B | 107 | 646 | 26 | 13 | C | B | 6 | 873 | 11 | 12 | - | B | 1 | 866 | 14 | 11 | - | B |
| | | | TH | 561 | | 9 | | A | | 539 | | 11 | | B | | 867 | | 12 | | B | | 864 | | 11 | | B | |
| | | SB | TH | 946 | 956 | 18 | 18 | B | B | 917 | 927 | 12 | 12 | B | B | 565 | 595 | 4 | 4 | A | A | 562 | 595 | 3 | 3 | A | A |
| | | | RT | 9 | | 10 | | B | | 10 | | 5 | | A | | 31 | | 2 | | A | | 33 | | 1 | | A | |
| | | EB | LT | 0 | 0 | - | - | - | - | 0 | 0 | - | - | - | - | 10 | 172 | 16.0 | 18.0 | B | B | 10 | 172 | 17.7 | 18.0 | B | B |
| | | | RT | 0 | | - | | - | | 0 | | - | | - | | 162 | | 18.1 | | B | | 162 | | 18.1 | | B | |
| | | Intersection | | 1,622 | | 15 | | B | | 10 | | 5 | | A | | 202 | | 15 | | B | | 205 | | 15 | | B | |

**Simulated level of service is approximated based on delay but is not equivalent to that produced using Highway Capacity Manual methodology.*
**The intersections are numbered based on their inclusion in both the Streetcar and IMR projects (100s), the Streetcar project (200s), and the IMR project (300s).*
**MOEs represent an average of 10 simulation runs.*

### 7.1.1.3 Travel Time Comparison

#### 7.1.1.3.1 AM Peak Period (7:00 AM - 9:00 AM); PM Peak Period (4:30 PM - 6:30 PM)

| Route | 2025 NB AM | 2025 Build AM | 2025 NB PM | 2025 Build PM |
|---|---|---|---|---|
| NB DC-295 from Nelson Place NE to East Capitol Street Bridge | 01:15 | 01:15 | 03:51 | 02:20 |
| NB DC-295 from East Capitol Street to Benning Road NE | 00:37 | 00:37 | 02:21 | 02:20 |
| NB DC-295 from Benning Road NE to Nannie Helen Burroughs Ave NE | 00:44 | 00:44 | 02:30 | 02:28 |
| NB DC-295 from Nannie Helen Burroughs Ave NE to Polk Street NE | 00:45 | 00:45 | 02:50 | 02:50 |
| **NB DC-295** | **03:21** | **03:21** | **11:32** | **11:44** |
| SB DC-295 from Polk Street NE to Lane Place NE | 03:11 | 03:12 | 00:31 | 00:31 |
| SB DC-295 from Lane Place NE to Nannie Helen Burroughs Ave NE | 01:29 | 01:30 | 00:13 | 00:13 |
| SB DC-295 from Nannie Helen Burroughs Ave NE to Benning Road NE | 06:38 | 06:25 | 00:45 | 00:45 |
| SB DC-295 from Benning Road NE to East Capitol Street | 03:44 | 03:37 | 00:53 | 00:59 |
| SB DC-295 from East Capitol Street NE to N Street NE | 03:51 | 03:51 | 02:22 | 02:29 |
| **SB DC-295** | **18:53** | **18:35** | **04:44** | **04:57** |
| WB Benning Road NE from East Capitol Street to Minnesota Ave NE | 03:04 | 03:05 | 02:49 | 02:51 |
| WB Benning Road NE from Minnesota Ave NE to 36th Street NE | 00:42 | 00:41 | 00:39 | 00:39 |
| WB Benning Road NE from 36th Street NE to Anacostia Ave NE | 00:47 | 01:02 | 00:40 | 00:51 |
| WB Benning Road NE from Anacostia Ave NE to 26th Street NE | 01:19 | 01:30 | 01:03 | 02:36 |
| **WB Benning Road NE** | **05:52** | **06:18** | **05:11** | **05:36** |
| EB Benning Road NE from 26th Street NE to Anacostia Ave NE | 01:09 | 01:21 | 01:06 | 01:04 |
| EB Benning Road NE from Anacostia Ave NE to 36th Street NE | 00:54 | 01:03 | 00:45 | 00:57 |
| EB Benning Road NE from 36th Street NE to Minnesota Ave NE | 00:50 | 00:48 | 00:49 | 02:12 |
| EB Benning Road NE from Minnesota Ave NE to East Capitol Street | 03:55 | 03:23 | 02:44 | 02:55 |
| **EB Benning Road NE** | **06:48** | **06:35** | **05:24** | **06:23** |

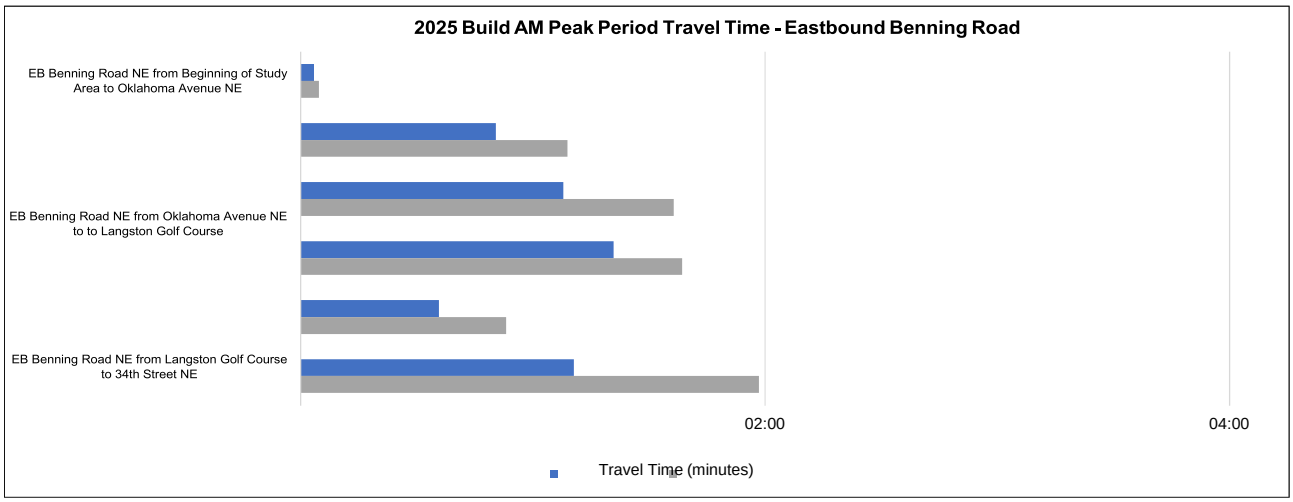


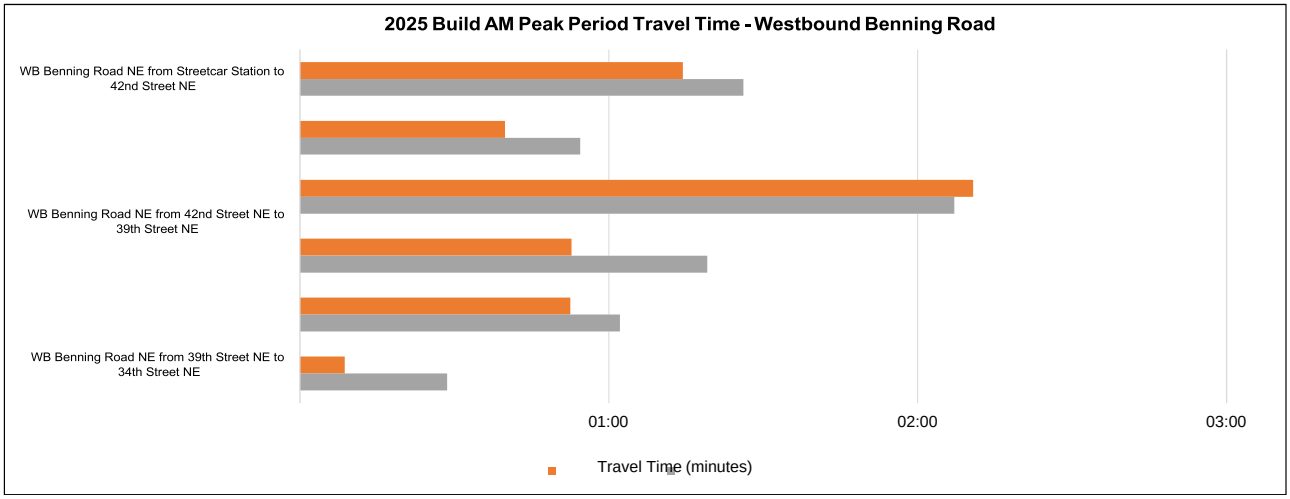
### 7.1.1.4 2025 Build Streetcar Travel Time Comparison

#### 7.1.1.4.1 AM Peak Period (7:00 AM - 9:00 AM); PM Peak Period (4:30 PM - 6:30 PM)

| Streetcar Travel Time Results | | | |
|---|---|---|---|
| **Route** | **Vehicular Travel Time (MM:SS)** | **Streetcar Travel Time (MM:SS)*** | **Difference (MM:SS)** |
| WB Benning Road NE from Streetcar Station to 42nd Street NE | 01:14 | 01:26 | 00:12 |
| WB Benning Road NE from 42nd Street NE to 39th Street NE | 00:40 | 00:54 | 00:15 |
| WB Benning Road NE from 39th Street NE to 34th Street NE | 02:11 | 02:07 | -00:04 |
| WB Benning Road NE from 34th Street NE to Langston Golf Course | 00:53 | 01:19 | 00:26 |
| WB Benning Road NE from Langston Golf Course to Oklahoma Avenue NE | 00:53 | 01:02 | 00:10 |
| WB Benning Road NE from Oklahoma Avenue NE to End of Study Area | 00:09 | 00:29 | 00:20 |
| **WB Benning Road NE** | **05:59** | **07:18** | **01:19** |
| EB Benning Road NE from Beginning of Study Area to Oklahoma Avenue NE | 00:04 | 00:05 | 00:01 |
| EB Benning Road NE from Oklahoma Avenue NE to Langston Golf Course | 00:51 | 01:09 | 00:18 |
| EB Benning Road NE from Langston Golf Course to 34th Street NE | 01:08 | 01:36 | 00:29 |
| EB Benning Road NE from 34th Street NE to 39th Street NE | 01:21 | 01:39 | 00:18 |
| EB Benning Road NE from 39th Street NE to 42nd Street NE | 00:36 | 00:53 | 00:17 |
| EB Benning Road NE from 42nd Street NE to Streetcar Station | 01:11 | 01:58 | 00:48 |
| **EB Benning Road NE** | **05:09** | **07:20** | **02:11** |

**Streetcar travel time does not include dwell time at stops (assuming 20 seconds per stop, on average)*



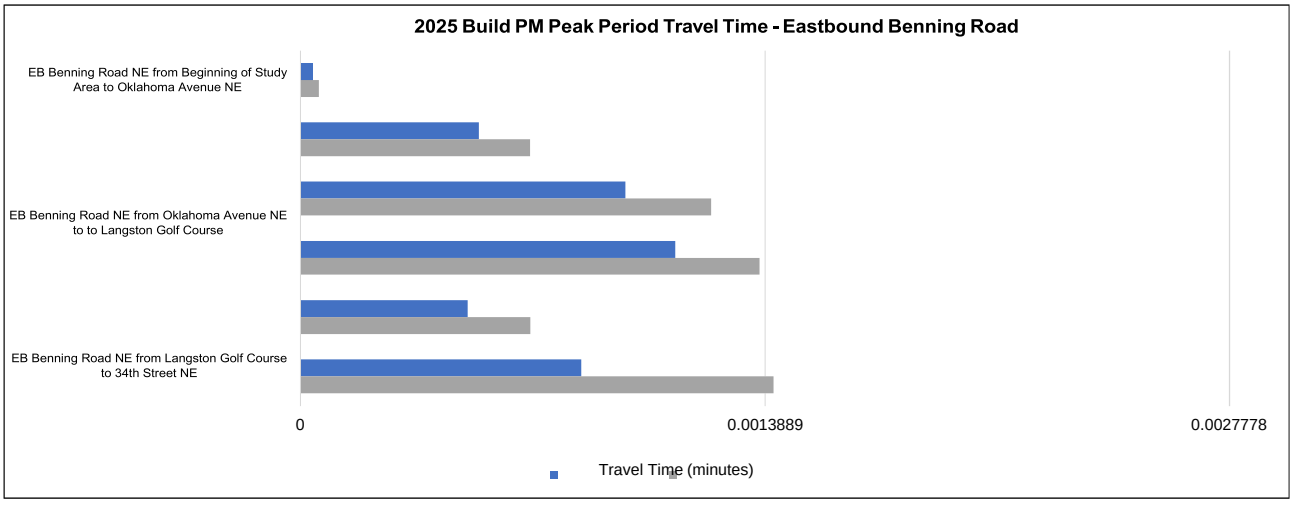



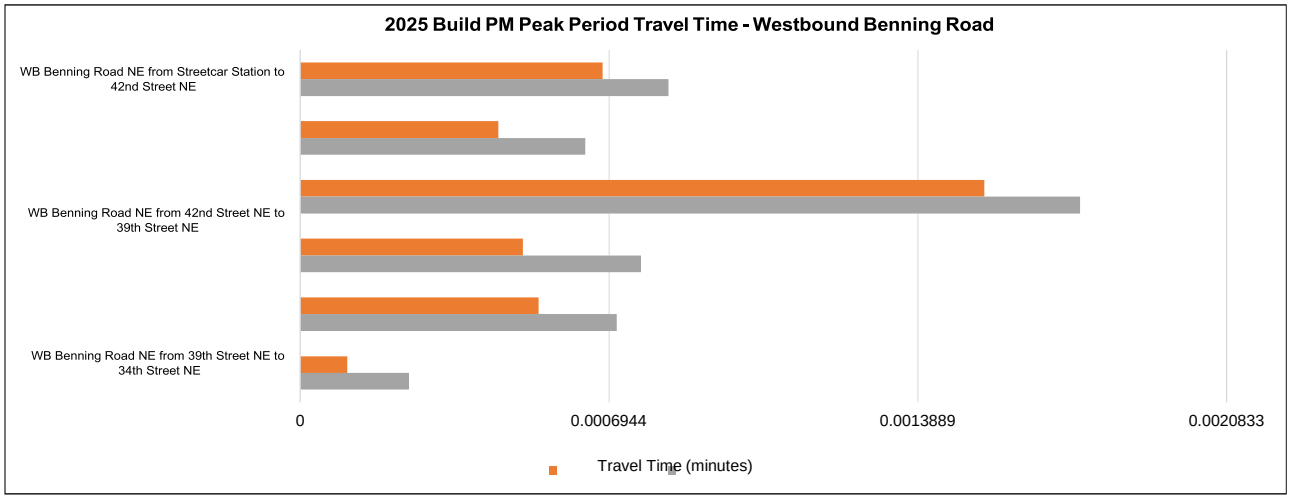
## 7.1.1.5 2025 Build Streetcar Travel Time Comparison

### 7.1.1.5.1 AM Peak Period (7:00 AM - 9:00 AM); PM Peak Period (4:30 PM - 6:30 PM)

| Streetcar Travel Time Results | | | |
|---|---|---|---|
| **Route** | **Vehicular Travel Time (MM:SS)** | **Streetcar Travel Time (MM:SS)*** | **Difference (MM:SS)** |
| WB Benning Road NE from Streetcar Station to 42nd Street NE | 00:59 | 01:12 | 00:13 |
| WB Benning Road NE from 42nd Street NE to 39th Street NE | 00:39 | 00:55 | 00:17 |
| WB Benning Road NE from 39th Street NE to 34th Street NE | 02:13 | 02:32 | 00:19 |
| WB Benning Road NE from 34th Street NE to Langston Golf Course | 00:43 | 01:06 | 00:23 |
| WB Benning Road NE from Langston Golf Course to Oklahoma Avenue NE | 00:46 | 01:01 | 00:15 |
| WB Benning Road NE from Oklahoma Avenue NE to End of Study Area | 00:09 | 00:21 | 00:12 |
| **WB Benning Road NE** | **05:29** | **07:07** | **01:38** |
| EB Benning Road NE from Beginning of Study Area to Oklahoma Avenue NE | 00:03 | 00:05 | 00:02 |
| EB Benning Road NE from Oklahoma Avenue NE to Langston Golf Course | 00:46 | 00:59 | 00:13 |
| EB Benning Road NE from Langston Golf Course to 34th Street NE | 01:24 | 01:46 | 00:22 |
| EB Benning Road NE from 34th Street NE to 39th Street NE | 01:37 | 01:59 | 00:22 |
| EB Benning Road NE from 39th Street NE to 42nd Street NE | 00:43 | 00:59 | 00:16 |
| EB Benning Road NE from 42nd Street NE to Streetcar Station | 01:13 | 02:02 | 00:50 |
| **EB Benning Road NE** | **05:46** | **07:51** | **02:05** |

*Streetcar travel time does not include dwell time at stops (assuming 20 seconds per stop, on average)



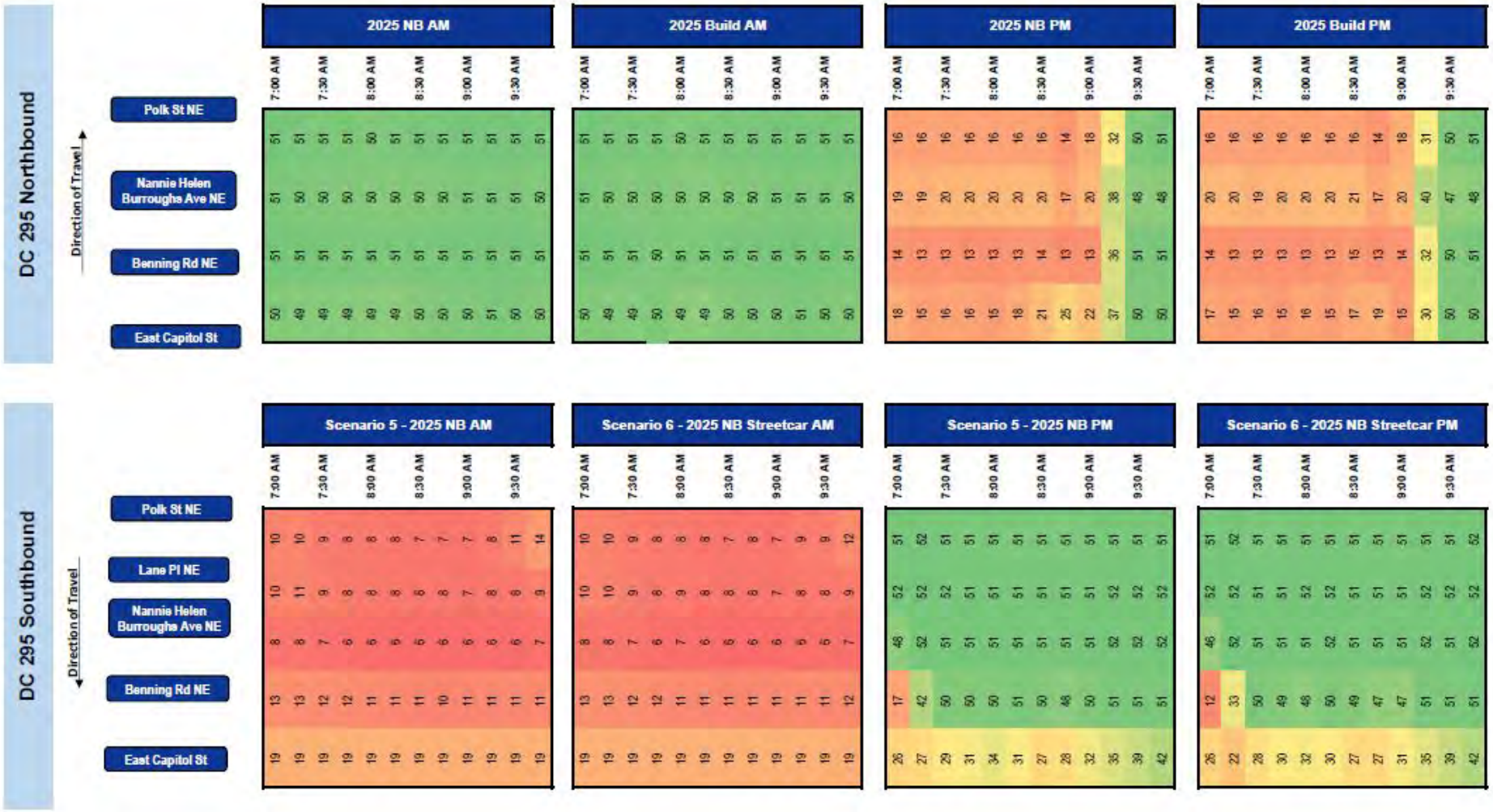
### 7.1.1.6 Queue Length Comparison

#### 7.1.1.6.1 AM Peak Period (7:00 AM - 9:00 AM); PM Peak Period (4:30 PM - 6:30 PM)

| Location | | Vissim Max Queue (feet) | | | |
|---|---|---|---|---|---|
| | | 2025 NB AM | 2025 Build AM | 2025 NB PM | 2025 Build PM |
| DC 295 and Benning Road NE Interchange | Eastbound Benning Road NE to Southbound DC-295 | 0 | 0 | 25 | 20 |
| | Eastbound Benning Road NE to Northbound DC-295 | 11 | 3 | 1411 | 1627 |
| | Southbound Kenilworth Avenue NE to Northbound DC-295 | 16 | 14 | 0 | 0 |
| | Northbound DC-295 to Westbound Benning Road NE | 375 | 308 | 0 | 0 |
| | Southbound Kenilworth Avenue NE to Westbound Benning Road NE | 0 | 444 | 0 | 93 |
| Benning Road NE and East Capitol Street Intersection | Southbound Benning Road NE at East Capitol Street | 533 | 410 | 492 | 402 |
| | Northbound Benning Road NE at East Capitol Street | 417 | 438 | 244 | 235 |
| | Westbound East Capitol Street at Benning Road NE | 1775 | 1781 | 229 | 219 |
| | Eastbound East Capitol Street at Benning Road NE | 220 | 232 | 1332 | 1335 |
| East Capitol Street and Texas Ave Intersection | Northbound Texas Avenue at East Capitol Street | 432 | 450 | 207 | 232 |
| | Southbound Texas Avenue at East Capitol Street (left turn from East Capitol to Texas) | 74 | 95 | 253 | 156 |
| Benning Road NE and Minnesota Avenue NE | Eastbound Benning Road NE at Minnesota Avenue NE | 372 | 270 | 560 | 673 |
| | Westbound Benning Road NE at Minnesota Avenue NE | 378 | 412 | 284 | 285 |
| | Northbound Minnesota Avenue NE at Benning Road NE | 460 | 353 | 285 | 442 |
| | Southbound Minnesota Avenue NE at Benning Road NE | 530 | 533 | 447 | 445 |

## Speed Heat Map Comparison

AM Analysis Period (7:00 AM - 10:00 AM); PM Analysis Period (4:30 PM - 7:30 PM)



### 7.1.1.6.2 2025 Build Curbside Alignment Morning Peak Hour Intersection Delay and Levels of Service (LOS)

| Intersection | Traffic Control | Intersection | | Northbound Approach | | Southbound Approach | | Westbound Approach | | Eastbound Approach | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road and 26th Street | Signalized | 7.5 | A | - | - | 28.5 | C | 6.0 | A | 9.3 | A |
| Benning Road and Oklahoma Avenue | Signalized | 25.0 | C | 21.9 | C | - | - | 29.5 | C | 12.1 | B |
| Benning Road and Anacostia Avenue | Signalized | 7.2 | A | 32.8 | C | 32.9 | C | 3.7 | A | 12.5 | B |
| Benning Road and 34th Street | Signalized | 12.5 | B | 16.8 | B | 35.2 | D | 12.1 | B | 10.1 | B |
| Benning Road and Minnesota Avenue | Signalized | 54.2 | D | 44.0 | D | 72.2 | E | 61.0 | E | 37.4 | D |
| Benning Road and 42nd Street | Signalized | 11.4 | B | 38.6 | D | 34.5 | C | 7.7 | A | 6.2 | A |
| Benning Road and 45nd Street | Signalized | 8.0 | A | 5.8 | A | 10.5 | B | 21.3 | C | 26.0 | C |
| Benning Road and Central Avenue* | Unsignalized | 11.1 | B | - | - | - | - | 11.1 | B | - | - |
| Benning Road and E Capitol Street | Signalized | 180.5 | F | 284.5 | F | 62.2 | E | 127.2 | F | 386.2 | F |
| Minnesota Avenue and Dix Street | Signalized | 9.1 | A | 7.5 | A | 8.9 | A | 20.3 | C | 18.0 | B |
| Minnesota Avenue and Grant Street | Signalized | 15.5 | B | 13.8 | B | 10.9 | B | 39.0 | D | - | - |
| Minnesota Avenue and Gault Place* | Unsignalized | 20.7 | C | 0.5 | A | 1.6 | A | 20.7 | C | 14.2 | B |
| Minnesota Avenue and Hayes Street* | Unsignalized | 15.4 | C | 1.7 | A | 0.9 | A | 15.4 | C | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | Signalized | 30.7 | C | 37.9 | D | 29.1 | C | 27.6 | C | 29.6 | C |
| Benning Road and 44th Street | Signalized | 17.1 | B | 15.9 | B | 11.6 | B | 27.7 | C | - | - |

** Indicates unsignalized intersections, for which intersection LOS is expressed in terms of the average vehicle delay of the worst approach delay*
*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*

### 7.1.1.6.3 2025 Build Curbside Alignment Morning Peak Hour Maximum Queue Length (feet)

| Intersection | Northbound | | | Southbound | | | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Benning Road and 26th Street | - | - | - | 124 | - | 151 | - | 302 | 285 | 90 | 127 | - |
| Benning Road and Oklahoma Avenue | 115 | - | 98 | - | - | - | 740 | 740 | - | - | 209 | 214 |
| Benning Road and Anacostia Avenue | 186 | - | 176 | 65 | - | - | 281 | 281 | 281 | 173 | 173 | 159 |
| Benning Road and 34th Street | 155 | 155 | 163 | 155 | 155 | 127 | 295 | 384 | 384 | 40 | 217 | 192 |
| Benning Road and Minnesota Avenue | 364 | 207 | 207 | 785 | 785 | 921 | - | 581 | 581 | 304 | 283 | 283 |
| Benning Road and 42nd Street | 118 | 118 | 133 | 198 | 198 | 213 | 241 | 241 | 255 | 149 | 149 | 180 |
| Benning Road and 45nd Street | 246 | 246 | 246 | 163 | 163 | 163 | 70 | 70 | 70 | 38 | 38 | 38 |
| Benning Road and Central Avenue | - | - | - | - | - | - | - | - | 257 | - | - | - |
| Benning Road and E Capitol Street | 1072 | 1072 | 1072 | 320 | 320 | 330 | 1674 | 1674 | 1674 | 1463 | 1463 | 1463 |
| Minnesota Avenue and Dix Street | 191 | 191 | 191 | 169 | 169 | 169 | 121 | 121 | 121 | 22 | 22 | 22 |
| Minnesota Avenue and Grant Street | 94 | 227 | 227 | 203 | 203 | 203 | 245 | - | 245 | - | - | - |
| Minnesota Avenue and Gault Place | - | 47 | 47 | 117 | 112 | - | 53 | - | 49 | 104 | 102 | 103 |
| Minnesota Avenue and Hayes Street | 71 | 67 | 67 | 8 | 3 | 3 | 43 | 24 | 47 | - | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | 466 | 466 | 466 | - | 274 | 292 | 230 | 230 | 251 | 401 | 400 | 401 |
| Benning Road and 44th Street | - | 392 | 392 | 148 | 148 | - | 295 | - | 294 | - | - | - |

*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*

### 7.1.1.6.4 2025 Build Curbside Alignment Evening Peak Hour Intersection Delay and Levels of Service (LOS)

| Intersection | Traffic Control | Intersection | | Northbound Approach | | Southbound Approach | | Westbound Approach | | Eastbound Approach | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road and 26th Street | Signalized | 10.5 | B | - | - | 40.5 | D | 3.7 | A | 11.3 | B |
| Benning Road and Oklahoma Avenue | Signalized | 7.5 | A | 21.4 | C | - | - | 9.3 | A | 5.8 | A |
| Benning Road and Anacostia Avenue | Signalized | 4.5 | A | 32.2 | C | 44.6 | D | 2.9 | A | 4.3 | A |
| Benning Road and 34th Street | Signalized | 19.4 | B | 18.1 | B | 36.8 | D | 12.3 | B | 22.3 | C |
| Benning Road and Minnesota Avenue | Signalized | 41.9 | D | 36.7 | D | 45.8 | D | 52.4 | D | 40.9 | D |
| Benning Road and 42nd Street | Signalized | 19.1 | B | 35.3 | D | 33.3 | C | 5.4 | A | 21.8 | C |
| Benning Road and 45nd Street | Signalized | 54.8 | D | 3.0 | A | 99.2 | F | 28.0 | C | 34.4 | C |
| Benning Road and Central Avenue* | Unsignalized | 4.2 | A | - | - | - | - | 4.2 | A | - | - |
| Benning Road and E Capitol Street | Signalized | 165.9 | F | 286.8 | F | 69.1 | E | 251.0 | F | 148.2 | F |
| Minnesota Avenue and Dix Street | Signalized | 11.5 | B | 8.7 | A | 11.6 | B | 22.1 | C | 19.1 | B |
| Minnesota Avenue and Grant Street | Signalized | 14.9 | B | 16.9 | B | 8.0 | A | 30.0 | C | - | - |
| Minnesota Avenue and Gault Place* | Unsignalized | 12.4 | B | 1.0 | A | 1.2 | A | 11.6 | B | 12.4 | B |
| Minnesota Avenue and Hayes Street* | Unsignalized | 19.9 | C | 1.9 | A | 2.5 | A | 19.9 | C | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | Signalized | 32.6 | C | 39.5 | D | 27.8 | C | 27.1 | C | 31.7 | C |
| Benning Road and 44th Street | Signalized | 60.0 | E | 18.4 | B | 99.4 | F | 34.7 | C | - | - |

** Indicates unsignalized intersections, for which intersection LOS is expressed in terms of the average vehicle delay of the worst approach delay*
*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*

### 7.1.1.6.5 2025 Build Curbside Alignment Evening Peak Hour Maximum Queue Length (feet)

| Intersection | Northbound | | | Southbound | | | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Benning Road and 26th Street | - | - | - | 191 | - | 218 | - | 157 | 140 | 41 | 285 | - |
| Benning Road and Oklahoma Avenue | 102 | - | 85 | - | - | - | 122 | 122 | - | - | 287 | 290 |
| Benning Road and Anacostia Avenue | 114 | - | 104 | 11 | - | - | 105 | 105 | 105 | 273 | 273 | 260 |
| Benning Road and 34th Street | 116 | 116 | 124 | 78 | 78 | 29 | 210 | 148 | 148 | 8 | 566 | 542 |
| Benning Road and Minnesota Avenue | 194 | 273 | 273 | 446 | 446 | 285 | - | 291 | 291 | 833 | 982 | 982 |
| Benning Road and 42nd Street | 135 | 135 | 151 | 168 | 168 | 183 | 140 | 140 | 154 | 592 | 592 | 626 |
| Benning Road and 45nd Street | 136 | 136 | 136 | 469 | 469 | 469 | 105 | 57 | 85 | 29 | 29 | 29 |
| Benning Road and Central Avenue | - | - | - | - | - | - | - | - | 68 | - | - | - |
| Benning Road and E Capitol Street | 1,017 | 1,017 | 1,017 | 363 | 363 | 373 | 1,032 | 1,032 | 1,032 | 1,466 | 1,466 | 1,466 |
| Minnesota Avenue and Dix Street | 171 | 171 | 171 | 255 | 255 | 255 | 154 | 154 | 154 | 90 | 90 | 90 |
| Minnesota Avenue and Grant Street | 86 | 607 | 607 | 141 | 141 | 141 | 104 | - | 104 | - | - | - |
| Minnesota Avenue and Gault Place | - | 97 | 97 | 97 | 95 | - | 55 | - | 51 | 74 | 97 | 69 |
| Minnesota Avenue and Hayes Street | 131 | 126 | 126 | 31 | 9 | 9 | 40 | 21 | 44 | - | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | 435 | 435 | 435 | - | 192 | 210 | 183 | 183 | 203 | 582 | 582 | 582 |
| Benning Road and 44th Street | - | 234 | 234 | 830 | 830 | - | 254 | - | 255 | - | - | - |

*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*

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# 8.0 Attachment C – Design Year 2045 Results

### 8.1.1.1 Freeway and Ramp MOEs Comparison

#### 8.1.1.1.1 AM Peak Hour (7:45 AM - 8:45 AM) PM Peak Hour (4:30 PM - 5:30 PM)

| Facility | Segment | Type | 2045 No Build AM | | | 2045 Build AM | | | 2045 No Build PM | | | 2045 Build PM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) |
| NB DC-295 | Mainline south of EB Capitol Street On-Ramp | Basic | 2,895 | 48 | 30 | 2,895 | 48 | 30 | 2,900 | 13 | 112 | 2,900 | 14 | 103 |
| | Between EB Capitol Street On-Ramp and WB Benning Road Off-Ramp | Merge/Diverge | 3,260 | 50 | 21 | 3,260 | 51 | 21 | 3,825 | 11 | 111 | 3,865 | 13 | 100 |
| | Between WB Benning Road Off-Ramp and EB Benning Road/Kenilworth Avenue On-Ramp | Basic | 2,990 | 51 | 20 | 2,990 | 51 | 20 | 3,720 | 10 | 121 | 3,760 | 12 | 109 |
| | Between EB Benning Road/Kenilworth Avenue On-Ramp and Nannie Helen Burroughs Avenue Off-Ramp | Merge/Diverge | 3,475 | 48 | 23 | 3,475 | 48 | 23 | 4,700 | 17 | 87 | 4,705 | 20 | 77 |
| | Between Nannie Helen Burroughs Avenue Off-Ramp and Kenilworth Avenue On-Ramp | Basic | 2,795 | 52 | 18 | 2,795 | 52 | 18 | 3,710 | 41 | 38 | 3,710 | 33 | 54 |
| | Mainline north of Nannie Helen Burroughs Avenue | Merge/Basic | 3,330 | 43 | 21 | 3,330 | 44 | 21 | 4,015 | 34 | 42 | 4,015 | 23 | 59 |
| SB DC-295 | Mainline North of Deane Avenue Off-Ramp | Merge/Diverge | 3,290 | 8 | 115 | 3,290 | 8 | 114 | 3,405 | 51 | 20 | 3,405 | 51 | 21 |
| | Between Deane Avenue Off-Ramp and Kenilworth Avenue Off-Ramp | Basic/Diverge | 3,000 | 7 | 135 | 3,000 | 7 | 134 | 3,015 | 51 | 19 | 3,015 | 51 | 19 |
| | Between Kenilworth Avenue Off-Ramp and Kenilworth Avenue On-Ramp | Basic | 2,190 | 4 | 169 | 2,250 | 4 | 165 | 2,785 | 52 | 18 | 2,805 | 52 | 18 |
| | Between Kenilworth Avenue On-Ramp and EB Benning Road On-Ramp | Merge/Basic | 2,930 | 6 | 147 | 3,050 | 6 | 142 | 3,060 | 51 | 19 | 3,100 | 51 | 20 |
| | Between EB Benning Road On-Ramp and Baker Street Off-Ramp | Weave | 3,245 | 7 | 103 | 3,365 | 8 | 101 | 3,390 | 51 | 17 | 3,410 | 51 | 17 |
| | Between Baker Street Off-Ramp and WB Capitol Street Off-Ramp | Diverge | 3,205 | 11 | 93 | 3,265 | 11 | 93 | 3,325 | 49 | 23 | 3,345 | 49 | 23 |
| | Between WB Capitol Street Off-Ramp and EB Capitol Street On-Ramp | Basic | 2,690 | 12 | 106 | 2,690 | 12 | 106 | 2,925 | 44 | 35 | 2,925 | 43 | 36 |
| | Mainline south of EB Capitol Street On-Ramp | Merge/Basic | 3,145 | 15 | 91 | 3,145 | 15 | 90 | 3,080 | 33 | 49 | 3,080 | 33 | 51 |

| Facility | Segment | Type | 2045 No Build AM | | | 2045 Build AM | | | 2045 No Build PM | | | 2045 Build PM | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) | VISSIM Throughput (vph) | Average Speed (mph) | Average Density (vpmpl) |
| East Capitol Street | EB Capitol Street to SB DC-295 | Ramp | 449 | 24 | 20 | 449 | 24 | 20 | 159 | 29 | 6 | 162 | 29 | 6 |
| | EB Capitol Street to NB DC-295 | Ramp | 367 | 32 | 12 | 366 | 32 | 12 | 913 | 25 | 39 | 955 | 26 | 40 |
| | SB DC-295 to WB Capitol Street | Ramp | 486 | 40 | 13 | 537 | 40 | 14 | 407 | 43 | 10 | 421 | 43 | 10 |
| Baker Street | SB DC-295 to WB Baker Street | Ramp | 38 | 20 | 2 | 100 | 20 | 5 | 63 | 20 | 3 | 65 | 20 | 3 |
| Benning Road | EB Benning Road to SB DC-295 | Ramp | 307 | 36 | 9 | 304 | 36 | 8 | 296 | 35 | 8 | 284 | 36 | 8 |
| | EB Benning Road to NB DC-295 | Ramp | 417 | 20 | 36 | 417 | 23 | 23 | 880 | 7 | 138 | 852 | 8 | 121 |
| | NB DC-295 to WB Benning Road | Ramp | 272 | 29 | 16 | 273 | 31 | 11 | 89 | 26 | 5 | 95 | 25 | 7 |
| | NB DC-295/EB Benning Road (U-turns) to WB Benning Road | Ramp | 282 | 3 | 120 | 288 | 5 | 69 | 90 | 13 | 9 | 94 | 12 | 10 |
| | SB Kenilworth Avenue NE to NB DC-295 | Ramp | 63 | 22 | 3 | 62 | 23 | 3 | 61 | 14 | 8 | 61 | 13 | 9 |
| | EB Benning Road/SB Kenilworth Avenue NE to NB DC-295 | Ramp | 471 | 37 | 13 | 465 | 37 | 12 | 940 | 8 | 121 | 917 | 8 | 116 |
| Kenilworth Avenue | SB Kenilworth Avenue to SB DC-295 (South) | Ramp | 634 | 4 | 145 | 660 | 5 | 140 | 266 | 25 | 10 | 284 | 25 | 11 |
| | SB DC-295 to SB Kenilworth Avenue | Ramp | 757 | 12 | 77 | 712 | 11 | 73 | 239 | 39 | 6 | 216 | 39 | 6 |
| | NB Kenilworth Avenue to NB DC-295 | Ramp | 536 | 24 | 22 | 539 | 24 | 22 | 233 | 24 | 10 | 295 | 20 | 17 |
| Nannie Helen Burroughs Avenue | NB DC-295 to Nannie Helen Burroughs Avenue/Kenilworth Avenue | Ramp | 678 | 40 | 22 | 663 | 40 | 24 | 923 | 8 | 139 | 987 | 14 | 106 |
| | SB DC-295 to Deane Avenue/Kenilworth Terrace/Kenilworth Avenue | Ramp | 274 | 28 | 23 | 292 | 29 | 18 | 386 | 39 | 12 | 385 | 32 | 26 |

## 8.1.1.2 Intersection MOE Comparison

### 8.1.1.2.1 AM Peak Hour (7:45 AM - 8:45 AM) PM Peak Hour (4:30 PM - 5:30 PM)

| No. | Intersection ID | Approach | Movement | 2045 No Build AM | | | | | | 2045 Build AM | | | | | | 2045 No Build PM | | | | | | 2045 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 101 | Benning Road NE at Anacostia Avenue NE | NB | LT | 120 | 199 | 54 | 39 | D | D | 184 | 259 | 60 | 49 | E | D | 42 | 73 | 57 | 37 | E | D | 43 | 73 | 59 | 38 | E | D |
| | | | RT | 79 | | 15 | | B | | 75 | | 23 | | C | | 31 | | 9 | | A | | 30 | | 9 | | A | |
| | | SB | LT | 24 | 32 | 49 | 49 | D | D | 25 | 32 | 44 | 45 | D | D | 0 | 0 | - | - | - | - | 0 | 0 | - | - | - | - |
| | | | RT | 8 | | 48 | | D | | 8 | | 46 | | D | | 0 | | - | | - | | 0 | | - | | - | |
| | | EB | LT | 15 | 1,116 | 22 | 4 | C | A | 14 | 1,097 | 40 | 7 | D | A | 6 | 2,344 | 28 | 32 | - | C | 5 | 2,250 | 32 | 36 | - | D |
| | | | TH | 1,068 | | 3 | | A | | 1,047 | | 7 | | A | | 2,235 | | 32 | | C | | 2,141 | | 36 | | D | |
| | | | RT | 34 | | 7 | | A | | 36 | | 10 | | A | | 104 | | 28 | | C | | 104 | | 37 | | D | |
| | | WB | LT | 27 | 2,836 | 13 | 4 | B | A | 24 | 2,624 | 19 | 11 | B | B | 5 | 1,220 | 24 | 1 | C | A | 5 | 1,182 | 40 | 5 | D | A |
| | | | TH | 2,790 | | 4 | | A | | 2,582 | | 11 | | B | | 1,208 | | 1 | | A | | 1,170 | | 5 | | A | |
| | | | RT | 19 | | 7 | | A | | 18 | | 15 | | B | | 8 | | 3 | | - | | 6 | | 4 | | - | |
| | | Intersection | | 4,183 | | 6 | | A | | 4,012 | | 13 | | B | | 3,637 | | 22 | | C | | 3,504 | | 26 | | C | |
| 102 | Benning Road NE at 34th Street NE | NB | LT | 20 | 84 | 36 | 17 | D | B | 19 | 83 | 3 | 6 | A | A | 35 | 119 | 40 | 22 | D | C | 30 | 113 | 39 | 21 | D | C |
| | | | RT | 62 | | 10 | | B | | 60 | | 5 | | A | | 84 | | 15 | | B | | 84 | | 15 | | B | |
| | | SB | LT | 38 | 78 | 34 | 35 | C | C | 37 | 72 | 34 | 35 | C | D | 51 | 64 | 35 | 36 | D | D | 51 | 64 | 35 | 36 | D | D |
| | | | RT | 41 | | 36 | | D | | 36 | | 36 | | D | | 11 | | 41 | | D | | 12 | | 40 | | D | |
| | | EB | LT | 9 | 1,166 | 24 | 27 | C | C | 5 | 1,141 | 33 | 29 | C | C | 0 | 2,268 | - | 32 | - | C | 0 | 2,161 | - | 42 | - | D |
| | | | TH | 1,137 | | 27 | | C | | 1,116 | | 29 | | C | | 2,206 | | 32 | | C | | 2,100 | | 42 | | D | |
| | | | RT | 20 | | 19 | | B | | 19 | | 22 | | C | | 61 | | 25 | | C | | 62 | | 50 | | D | |
| | | WB | LT | 279 | 3,178 | 28 | 17 | C | B | 282 | 2,969 | 25 | 21 | C | C | 260 | 1,468 | 50 | 16 | D | B | 264 | 1,429 | 43 | 17 | D | B |
| | | | TH | 2,779 | | 16 | | B | | 2,566 | | 20 | | B | | 1,174 | | 9 | | A | | 1,131 | | 11 | | B | |
| | | | RT | 56 | | 21 | | C | | 59 | | 22 | | C | | 29 | | 9 | | A | | 29 | | 8 | | A | |
| | | | U | 63 | | 30 | | C | | 61 | | 25 | | C | | 5 | | 36 | | D | | 6 | | 43 | | D | |
| | | Intersection | | 4,443 | | 20 | | C | | 4,205 | | 23 | | C | | 3,914 | | 26 | | C | | 3,761 | | 32 | | C | |
| 103 | Benning Road NE Ramp to DC-295 at 36th Street NE | NB | RT | 157 | 157 | 3 | 3 | A | A | 157 | 157 | 2 | 2 | A | A | 244 | 244 | 280 | 280 | F | F | 301 | 301 | 19 | 19 | C | C |
| | | EB | TH | 570 | 573 | 4 | 4 | A | A | 567 | 570 | 7 | 7 | A | A | 925 | 925 | 104 | 104 | F | F | 870 | 870 | 64 | 64 | F | F |
| | | | RT | 3 | | 2 | | A | | 3 | | 2 | | A | | 0 | | - | | - | | 0 | | - | | - | |
| | | Intersection | | 730 | | 4 | | A | | 727 | | 6 | | A | | 1,169 | | 141 | | F | | 1,171 | | 53 | | F | |
| 104 | Benning Road NE at Minnesota Avenue NE | NB | LT | 305 | 782 | 67 | 41 | E | D | 258 | 721 | 47 | 27 | D | C | 188 | 819 | 59 | 28 | E | C | 185 | 819 | 44 | 32 | D | C |
| | | | TH | 442 | | 24 | | C | | 434 | | 16 | | B | | 555 | | 19 | | B | | 560 | | 28 | | C | |
| | | | RT | 35 | | 20 | | B | | 29 | | 14 | | B | | 76 | | 24 | | C | | 74 | | 27 | | C | |
| | | SB | LT | 60 | 992 | 58 | 51 | E | D | 60 | 960 | 54 | 41 | D | D | 70 | 813 | 68 | 35 | E | C | 70 | 799 | 56 | 42 | E | D |
| | | | TH | 528 | | 49 | | D | | 534 | | 39 | | D | | 528 | | 35 | | C | | 523 | | 45 | | D | |
| | | | RT | 404 | | 54 | | D | | 366 | | 43 | | D | | 214 | | 25 | | C | | 207 | | 28 | | C | |
| | | EB | LT | 207 | 718 | 47 | 27 | D | C | 200 | 694 | 39 | 20 | D | B | 254 | 1,415 | 18 | 15 | B | B | 233 | 1,382 | 28 | 24 | C | C |
| | | | TH | 304 | | 17 | | B | | 295 | | 11 | | B | | 859 | | 14 | | B | | 838 | | 22 | | C | |
| | | | RT | 207 | | 20 | | C | | 199 | | 14 | | B | | 303 | | 17 | | B | | 312 | | 27 | | C | |
| | | WB | TH | 769 | 41 | 41 | 136 | D | D | 727 | 39 | 38 | 123 | D | D | 338 | 41 | 38 | 72 | D | D | 335 | 48 | 44 | 85 | D | D |
| | | | RT | 58 | | 44 | | D | | 64 | | 52 | | D | | 129 | | 46 | | D | | 124 | | 61 | | E | |
| | | Intersection | | 3,318 | | 41 | | D | | 3,165 | | 33 | | C | | 3,514 | | 26 | | C | | 3,459 | | 33 | | C | |
| 105 | Benning Road NE at 39th Street NE/Driveway | NB | LT | 22 | 105 | 68 | 69 | E | E | 10 | 89 | 62 | 60 | E | E | 0 | 166 | - | 57 | - | E | 18 | 180 | 60 | 57 | E | E |
| | | | RT | 82 | | 69 | | E | | 78 | | 59 | | E | | 165 | | 57 | | E | | 162 | | 56 | | E | |
| | | SB | LT | 3 | 8 | 51 | 56 | D | E | 3 | 8 | 60 | 59 | E | E | 3 | 4 | 43 | 41 | D | D | 3 | 8 | 39 | 40 | D | D |
| | | | RT | 0 | | - | | - | | 3 | | 65 | | E | | 0 | | - | | - | | 4 | | 42 | | D | |
| | | EB | LT | 11 | 399 | 15 | 5 | B | A | 10 | 383 | 14 | 3 | B | A | 11 | 951 | 10 | 3 | A | A | 12 | 984 | 13 | 9 | B | A |
| | | | TH | 367 | | 5 | | A | | 353 | | 3 | | A | | 940 | | 3 | | A | | 922 | | 9 | | A | |
| | | | RT | 21 | | 6 | | A | | 21 | | 5 | | A | | 0 | | - | | - | | 50 | | 11 | | B | |
| | | WB | LT | 137 | 945 | 12 | 12 | B | B | 136 | 927 | 10 | 9 | A | A | 122 | 131 | 23 | 22 | C | C | 126 | 564 | 16 | 9 | B | A |
| | | | TH | 799 | | 12 | | B | | 780 | | 9 | | A | | 0 | | - | | - | | 427 | | 7 | | A | |
| | | | RT | 10 | | 10 | | B | | 11 | | 7 | | A | | 9 | | 9 | | A | | 11 | | 6 | | A | |
| | | Intersection | | 1,457 | | 14 | | B | | 1,407 | | 11 | | B | | 1,252 | | 12 | | B | | 1,737 | | 14 | | B | |

| No. | Intersection ID | Approach | Movement | 2045 No Build AM | | | | | | 2045 Build AM | | | | | | 2045 No Build PM | | | | | | 2045 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 106 | Benning Road NE at 40th Street NE | NB | LT | 4 | 88 | 11 | 6 | B | A | 4 | 84 | 10 | 6 | B | A | 59 | 226 | 28 | 22 | D | C | 61 | 222 | 25 | 20 | D | C |
| | | | RT | 84 | | 6 | | A | | 80 | | 6 | | A | | 167 | | 19 | | C | | 160 | | 18 | | C | |
| | | EB | TH | 421 | 453 | 1 | 1 | A | A | 403 | 434 | 1 | 1 | A | A | 1,035 | 1,105 | 1 | 1 | A | A | 1,019 | 1,086 | 2 | 2 | A | A |
| | | | RT | 33 | | 1 | | A | | 31 | | 1 | | A | | 70 | | 2 | | A | | 67 | | 3 | | A | |
| | | WB | LT | 191 | 1,131 | 5 | 3 | A | A | 184 | 1,105 | 4 | 2 | A | A | 128 | 649 | 12 | 4 | B | A | 126 | 631 | 12 | 4 | B | A |
| | | | TH | 940 | | 2 | | A | | 921 | | 2 | | A | | 521 | | 3 | | A | | 505 | | 2 | | A | |
| | | Intersection | | 1,673 | | 2 | | A | | 1,623 | | 2 | | A | | 1,980 | | 5 | | A | | 1,938 | | 4 | | A | |
| 107 | Benning Road NE at 41st Street NE | NB | LT | 4 | 33 | 11 | 6 | B | A | 4 | 33 | 12 | 7 | B | A | 3 | 114 | 16 | 10 | C | B | 3 | 114 | 20 | 11 | C | B |
| | | | RT | 29 | | 6 | | A | | 29 | | 6 | | A | | 111 | | 10 | | A | | 111 | | 11 | | B | |
| | | EB | TH | 489 | 504 | 0 | 0 | A | A | 471 | 483 | 0 | 0 | A | A | 1,195 | 1,198 | 1 | 1 | A | A | 1,168 | 1,172 | 2 | 2 | A | A |
| | | | RT | 15 | | 1 | | A | | 13 | | 1 | | A | | 3 | | 1 | | A | | 4 | | 2 | | A | |
| | | WB | LT | 138 | 1,266 | 5 | 3 | A | A | 136 | 1,237 | 5 | 3 | A | A | 40 | 686 | 12 | 2 | B | A | 41 | 669 | 10 | 2 | B | A |
| | | | TH | 1,128 | | 3 | | A | | 1,101 | | 3 | | A | | 646 | | 1 | | A | | 628 | | 1 | | A | |
| | | Intersection | | 1,804 | | 2 | | A | | 1,754 | | 2 | | A | | 1,998 | | 2 | | A | | 1,955 | | 2 | | A | |
| 108 | Benning Road NE at 42nd Street NE | NB | LT | 11 | 99 | 20 | 18 | C | B | 5 | 99 | 20 | 19 | C | B | 31 | 167 | 31 | 29 | C | C | 34 | 167 | 32 | 31 | C | C |
| | | | TH | 65 | | 21 | | C | | 71 | | 21 | | C | | 125 | | 29 | | C | | 122 | | 32 | | C | |
| | | | RT | 23 | | 11 | | B | | 24 | | 12 | | B | | 11 | | 24 | | C | | 11 | | 20 | | C | |
| | | SB | LT | 9 | 475 | 111 | 103 | F | F | 7 | 459 | 120 | 113 | F | F | 24 | 312 | 48 | 40 | D | D | 26 | 313 | 63 | 56 | E | E |
| | | | TH | 139 | | 108 | | F | | 136 | | 118 | | F | | 104 | | 49 | | D | | 106 | | 66 | | E | |
| | | | RT | 327 | | 101 | | F | | 316 | | 110 | | F | | 183 | | 34 | | C | | 181 | | 49 | | D | |
| | | | LT | 119 | 513 | 23 | 14 | C | B | 120 | 498 | 18 | 8 | B | A | 478 | 1,304 | 29 | 21 | C | C | 475 | 1,274 | 32 | 22 | C | C |
| | | | TH | 352 | | 12 | | B | | 333 | | 5 | | A | | 763 | | 16 | | B | | 733 | | 16 | | B | |
| | | | RT | 42 | | 7 | | A | | 45 | | 9 | | A | | 63 | | 12 | | B | | 66 | | 12 | | B | |
| | | WB | LT | 4 | 938 | 16 | 15 | B | B | 4 | 921 | 18 | 14 | B | B | 5 | 504 | 24 | 13 | C | B | 4 | 487 | 11 | 9 | B | A |
| | | | TH | 888 | | 15 | | B | | 869 | | 14 | | B | | 472 | | 13 | | B | | 455 | | 9 | | A | |
| | | | RT | 47 | | 15 | | B | | 48 | | 14 | | B | | 27 | | 11 | | B | | 28 | | 9 | | A | |
| | | Intersection | | 2,025 | | 36 | | D | | 1,977 | | 36 | | D | | 2,287 | | 22 | | C | | 2,241 | | 25 | | C | |
| 208 | Benning Road NE at 26th Street NE | SB | LT | 191 | 254 | 78 | 75 | E | E | 191 | 253 | 80 | 77 | E | E | 169 | 187 | 49 | 48 | D | D | 178 | 197 | 49 | 48 | D | D |
| | | | RT | 62 | | 66 | | E | | 62 | | 68 | | E | | 18 | | 37 | | D | | 19 | | 35 | | C | |
| | | EB | LT | 86 | 1,056 | 47 | 14 | D | B | 86 | 1,035 | 54 | 13 | D | B | 10 | 2,155 | 15 | 8 | B | A | 9 | 2,111 | 13 | 8 | B | A |
| | | | TH | 970 | | 11 | | B | | 949 | | 10 | | A | | 2,146 | | 8 | | A | | 2,102 | | 8 | | A | |
| | | WB | TH | 1,887 | 2,379 | 8 | 10 | A | A | 1,805 | 2,313 | 9 | 11 | A | B | 1,077 | 1,225 | 4 | 4 | A | A | 1,052 | 1,207 | 4 | 4 | A | A |
| | | | RT | 492 | | 16 | | B | | 508 | | 17 | | B | | 148 | | 6 | | A | | 154 | | 6 | | A | |
| | | Intersection | | 3,688 | | 16 | | B | | 3,601 | | 16 | | B | | 3,567 | | 9 | | A | | 3,515 | | 9 | | A | |
| 209 | Benning Road NE at Oklahoma Avenue NE | NB | LT | 89 | 147 | 63 | 39 | E | D | 91 | 148 | 60 | 38 | E | D | 39 | 124 | 53 | 21 | D | C | 58 | 84 | 54 | 39 | D | D |
| | | | RT | 59 | | 4 | | A | | 57 | | 4 | | A | | 84 | | 6 | | A | | 26 | | 5 | | A | |
| | | EB | TH | 1,071 | 1,163 | 12 | 13 | B | B | 1,052 | 1,144 | 11 | 11 | B | B | 2,268 | 2,330 | 2 | 2 | A | A | 2,236 | 2,295 | 1 | 1 | A | A |
| | | | RT | 92 | | 19 | | B | | 92 | | 17 | | B | | 61 | | 3 | | A | | 59 | | 1 | | A | |
| | | WB | LT | 537 | 2,835 | 73 | 75 | E | E | 492 | 2,721 | 58 | 56 | E | E | 73 | 1,257 | 29 | 5 | C | A | 60 | 1,209 | 26 | 7 | C | A |
| | | | TH | 2,298 | | 76 | | E | | 2,229 | | 55 | | E | | 1,184 | | 3 | | A | | 1,149 | | 6 | | A | |
| | | Intersection | | 4,146 | | 56 | | E | | 4,013 | | 42 | | D | | 3,710 | | 3 | | A | | 3,588 | | 4 | | A | |
| 210 | Minnesota Avenue NE at Dix Street NE | NB | TH | 645 | 41 | 40 | 125 | D | D | 588 | 11 | 11 | 27 | B | B | 677 | 27 | 27 | 80 | C | C | 682 | 29 | 28 | 87 | C | C |
| | | | RT | 120 | | 49 | | D | | 111 | | 11 | | B | | 154 | | 28 | | C | | 157 | | 29 | | C | |
| | | SB | LT | 46 | 734 | 25 | 8 | C | A | 52 | 733 | 4 | 3 | A | A | 153 | 833 | 31 | 20 | C | B | 153 | 836 | 36 | 19 | D | B |
| | | | TH | 659 | | 7 | | A | | 656 | | 3 | | A | | 629 | | 17 | | B | | 630 | | 15 | | B | |
| | | | RT | 30 | | 10 | | B | | 25 | | 8 | | A | | 51 | | 14 | | B | | 53 | | 18 | | B | |
| | | EB | LT | 27 | 109 | 115 | 105 | F | F | 28 | 113 | 102 | 99 | F | F | 36 | 114 | 37 | 35 | D | C | 37 | 113 | 39 | 35 | D | D |
| | | | TH | 29 | | 99 | | F | | 30 | | 96 | | F | | 33 | | 32 | | C | | 31 | | 35 | | C | |
| | | | RT | 53 | | 104 | | F | | 55 | | 100 | | F | | 45 | | 35 | | C | | 46 | | 33 | | C | |
| | | WB | LT | 118 | 243 | 219 | 213 | F | F | 122 | 243 | 197 | 195 | F | F | 260 | 447 | 161 | 158 | F | F | 253 | 438 | 164 | 164 | F | F |
| | | | TH | 20 | | 207 | | F | | 19 | | 191 | | F | | 84 | | 159 | | F | | 85 | | 165 | | F | |
| | | | RT | 106 | | 207 | | F | | 102 | | 194 | | F | | 103 | | 152 | | F | | 100 | | 163 | | F | |
| | | Intersection | | 1,853 | | 54 | | D | | 1,790 | | 38 | | D | | 2,240 | | 51 | | D | | 2,241 | | 52 | | D | |
| 211 | Minnesota Avenue NE at Bus Exit South | NB | TH | 599 | 599 | 14 | 14 | B | B | 594 | 594 | 15 | 15 | B | B | 927 | 927 | 13 | 13 | B | B | 932 | 932 | 14 | 14 | B | B |
| | | SB | TH | 959 | 959 | 10 | 10 | A | A | 933 | 933 | 9 | 9 | A | A | 636 | 636 | 5 | 5 | A | A | 622 | 622 | 5 | 5 | A | A |
| | | EB | LT | 0 | 30 | - | 14 | - | B | 0 | 29 | - | 14 | - | B | 1 | 27 | 4 | 8 | A | A | 11 | 48 | 50 | 30 | D | C |
| | | | RT | 30 | | 14 | | B | | 29 | | 14 | | B | | 26 | | 8 | | A | | 37 | | 24 | | C | |
| | | Intersection | | 1,588 | | 11 | | B | | 1,556 | | 11 | | B | | 1,589 | | 10 | | A | | 1,602 | | 11 | | B | |

| No. | Intersection ID | Approach | Movement | 2045 No Build AM | | | | | | 2045 Build AM | | | | | | 2045 No Build PM | | | | | | 2045 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 212 | Minnesota Avenue NE at Grant Street NE and Bus Entrance North | NB | LT | 0 | 572 | - | 31 | - | C | 0 | 574 | - | 32 | - | C | 0 | 897 | - | 14 | - | B | 13 | 915 | 24 | 16 | C | B |
| | | | TH | 507 | | 31 | | C | | 509 | | 32 | | C | | 735 | | 14 | | B | | 753 | | 15 | | B | |
| | | | RT | 65 | | 32 | | C | | 65 | | 32 | | C | | 162 | | 18 | | B | | 149 | | 18 | | B | |
| | | SB | LT | 21 | 783 | 22 | 16 | C | B | 21 | 764 | 20 | 15 | C | B | 54 | 532 | 30 | 15 | C | B | 54 | 525 | 29 | 15 | C | B |
| | | | TH | 762 | | 15 | | B | | 742 | | 14 | | B | | 478 | | 14 | | B | | 471 | | 14 | | B | |
| | | | RT | 0 | | - | | - | | 0 | | - | | - | | 0 | | - | | - | | 0 | | - | | - | |
| | | WB | LT | 189 | 233 | 19 | 18 | B | B | 190 | 233 | 19 | 18 | B | B | 158 | 199 | 18 | 17 | B | B | 162 | 203 | 18 | 17 | B | B |
| | | | RT | 44 | | 12 | | B | | 43 | | 12 | | B | | 42 | | 11 | | B | | 41 | | 11 | | B | |
| | | Intersection | | 1,587 | | 22 | | C | | 1,571 | | 21 | | C | | 1,629 | | 15 | | B | | 1,644 | | 16 | | B | |
| 213 | Benning Road NE at Blaine Street NE | NB | RT | 58 | 15 | 15 | 4 | C | C | 58 | 7 | 7 | 3 | A | A | 34 | 11 | 9 | 2 | A | B | 34 | 10 | 10 | 2 | B | B |
| | | EB | TH | 370 | 387 | 16 | 15 | C | C | 359 | 366 | 1 | 1 | A | A | 797 | 800 | 1 | 1 | A | A | 765 | 769 | 1 | 1 | A | A |
| | | WB | LT | 277 | 1,214 | 7 | 3 | A | A | 272 | 1,194 | 5 | 2 | A | A | 32 | 530 | 11 | 1 | B | A | 30 | 510 | 9 | 1 | A | A |
| | | | TH | 937 | | 1 | | A | | 922 | | 1 | | A | | 498 | | 0 | | A | | 480 | | 0 | | A | |
| | | Intersection | | 1,659 | | 6 | | A | | 1,618 | | 2 | | A | | 1,370 | | 1 | | A | | 1,318 | | 1 | | A | |
| 214 | Benning Road NE at 44th Street NE | SB | LT | 139 | 488 | 79 | 72 | E | E | 122 | 437 | 153 | 146 | F | F | 135 | 236 | 43 | 37 | D | D | 134 | 231 | 45 | 40 | D | D |
| | | | RT | 350 | | 69 | | E | | 315 | | 143 | | F | | 101 | | 30 | | C | | 97 | | 32 | | C | |
| | | EB | LT | 104 | 425 | 148 | 58 | F | E | 106 | 416 | 25 | 15 | C | B | 169 | 832 | 17 | 7 | B | A | 166 | 798 | 11 | 8 | B | A |
| | | | TH | 321 | | 29 | | C | | 311 | | 12 | | B | | 663 | | 5 | | A | | 632 | | 7 | | A | |
| | | WB | TH | 856 | 1,018 | 16 | 15 | B | B | 845 | 1,000 | 21 | 23 | C | C | 429 | 593 | 5 | 5 | A | A | 413 | 571 | 5 | 6 | A | A |
| | | | RT | 163 | | 14 | | B | | 155 | | 35 | | C | | 164 | | 5 | | A | | 158 | | 8 | | A | |
| | | Intersection | | 1,932 | | 39 | | D | | 1,853 | | 50 | | D | | 1,661 | | 11 | | B | | 1,599 | | 12 | | B | |
| 215 | Benning Road NE at 45th Street NE | SB | LT | 49 | 87 | 477 | 464 | F | F | 58 | 101 | 357 | 348 | F | F | 12 | 29 | 16 | 11 | B | B | 14 | 29 | 47 | 28 | D | C |
| | | | RT | 39 | | 447 | | F | | 43 | | 337 | | F | | 17 | | 8 | | A | | 15 | | 10 | | B | |
| | | EB | LT | 36 | 464 | 78 | 71 | E | E | 33 | 435 | 136 | 85 | F | F | 15 | 797 | 8 | 8 | A | A | 15 | 755 | 10 | 10 | B | A |
| | | | TH | 428 | | 70 | | E | | 402 | | 80 | | F | | 782 | 0 | 8 | 0 | A | 0 | 740 | 0 | 10 | 0 | A | 0 |
| | | WB | TH | 977 | 1,059 | 2 | 2 | A | A | 952 | 1,039 | 11 | 11 | B | B | 577 | 629 | 1 | 1 | A | A | 551 | 601 | 14 | 14 | B | B |
| | | | RT | 82 | | 3 | | A | | 87 | | 10 | | B | | 52 | | 2 | | A | | 51 | | 18 | | B | |
| | | Intersection | | 1,610 | | 47 | | D | | 1,575 | | 53 | | D | | 1,456 | | 5 | | A | | 1,385 | | 12 | | B | |
| 216 | Benning RoadNE at Central Avenue NE | WB | TH | 656 | 684 | 1 | 1 | A | A | 639 | 662 | 6 | 6 | A | A | 533 | 558 | 1 | 1 | A | A | 506 | 530 | 7 | 7 | A | A |
| | | | RT | 28 | | 0 | | A | | 23 | | 0 | | A | | 25 | | 0 | | A | | 24 | | 0 | | A | |
| | | EB | TH | 388 | 388 | 97 | 97 | F | F | 383 | 383 | 83 | 83 | F | F | 672 | 672 | 28 | 28 | D | D | 630 | 630 | 23 | 23 | C | C |
| | | SB | RT | 399 | 399 | 12 | 12 | B | B | 397 | 397 | 41 | 41 | E | E | 96 | 96 | 4 | 4 | A | A | 97 | 97 | 9 | 9 | A | A |
| | | Intersection | | 1,471 | | 29 | | D | | 1,441 | | 36 | | E | | 1,326 | | 15 | | C | | 1,257 | | 15 | | B | |
| 217 | Benning Road NE at East Capitol Street SE | NB | LT | 207 | 659 | 42 | 17 | D | B | 215 | 654 | 47 | 19 | D | B | 85 | 1,866 | 89 | 9 | F | A | 62 | 1,822 | 93 | 9 | F | A |
| | | | TH | 312 | | 8 | | A | | 301 | | 6 | | A | | 1,426 | | 7 | | A | | 1,413 | | 6 | | A | |
| | | | RT | 140 | | 2 | | A | | 137 | | 2 | | A | | 355 | | 2 | | A | | 347 | | 3 | | A | |
| | | SB | LT | 14 | 1,283 | 211 | 215 | F | F | 13 | 1,317 | 263 | 209 | F | F | 52 | 759 | 60 | 34 | E | C | 65 | 768 | 63 | 35 | E | D |
| | | | TH | 1,261 | | 215 | | F | | 1,294 | | 209 | | F | | 651 | | 33 | | C | | 648 | | 34 | | C | |
| | | | RT | 8 | | 214 | | F | | 10 | | 194 | | F | | 57 | | 18 | | B | | 55 | | 22 | | C | |
| | | EB | LT | 84 | 472 | 29 | 19 | C | B | 72 | 455 | 31 | 19 | C | B | 119 | 791 | 22 | 10 | C | A | 123 | 753 | 24 | 12 | C | B |
| | | | TH | 304 | | 20 | | C | | 308 | | 20 | | C | | 388 | | 11 | | B | | 387 | | 14 | | B | |
| | | | RT | 84 | | 3 | | A | | 75 | | 3 | | A | | 283 | | 3 | | A | | 244 | | 4 | | A | |
| | | WB | LT | 411 | 888 | 58 | 53 | E | D | 450 | 897 | 134 | 110 | F | F | 60 | 540 | 164 | 57 | F | E | 53 | 529 | 130 | 54 | F | D |
| | | | TH | 462 | | 49 | | D | | 432 | | 87 | | F | | 415 | | 45 | | D | | 411 | | 46 | | D | |
| | | | RT | 15 | | 44 | | D | | 15 | | 83 | | F | | 65 | | 36 | | D | | 65 | | 40 | | D | |
| | | Intersection | | 3,302 | | 104 | | F | | 3,322 | | 119 | | F | | 3,955 | | 21 | | C | | 3,872 | | 21 | | C | |
| 218 | East Capitol Street SE at Texas Avenue SE | NB | RT | 90 | 423 | 52 | 99 | D | F | 71 | 348 | 77 | 124 | E | F | 38 | 153 | 82 | 80 | F | E | 31 | 145 | 116 | 87 | F | F |
| | | | RT2 | | | | | | | | | | | | | | | | | | | | | | | | |
| | | | LT | 288 | | 130 | | F | | 239 | | 158 | | F | | 102 | | 78 | | E | | 114 | | 79 | | E | |
| | | EB | TH | 354 | 368 | 33 | 33 | C | C | 536 | 546 | 23 | 23 | C | C | 1,555 | 1,624 | 113 | 112 | F | F | 1,552 | 1,650 | 112 | 111 | F | F |
| | | | RT | 14 | | 21 | | C | | 10 | | 20 | | C | | 69 | | 106 | | F | | 98 | | 107 | | F | |
| | | WB | U | 0 | 1,995 | - | 2 | - | A | 0 | 2,050 | - | 2 | - | A | 0 | 998 | - | 8 | - | A | 0 | 947 | - | 6 | - | A |
| | | | LT | 88 | | 13 | | B | | 92 | | 14 | | B | | 267 | | 28 | | C | | 231 | | 25 | | C | |
| | | | TH | 1,908 | | 2 | | A | | 1,958 | | 2 | | A | | 731 | | 0 | | A | | 716 | | 0 | | A | |
| | | Intersection | | 2,786 | | 21 | | C | | 2,945 | | 21 | | C | | 2,775 | | 73 | | E | | 2,743 | | 74 | | E | |

| No. | Intersection ID | Approach | Movement | 2045 No Build AM | | | | | | 2045 Build AM | | | | | | 2045 No Build PM | | | | | | 2045 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 310 | Deane Avenue NE at Lee St NE | SB | LT | 215 | 215 | 516 | 516 | F | F | 212 | 212 | 515 | 515 | F | F | 82 | 82 | 6 | 6 | A | A | 83 | 83 | 3 | 3 | A | A |
| | | | RT | | | | | | | | | | | | | | | | | | | | | | | | |
| | | EB | LT | 0 | 4 | - | 394 | - | F | 0 | 4 | - | 297 | - | F | 0 | 0 | - | - | - | - | 0 | 0 | - | - | - | - |
| | | | TH | | | | | | | | | | | | | | | | | | | | | | | | |
| | | WB | TH | 2 | 72 | 3 | 1 | - | A | 2 | 73 | 1 | 1 | - | A | 4 | 120 | 1 | 1 | - | A | 0 | 127 | - | 1 | - | A |
| | | | RT | | | | | | | | | | | | | | | | | | | | | | | | |
| | | Intersection | | 291 | | 387 | | F | | 289 | | 382 | | F | | 202 | | 3 | | A | | 210 | | 2 | | A | |
| 311 | Deane Avenue NE at Kenilworth Terrace NE | NB | LT | 7 | 258 | 288 | 268 | F | F | 7 | 236 | 331 | 297 | F | F | 18 | 292 | 83 | 53 | F | D | 18 | 235 | 101 | 72 | F | E |
| | | | RT | 251 | | 268 | | F | | 229 | | 296 | | F | | 274 | | 51 | | D | | 217 | | 69 | | E | |
| | | SB | LT | 583 | 796 | 257 | 258 | F | F | 543 | 767 | 281 | 281 | F | F | 198 | 315 | 46 | 47 | D | D | 254 | 374 | 71 | 69 | E | E |
| | | | TH | 213 | | 259 | | F | | 224 | | 281 | | F | | 118 | | 48 | | D | | 119 | | 65 | | E | |
| | | EB | TH | 150 | 235 | 68 | 57 | E | E | 147 | 228 | 71 | 59 | E | E | 66 | 87 | 59 | 53 | E | D | 68 | 89 | 56 | 48 | E | D |
| | | | RT | 84 | | 38 | | D | | 81 | | 36 | | D | | 22 | | 35 | | D | | 21 | | 22 | | C | |
| | | WB | LT | 271 | 328 | 6 | 5 | A | A | 253 | 312 | 6 | 5 | A | A | 163 | 270 | 1 | 1 | A | A | 187 | 303 | 2 | 1 | A | A |
| | | | TH | 58 | | 1 | | A | | 58 | | 1 | | A | | 108 | | 0 | | A | | 116 | | 0 | | A | |
| | | Intersection | | 1,616 | | 179 | | F | | 1,542 | | 195 | | F | | 965 | | 36 | | D | | 1,001 | | 47 | | D | |
| 312 | Deane Avenue NE at Kenilworth Avenue NE | SB | LT | 111 | 216 | 308 | 314 | F | F | 107 | 203 | 288 | 294 | F | F | 333 | 359 | 53 | 53 | D | D | 339 | 366 | 82 | 83 | F | F |
| | | | TH | 104 | | 320 | | F | | 96 | | 300 | | F | | 26 | | 51 | | D | | 28 | | 86 | | F | |
| | | EB | TH | 707 | 1,071 | 11 | 8 | B | A | 670 | 1,012 | 11 | 8 | B | A | 497 | 538 | 14 | 14 | B | B | 497 | 540 | 16 | 15 | B | B |
| | | | RT | 364 | | 2 | | A | | 341 | | 2 | | A | | 41 | | 5 | | A | | 43 | | 5 | | A | |
| | | WB | LT | 505 | 833 | 82 | 66 | F | E | 515 | 826 | 83 | 69 | F | E | 304 | 575 | 14 | 21 | B | C | 352 | 655 | 46 | 35 | D | D |
| | | | TH | 328 | | 40 | | D | | 312 | | 46 | | D | | 271 | | 29 | | C | | 303 | | 23 | | C | |
| | | Intersection | | 2,119 | | 62 | | E | | 2,041 | | 61 | | E | | 1,472 | | 26 | | C | | 1,561 | | 39 | | D | |
| 313 | Nannie Helen Burroughs Avenue NE at Kenilworth Avenue NE and DC-295 U-turns | NB | U | 128 | 668 | 45 | 21 | D | C | 127 | 656 | 39 | 18 | D | B | 147 | 483 | 333 | 339 | F | F | 146 | 495 | 284 | 287 | F | F |
| | | | LT | 59 | | 77 | | E | | 58 | | 70 | | E | | 47 | | 350 | | F | | 51 | | 301 | | F | |
| | | | TH | 53 | | 65 | | E | | 51 | | 62 | | E | | 289 | | 340 | | F | | 298 | | 286 | | F | |
| | | | RT | 428 | 428 | 70 | 70 | E | E | 421 | 421 | 69 | 69 | E | E | 438 | 438 | 440 | 440 | F | F | 457 | 457 | 378 | 378 | F | F |
| | | EB | LT | 193 | 843 | 40 | 40 | D | D | 183 | 804 | 52 | 41 | D | D | 144 | 835 | 39 | 33 | D | C | 152 | 842 | 49 | 35 | D | D |
| | | | TH | 649 | | 39 | | D | | 622 | | 38 | | D | | 691 | | 32 | | C | | 690 | | 32 | | C | |
| | | WB | TH | 794 | 1,320 | 38 | 36 | D | D | 789 | 1,317 | 40 | 36 | D | D | 532 | 1,047 | 46 | 45 | D | D | 603 | 1,213 | 28 | 27 | C | C |
| | | | RT | 527 | | 32 | | C | | 529 | | 30 | | C | | 515 | | 44 | | D | | 610 | | 26 | | C | |
| | | Intersection | | 2,831 | | 44 | | D | | 2,778 | | 44 | | D | | 2,602 | | 154 | | F | | 3,008 | | 125 | | F | |
| 314 | Nannie Helen Burroughs Avenue NE at Minnesota Avenue NE | NB | LT | 219 | 406 | 444 | 364 | F | F | 221 | 412 | 442 | 355 | F | F | 380 | 892 | 211 | 182 | F | F | 466 | 1,053 | 71 | 52 | E | D |
| | | | TH | 130 | | 280 | | F | | 133 | | 258 | | F | | 403 | | 166 | | F | | 459 | | 42 | | D | |
| | | | RT | 57 | | 253 | | F | | 58 | | 250 | | F | | 109 | | 139 | | F | | 128 | | 18 | | B | |
| | | SB | TH | 302 | 624 | 237 | 366 | F | F | 254 | 559 | 359 | 458 | F | F | 150 | 328 | 130 | 130 | F | F | 153 | 331 | 115 | 112 | F | F |
| | | | RT | 322 | | 487 | | F | | 304 | | 542 | | F | | 178 | | 130 | | F | | 179 | | 109 | | F | |
| | | EB | LT | 112 | 1,075 | 51 | 29 | D | C | 112 | 1,041 | 53 | 31 | D | C | 123 | 1,128 | 32 | 31 | C | C | 130 | 1,149 | 26 | 29 | C | C |
| | | | TH | 544 | | 34 | | C | | 526 | | 35 | | D | | 672 | | 34 | | C | | 691 | | 32 | | C | |
| | | | RT | 419 | | 17 | | B | | 403 | | 18 | | B | | 332 | | 23 | | C | | 328 | | 23 | | C | |
| | | WB | LT | 53 | 786 | 93 | 49 | F | D | 70 | 805 | 186 | 60 | F | E | 64 | 516 | 396 | 512 | F | F | 79 | 660 | 225 | 216 | F | F |
| | | | TH | 726 | | 46 | | D | | 728 | | 49 | | D | | 439 | | 525 | | F | | 563 | | 213 | | F | |
| | | | RT | 7 | | 47 | | - | | 6 | | 40 | | - | | 13 | | 626 | | F | | 18 | | 277 | | F | |
| | | Intersection | | 2,691 | | 155 | | F | | 2,816 | | 171 | | F | | 2,865 | | 176 | | F | | 3,194 | | 84 | | F | |

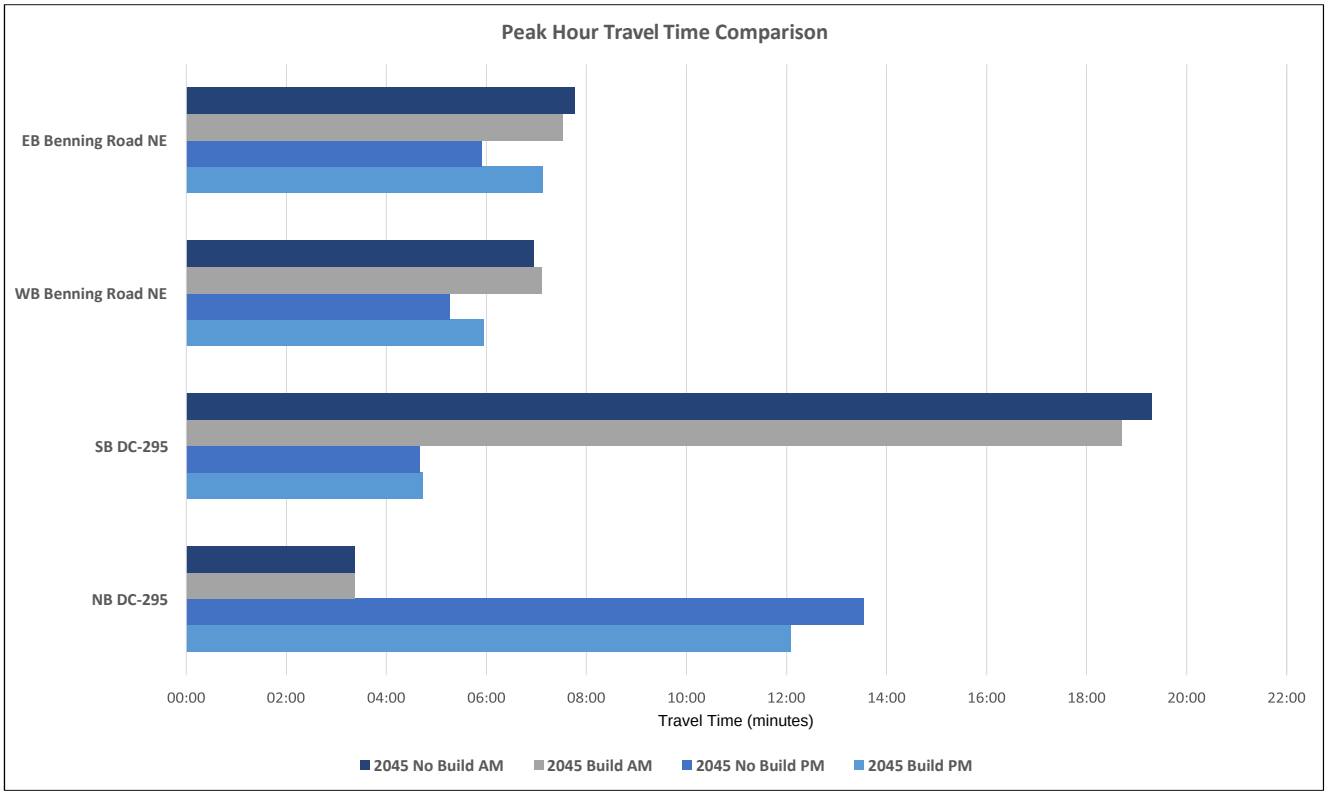
| No. | Intersection ID | Approach | Movement | 2045 No Build AM | | | | | | 2045 Build AM | | | | | | 2045 No Build PM | | | | | | 2045 Build PM | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | | Vissim Throughput (vph) | | Average Delay (sec/veh) | | LOS* | |
| 315 | Nannie Helen Burroughs Avenue NE at 44th Street NE and Hunt Place NE | NB | LT | 124 | 226 | 69 | 55 | E | E | 127 | 235 | 81 | 66 | F | E | 117 | 261 | 443 | 360 | F | F | 163 | 369 | 46 | 37 | D | D |
| | | | RT | 41 | | 32 | | C | | 40 | | 41 | | D | | 83 | | 290 | | F | | 115 | | 25 | | C | |
| | | SB | LT | 4 | 360 | 40 | 32 | D | C | 4 | 360 | 40 | 32 | D | C | 21 | 152 | 59 | 81 | E | F | 25 | 152 | 31 | 28 | C | C |
| | | | TH | 212 | | 33 | | C | | 211 | | 33 | | C | | 77 | | 67 | | E | | 57 | | 30 | | C | |
| | | | SBR - NHB EB | 49 | | 27 | | C | | 50 | | 27 | | C | | 29 | | 128 | | F | | 37 | | 19 | | B | |
| | | | SBR - Hunt | 95 | | 33 | | C | | 94 | | 33 | | C | | 26 | | 89 | | F | | 35 | | 33 | | C | |
| | | EB | LT | 20 | 607 | 33 | 15 | C | B | 20 | 592 | 34 | 16 | C | B | 26 | 794 | 35 | 23 | D | C | 27 | 816 | 22 | 20 | C | B |
| | | | TH | 445 | | 14 | | B | | 434 | | 14 | | B | | 506 | | 21 | | C | | 521 | | 18 | | B | |
| | | | EBR - Hunt Street | 5 | | 11 | | B | | 4 | | 11 | | B | | 0 | | - | | - | | 3 | | 22 | | C | |
| | | | EBR - 44th Street | 136 | | 16 | | B | | 134 | | 18 | | B | | 262 | | 26 | | C | | 265 | | 23 | | C | |
| | | Hunt Street | NBL- NHB EB | 25 | 49 | 45 | 45 | D | D | 24 | 51 | 42 | 45 | D | D | 93 | 202 | 306 | 281 | F | F | 99 | 222 | 85 | 82 | F | F |
| | | | NBU - 44th NB | 1 | | 40 | | - | | 6 | | 53 | | - | | 0 | | - | | - | | 0 | | - | | - | |
| | | | NBT - 44th SB | 13 | | 46 | | D | | 12 | | 47 | | D | | 46 | | 258 | | F | | 50 | | 79 | | E | |
| | | WB | WBL - Hunt Street | 60 | 643 | 108 | 82 | F | F | 59 | 639 | 136 | 105 | F | F | 32 | 302 | 434 | 404 | F | F | 43 | 407 | 84 | 44 | F | D |
| | | | WBL - 44th Street | 6 | | 104 | | F | | 5 | | 121 | | F | | 4 | | 408 | | F | | 4 | | 75 | | E | |
| | | | TH | 564 | | 79 | | E | | 562 | | 101 | | F | | 254 | | 403 | | F | | 345 | | 40 | | D | |
| | | | RT | 13 | | 75 | | E | | 13 | | 95 | | F | | 12 | | 339 | | F | | 16 | | 25 | | C | |
| | | Intersection | | 1,885 | | 47 | | D | | 1,878 | | 56 | | E | | 1,712 | | 177 | | F | | 1,966 | | 36 | | D | |
| 316 | Kenilworth Avenue NE at Foote Street NE | SB | TH | 1,224 | 1,269 | 227 | 226 | F | D | 1,151 | 1,195 | 227 | 225 | F | D | 488 | 577 | 2 | 2 | A | A | 459 | 545 | 2 | 2 | A | A |
| | | | RT | 45 | | 183 | | F | | 44 | | 176 | | F | | 89 | | 3 | | A | | 86 | | 3 | | A | |
| | | EB | RT | 241 | 241 | 16 | 16 | B | B | 229 | 229 | 15 | 15 | B | B | 214 | 214 | 9 | 9 | A | A | 214 | 214 | 9 | 9 | A | A |
| | | Intersection | | 1,510 | | 192 | | F | | 1,423 | | 191 | | F | | 791 | | 4 | | A | | 759 | | 4 | | A | |
| 219 | Minnesota Avenue NE at DOES Parking Garage | NB | LT | 107 | 707 | 23.2 | 10.6 | C | B | 105 | 699 | 24.8 | 12.8 | C | B | 17 | 939 | 12 | 12 | - | B | 0 | 919 | - | 11 | - | B |
| | | | TH | 600 | | 8.4 | | A | | 594 | | 10.6 | | B | | 922 | | 12 | | B | | 919 | | 11 | | B | |
| | | SB | TH | 988 | 998 | 24.9 | 24.8 | C | C | 956 | 966 | 12.7 | 12.7 | B | B | 628 | 662 | 4 | 4 | A | A | 626 | 660 | 3 | 3 | A | A |
| | | | RT | 9 | | 15.2 | | B | | 9 | | 5.8 | | A | | 34 | | 1 | | A | | 34 | | 1 | | A | |
| | | EB | LT | 0 | 0 | - | - | - | - | 0 | 0 | - | - | - | - | 10 | 192 | 20 | 18 | B | B | 10 | 188 | 21 | 20 | C | B |
| | | | RT | 0 | | - | | - | | 0 | | - | | - | | 182 | | 18 | | B | | 178 | | 20 | | B | |
| | | Intersection | | 1,704 | | 19 | | B | | 9 | | 6 | | A | | 225 | | 16 | | B | | 222 | | 17 | | B | |

**Simulated level of service is approximated based on delay but is not equivalent to that produced usingHighway Capacity Manual methodology.*
**The intersections are numbered based on their inclusion in both the Streetcar and IMR projects (100s), the Streetcar project (200s), and the IMR project (300s).*
**MOEs represent an average of 10 simulation runs.*

### 8.1.1.3 Travel Time Comparison

#### 8.1.1.3.1 AM Peak Period (7:00 AM - 9:00 AM) PM Peak Period (4:30 PM - 6:30 PM)

| Route | 2045 No Build AM | 2045 Build AM | 2045 No Build PM | 2045 Build PM |
|---|---|---|---|---|
| NB DC-295 from East Capitol Street to Benning Road NE | 00:37 | 00:37 | 05:58 | 05:01 |
| NB DC-295 from Benning Road NE to Nannie Helen Burroughs Ave NE | 00:44 | 00:44 | 03:33 | 02:47 |
| NB DC-295 from Nannie Helen Burroughs Ave NE to Polk Street NE | 00:45 | 00:45 | 02:14 | 02:04 |
| NB DC-295 from Nelson Place NE to East Capitol Street Bridge | 01:16 | 01:16 | 01:48 | 02:13 |
| **NB DC-295** | **03:22** | **03:22** | **13:33** | **12:05** |
| SB DC-295 from Polk Street NE to Lane Place NE | 03:10 | 03:04 | 00:31 | 00:31 |
| SB DC-295 from Lane Place NE to Nannie Helen Burroughs Ave NE | 01:29 | 01:27 | 00:13 | 00:13 |
| SB DC-295 from Nannie Helen Burroughs Ave NE to Benning Road NE | 06:50 | 06:30 | 00:45 | 00:45 |
| SB DC-295 from Benning Road NE to East Capitol Street | 03:55 | 03:47 | 00:50 | 00:52 |
| SB DC-295 from East Capitol Street NE to N Street NE | 03:54 | 03:54 | 02:21 | 02:23 |
| **SB DC-295** | **19:18** | **18:42** | **04:40** | **04:44** |
| WB Benning Road NE from East Capitol Street to Minnesota Ave NE | 03:16 | 03:20 | 02:53 | 03:11 |
| WB Benning Road NE from Minnesota Ave NE to 36th Street NE | 00:42 | 00:42 | 00:39 | 00:39 |
| WB Benning Road NE from 36th Street NE to Anacostia Ave NE | 00:51 | 01:08 | 00:41 | 00:51 |
| WB Benning Road NE from Anacostia Ave NE to 26th Street NE | 02:08 | 02:59 | 01:03 | 02:40 |
| **WB Benning Road NE** | **06:57** | **07:07** | **05:16** | **05:57** |
| EB Benning Road NE from 26th Street NE to Anacostia Ave NE | 01:13 | 01:22 | 01:20 | 01:24 |
| EB Benning Road NE from Anacostia Ave NE to 36th Street NE | 00:59 | 01:05 | 00:59 | 00:59 |
| EB Benning Road NE from 36th Street NE to Minnesota Ave NE | 00:49 | 00:48 | 00:46 | 02:19 |
| EB Benning Road NE from Minnesota Ave NE to East Capitol Street | 04:45 | 04:16 | 02:50 | 03:03 |
| **EB Benning Road NE** | **07:46** | **07:31** | **05:55** | **07:08** |

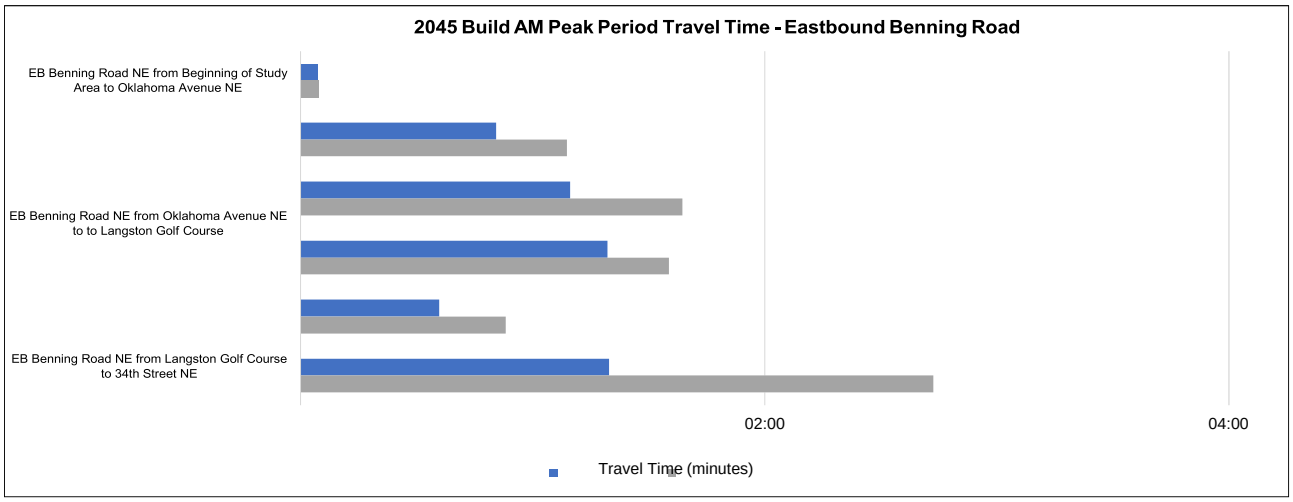


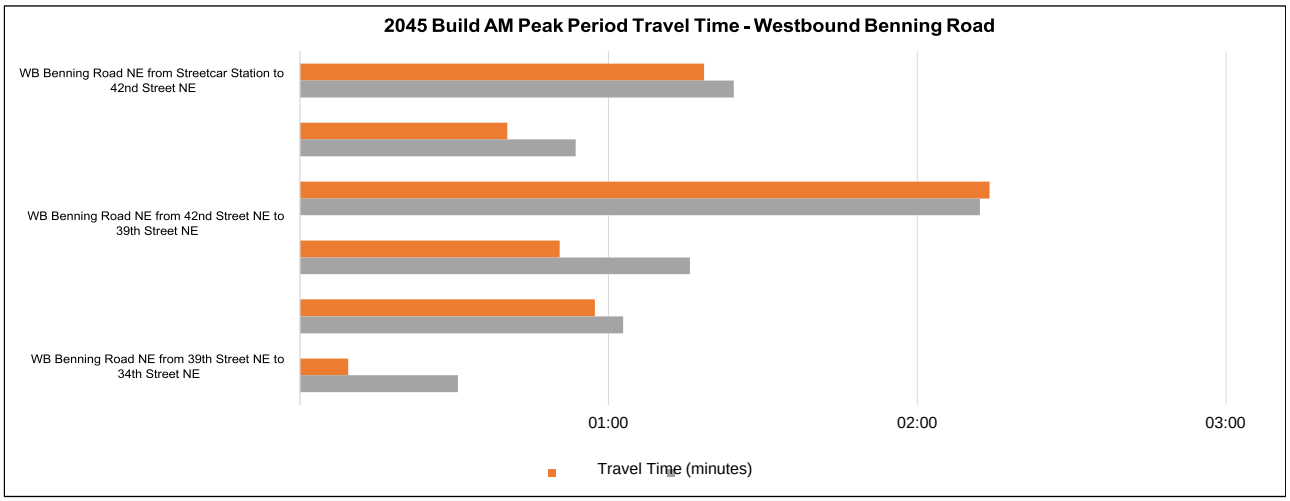
## 8.1.1.4 2045 Build AM Streetcar Travel Time Comparison

### 8.1.1.4.1 AM Peak Period (7:00 AM - 9:00 AM) PM Peak Period (4:30 PM - 6:30 PM)

| Streetcar Travel Time Results | | | |
|---|---|---|---|
| **Route** | **Vehicular Travel Time (MM:SS)** | **Streetcar Travel Time (MM:SS)*** | **Difference (MM:SS)** |
| WB Benning Road NE from Streetcar Station to 42nd Street NE | 01:19 | 01:24 | 00:06 |
| WB Benning Road NE from 42nd Street NE to 39th Street NE | 00:40 | 00:54 | 00:13 |
| WB Benning Road NE from 39th Street NE to 34th Street NE | 02:14 | 02:12 | 00:02 |
| WB Benning Road NE from 34th Street NE to Langston Golf Course | 00:51 | 01:16 | 00:25 |
| WB Benning Road NE from Langston Golf Course to Oklahoma Avenue NE | 00:57 | 01:03 | 00:06 |
| WB Benning Road NE from Oklahoma Avenue NE to End of Study Area | 00:09 | 00:31 | 00:21 |
| **WB Benning Road NE** | **06:10** | **07:20** | **01:09** |
| EB Benning Road NE from Beginning of Study Area to Oklahoma Avenue NE | 00:04 | 00:05 | 00:00 |
| EB Benning Road NE from Oklahoma Avenue NE to Langston Golf Course | 00:51 | 01:09 | 00:18 |
| EB Benning Road NE from Langston Golf Course to 34th Street NE | 01:10 | 01:39 | 00:29 |
| EB Benning Road NE from 34th Street NE to 39th Street NE | 01:19 | 01:35 | 00:16 |
| EB Benning Road NE from 39th Street NE to 42nd Street NE | 00:36 | 00:53 | 00:17 |
| EB Benning Road NE from 42nd Street NE to Streetcar Station | 01:20 | 02:44 | 01:24 |
| **EB Benning Road NE** | **05:20** | **08:05** | **02:45** |

*Streetcar travel time does not include dwell time at stops (assuming 20 seconds per stop, on average)



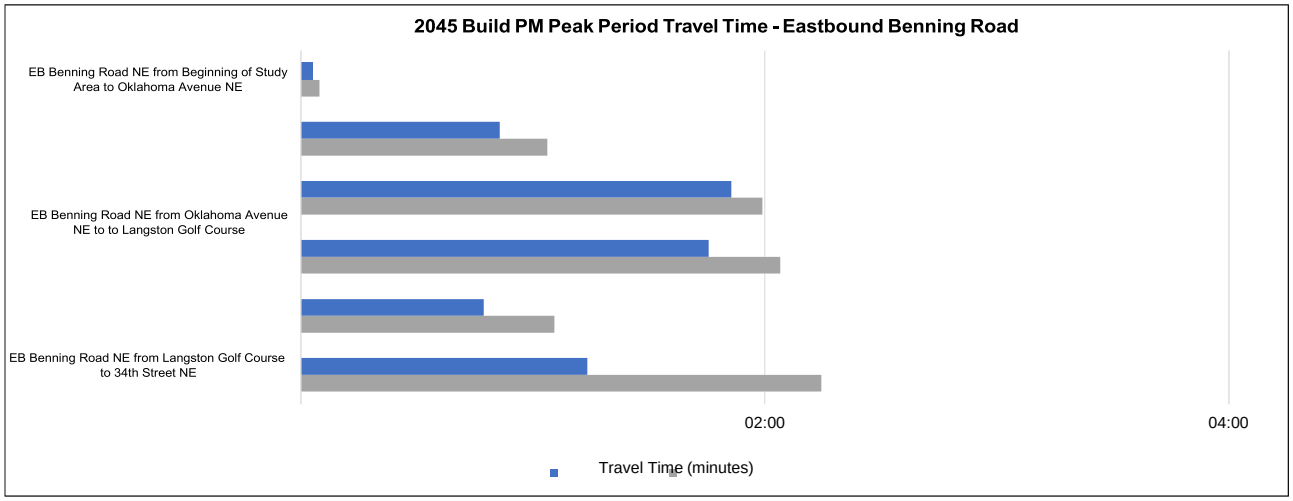



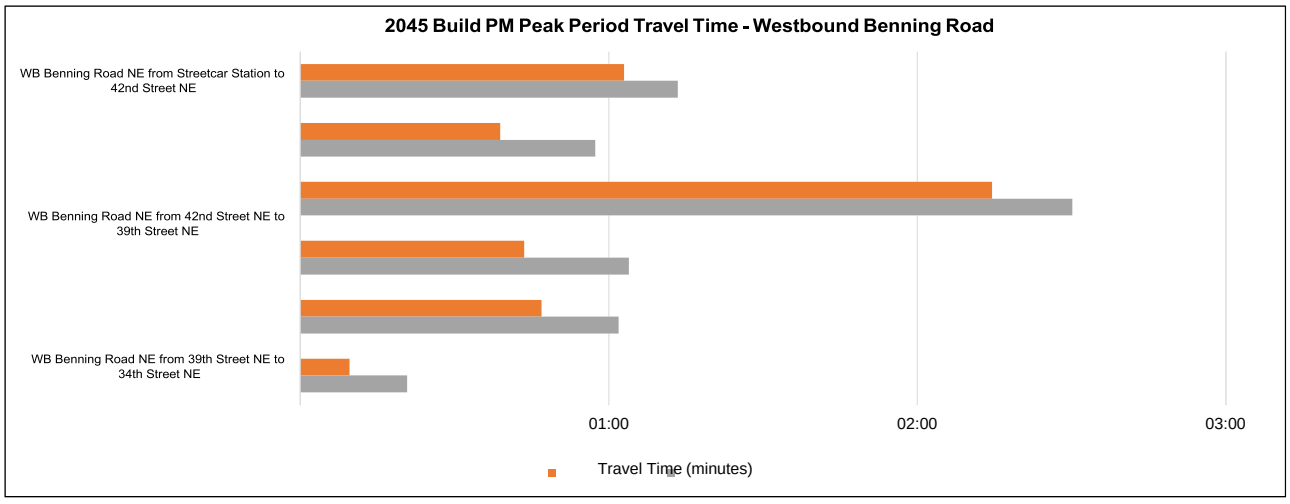
## 8.1.1.5 2045 Build PM Streetcar Travel Time Comparison

### 8.1.1.5.1 AM Peak Period (7:00 AM - 9:00 AM) PM Peak Period (4:30 PM - 6:30 PM)

| Streetcar Travel Time Results | | | |
|---|---|---|---|
| **Route** | **Vehicular Travel Time (MM:SS)** | **Streetcar Travel Time (MM:SS)*** | **Difference (MM:SS)** |
| WB Benning Road NE from Streetcar Station to 42nd Street NE | 01:03 | 01:13 | 00:10 |
| WB Benning Road NE from 42nd Street NE to 39th Street NE | 00:39 | 00:57 | 00:19 |
| WB Benning Road NE from 39th Street NE to 34th Street NE | 02:15 | 02:30 | 00:16 |
| WB Benning Road NE from 34th Street NE to Langston Golf Course | 00:44 | 01:04 | 00:20 |
| WB Benning Road NE from Langston Golf Course to Oklahoma Avenue NE | 00:47 | 01:02 | 00:15 |
| WB Benning Road NE from Oklahoma Avenue NE to End of Study Area | 00:10 | 00:21 | 00:11 |
| **WB Benning Road NE** | **05:36** | **07:08** | **01:31** |
| EB Benning Road NE from Beginning of Study Area to Oklahoma Avenue NE | 00:03 | 00:05 | 00:02 |
| EB Benning Road NE from Oklahoma Avenue NE to Langston Golf Course | 00:51 | 01:04 | 00:12 |
| EB Benning Road NE from Langston Golf Course to 34th Street NE | 01:51 | 01:59 | 00:08 |
| EB Benning Road NE from 34th Street NE to 39th Street NE | 01:45 | 02:04 | 00:19 |
| EB Benning Road NE from 39th Street NE to 42nd Street NE | 00:47 | 01:06 | 00:18 |
| EB Benning Road NE from 42nd Street NE to Streetcar Station | 01:14 | 02:15 | 01:01 |
| **EB Benning Road NE** | **06:33** | **08:32** | **01:59** |

*Streetcar travel time does not include dwell time at stops (assuming 20 seconds per stop, on average)



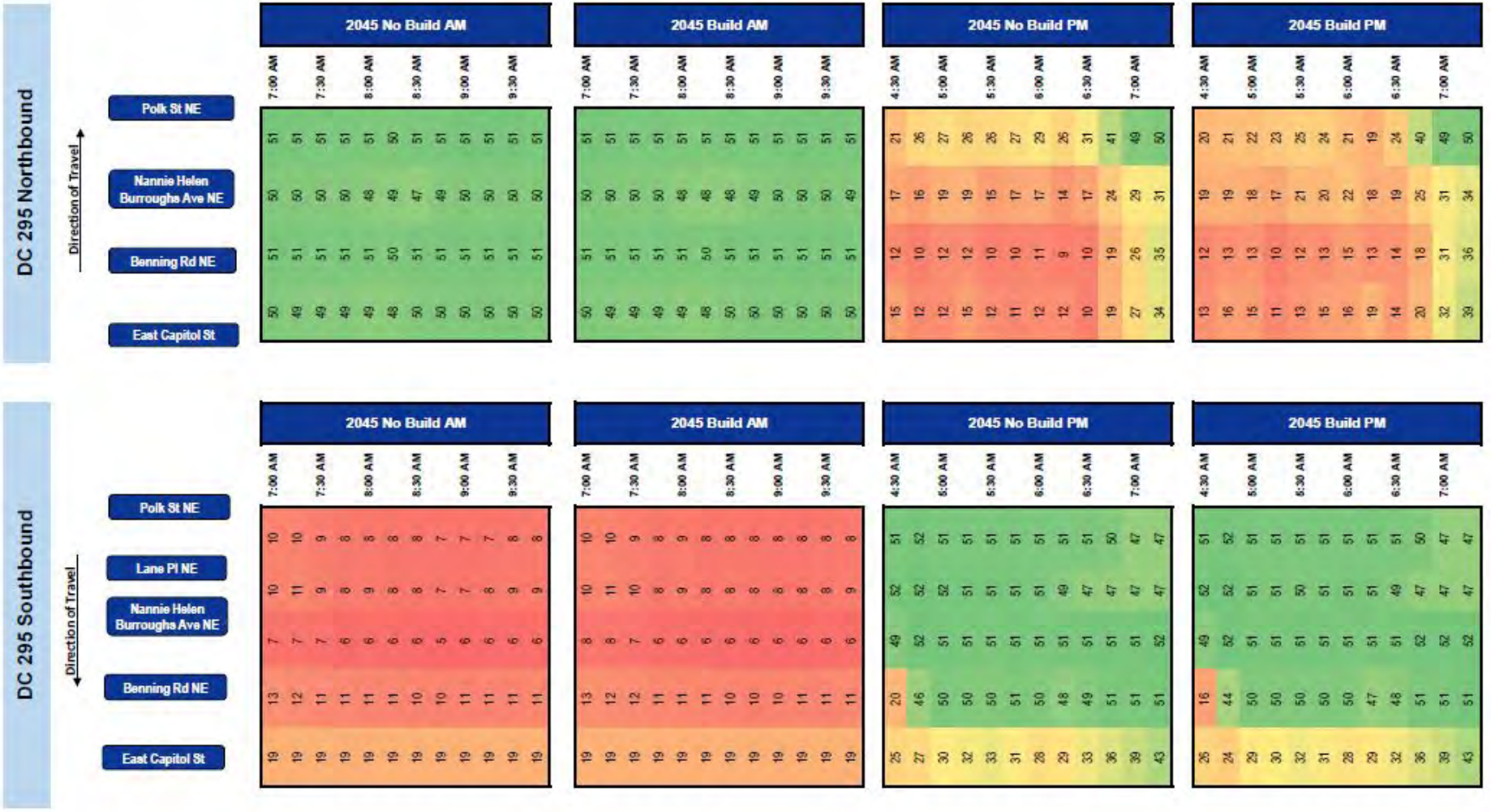
### 8.1.1.6 Queue Length Comparison

#### 8.1.1.6.1 AM Peak Period (7:00 AM - 9:00 AM) PM Peak Period (4:30 PM - 6:30 PM)

| Location | | Vissim Max Queue (feet) | | | |
|---|---|---|---|---|---|
| | | 2045 No Build AM | 2045 Build AM | 2045 No Build PM | 2045 Build PM |
| DC 295 and Benning Road NE Interchange | Eastbound Benning Road NE to Southbound DC-295 | 0 | 0 | 290 | 37 |
| | Eastbound Benning Road NE to Northbound DC-295 | 46 | 25 | 2655 | 2783 |
| | Southbound Kenilworth Avenue NE to Northbound DC-295 | 30 | 21 | 0 | 0 |
| | Northbound DC-295 to Westbound Benning Road NE | 704 | 382 | 0 | 0 |
| | Northbound DC-295/Southbound Kenilworth Avenue NE to Westbound Benning Road NE | 0 | 167 | 65 | 59 |
| Benning Road NE and East Capitol Street Intersection | Southbound Benning Road NE at East Capitol Street | 903 | 913 | 522 | 459 |
| | Northbound Benning Road NE at East Capitol Street | 555 | 862 | 292 | 271 |
| | Westbound East Capitol Street at Benning Road NE | 1776 | 1784 | 240 | 220 |
| | Eastbound East Capitol Street at Benning Road NE | 247 | 320 | 1335 | 1334 |
| East Capitol Street and Texas Ave Intersection | Northbound Texas Avenue at East Capitol Street | 540 | 541 | 204 | 232 |
| | Southbound Texas Avenue at East Capitol Street (left turn from East Capitol to Texas) | 86 | 79 | 278 | 238 |
| Benning Road NE and Minnesota Avenue NE | Eastbound Benning Road NE at Minnesota Avenue NE | 382 | 304 | 535 | 777 |
| | Westbound Benning Road NE at Minnesota Avenue NE | 389 | 416 | 313 | 330 |
| | Northbound Minnesota Avenue NE at Benning Road NE | 478 | 403 | 373 | 482 |
| | Southbound Minnesota Avenue NE at Benning Road NE | 532 | 549 | 454 | 482 |

## Speed Heat Map Comparison

AM Analysis Period (7:00 AM - 10:00 AM) PM Analysis Period (4:30 PM - 7:30 PM)



### 8.1.1.6.2 2045 Build Curbside Alignment Morning Peak Hour Intersection Delay and Levels of Service (LOS)

| Intersection | Traffic Control | Intersection | | Northbound Approach | | Southbound Approach | | Westbound Approach | | Eastbound Approach | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road and 26th Street | Signalized | 8.6 | A | - | - | 29.0 | C | 7.2 | A | 10.0 | B |
| Benning Road and Oklahoma Avenue | Signalized | 30.9 | C | 22.9 | C | - | - | 37.5 | D | 12.5 | B |
| Benning Road and Anacostia Avenue | Signalized | 7.6 | A | 33.8 | C | 30.8 | C | 4.0 | A | 13.0 | B |
| Benning Road and 34th Street | Signalized | 13.2 | B | 15.7 | B | 34.8 | C | 12.8 | B | 10.7 | B |
| Benning Road and Minnesota Avenue | Signalized | 72.6 | E | 62.7 | E | 104.6 | F | 69.6 | E | 51.3 | D |
| Benning Road and 42nd Street | Signalized | 12.2 | B | 39.8 | D | 36.6 | D | 8.1 | A | 6.9 | A |
| Benning Road and 45nd Street | Signalized | 14.0 | B | 8.3 | A | 25.1 | C | 25.4 | C | 31.1 | C |
| Benning Road and Central Avenue* | Unsignalized | 12.4 | B | - | - | - | - | 12.4 | B | - | - |
| Benning Road and E Capitol Street | Signalized | 188.9 | F | 255.5 | F | 74.6 | E | 197.9 | F | 286.6 | F |
| Minnesota Avenue and Dix Street | Signalized | 16.1 | B | 18.2 | B | 11.3 | B | 21.6 | C | 19.5 | B |
| Minnesota Avenue and Grant Street | Signalized | 16.9 | B | 14.8 | B | 12.3 | B | 41.2 | D | - | - |
| Minnesota Avenue and Gault Place* | Unsignalized | 21.9 | C | 0.5 | A | 1.8 | A | 21.9 | C | 18.6 | C |
| Minnesota Avenue and Hayes Street* | Unsignalized | 19.2 | C | 1.8 | A | 0.9 | A | 19.2 | C | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | Signalized | 42.0 | D | 71.2 | E | 31.4 | C | 28.2 | C | 41.1 | D |
| Benning Road and 44th Street | Signalized | 24.4 | C | 24.9 | C | 12.6 | B | 36.6 | D | - | - |

** Indicates unsignalized intersections, for which intersection LOS is expressed in terms of the average vehicle delay of the worst approach delay*
*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*

### 8.1.1.6.3 2045 Build Curbside Alignment Morning Peak Hour Maximum Queue Length (feet)

| Intersection | Northbound | | | Southbound | | | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Benning Road and 26th Street | - | - | - | 140 | - | 166 | - | 301 | 284 | 109 | 141 | - |
| Benning Road and Oklahoma Avenue | 114 | - | 96 | - | - | - | 983 | 983 | - | - | 231 | 236 |
| Benning Road and Anacostia Avenue | 199 | - | 189 | 68 | - | - | 306 | 306 | 306 | 196 | 196 | 181 |
| Benning Road and 34th Street | 163 | 163 | 171 | 142 | 142 | 110 | 346 | 399 | 399 | 49 | 241 | 216 |
| Benning Road and Minnesota Avenue | 545 | 264 | 264 | 1,344 | 1,344 | 1,346 | - | 747 | 747 | 478 | 324 | 324 |
| Benning Road and 42nd Street | 129 | 129 | 144 | 224 | 224 | 239 | 238 | 238 | 252 | 148 | 148 | 179 |
| Benning Road and 45nd Street | 262 | 262 | 262 | 224 | 224 | 224 | 77 | 77 | 77 | 40 | 40 | 40 |
| Benning Road and Central Avenue | - | - | - | - | - | - | - | - | 332 | - | - | - |
| Benning Road and E Capitol Street | 1,076 | 1,076 | 1,076 | 350 | 350 | 360 | 1,674 | 1,674 | 1,674 | 1,467 | 1,467 | 1,467 |
| Minnesota Avenue and Dix Street | 347 | 347 | 347 | 199 | 199 | 199 | 144 | 144 | 144 | 24 | 24 | 24 |
| Minnesota Avenue and Grant Street | 102 | 251 | 251 | 267 | 267 | 267 | 288 | - | 288 | - | - | - |
| Minnesota Avenue and Gault Place | - | 63 | 63 | 128 | 123 | - | 55 | - | 51 | 108 | 104 | 107 |
| Minnesota Avenue and Hayes Street | 97 | 92 | 92 | 15 | 4 | 4 | 47 | 28 | 50 | - | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | 630 | 630 | 630 | - | 304 | 322 | 278 | 278 | 298 | 504 | 504 | 505 |
| Benning Road and 44th Street | - | 484 | 484 | 188 | 188 | - | 387 | - | 386 | - | - | - |

*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*

### 8.1.1.6.4 2045 Build Curbside Alignment Evening Peak Hour Intersection Delay and Levels of Service (LOS)

| Intersection | Traffic Control | Intersection | | Northbound Approach | | Southbound Approach | | Westbound Approach | | Eastbound Approach | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS | Delay | LOS |
| Benning Road and 26th Street | Signalized | 11.9 | B | - | - | 41.6 | D | 4.3 | A | 12.9 | B |
| Benning Road and Oklahoma Avenue | Signalized | 7.7 | A | 23.1 | C | - | - | 9.7 | A | 5.9 | A |
| Benning Road and Anacostia Avenue | Signalized | 4.9 | A | 33.4 | C | 44.6 | D | 2.7 | A | 4.9 | A |
| Benning Road and 34th Street | Signalized | 21.9 | C | 19.9 | B | 37.4 | D | 12.2 | B | 25.9 | C |
| Benning Road and Minnesota Avenue | Signalized | 53.9 | D | 44.6 | D | 46.1 | D | 54.3 | D | 61.8 | E |
| Benning Road and 42nd Street | Signalized | 13.7 | B | 35.5 | D | 35.1 | D | 5.2 | A | 12.2 | B |
| Benning Road and 45nd Street | Signalized | 41.0 | D | 3.6 | A | 70.5 | E | 28.8 | C | 28.4 | C |
| Benning Road and Central Avenue* | Unsignalized | 4.8 | A | - | - | - | - | 4.8 | A | - | - |
| Benning Road and E Capitol Street | Signalized | 214.1 | F | 445.9 | F | 54.3 | D | 424.1 | F | 158.3 | F |
| Minnesota Avenue and Dix Street | Signalized | 13.5 | B | 9.4 | A | 15.4 | B | 23.8 | C | 18.9 | B |
| Minnesota Avenue and Grant Street | Signalized | 15.7 | B | 17.6 | B | 9.1 | A | 30.6 | C | - | - |
| Minnesota Avenue and Gault Place* | Unsignalized | 18.4 | C | 1.3 | A | 1.4 | A | 13.1 | B | 18.4 | C |
| Minnesota Avenue and Hayes Street* | Unsignalized | 24.5 | C | 3.1 | A | 4.0 | A | 24.5 | C | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | Signalized | 65.9 | E | 68.1 | E | 31.9 | C | 27.1 | C | 92.8 | F |
| Benning Road and 44th Street | Signalized | 50.6 | D | 19.6 | B | 78.8 | E | 30.3 | C | - | - |

** Indicates unsignalized intersections, for which intersection LOS is expressed in terms of the average vehicle delay of the worst approach delay*
*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*

### 8.1.1.6.5 2045 Build Curbside Alignment Evening Peak Hour Maximum Queue Length (feet)

| Intersection | Northbound | | | Southbound | | | Westbound | | | Eastbound | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | L | T | R | L | T | R | L | T | R | L | T | R |
| Benning Road and 26th Street | - | - | - | 204 | - | 231 | - | 198 | 181 | 22 | 342 | - |
| Benning Road and Oklahoma Avenue | 112 | - | 95 | - | - | - | 118 | 118 | - | - | 290 | 293 |
| Benning Road and Anacostia Avenue | 113 | - | 103 | 11 | - | - | 116 | 116 | 116 | 325 | 325 | 311 |
| Benning Road and 34th Street | 141 | 141 | 149 | 75 | 75 | 33 | 207 | 153 | 153 | 13 | 639 | 614 |
| Benning Road and Minnesota Avenue | 258 | 333 | 333 | 527 | 527 | 247 | - | 284 | 284 | 1,507 | 1,531 | 1,531 |
| Benning Road and 42nd Street | 144 | 144 | 159 | 186 | 186 | 201 | 140 | 140 | 154 | 432 | 432 | 466 |
| Benning Road and 45nd Street | 156 | 156 | 156 | 459 | 459 | 459 | 108 | 60 | 88 | 29 | 29 | 29 |
| Benning Road and Central Avenue | - | - | - | - | - | - | - | - | 79 | - | - | - |
| Benning Road and E Capitol Street | 1,072 | 1,072 | 1,072 | 364 | 364 | 374 | 1,673 | 1,673 | 1,673 | 1,465 | 1,465 | 1,465 |
| Minnesota Avenue and Dix Street | 209 | 209 | 209 | 322 | 322 | 322 | 165 | 165 | 165 | 90 | 90 | 90 |
| Minnesota Avenue and Grant Street | 86 | 696 | 696 | 173 | 173 | 173 | 114 | - | 114 | - | - | - |
| Minnesota Avenue and Gault Place | - | 164 | 164 | 108 | 103 | - | 55 | - | 51 | 100 | 98 | 92 |
| Minnesota Avenue and Hayes Street | 138 | 133 | 133 | 34 | 19 | 19 | 42 | 23 | 46 | - | - | - |
| Minnesota Avenue and Nannie Helen Burroughs Avenue | 811 | 811 | 811 | - | 192 | 210 | 207 | 207 | 227 | 952 | 952 | 952 |
| Benning Road and 44th Street | - | 275 | 275 | 810 | 810 | - | 228 | - | 228 | - | - | - |

*Note: Benning Road is considered east-west at all intersections except for at 44th Street, 45th Street, and E Capitol Street where it is considered to be north-south.*