BENNING ROAD & BRIDGES TRANSPORTATION IMPROVEMENTS

CRASH DATA AND SAFETY ANALYSIS TECHNICAL MEMORANDUM

FINAL SEPTEMBER 2020

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Executive Summary

The project team identified 12 key crash intersections in the study area, with seven sites located along Benning Road, where it intersects with Anacostia Avenue; 34th Street NE; 36th Street NE; Minnesota Ave NE; 45th Street NE; Central Avenue; and East Capitol Street. The different types of crashes considered were:

- Rear-end
- Sideswipe
- Right Angle
- Head on
- Left Turn Hit Vehicle
- Left Turn Hit Pedestrian
- Right Turn Hit Vehicle
- Right Turn Hit Pedestrian
- Straight Hit Pedestrian

The project team then analyzed the crash data to determine the Crash Rate per intersection. The intersections with the highest crash rates along the corridor that are associated with the two build alternatives were then further evaluated to develop tables with a list of potential causes for crashes at each of these high crash-frequency intersections. These intersections were the Benning Road and Minnesota Avenue intersection; the Benning Road and East Capitol Street intersection; the Minnesota Avenue and Nannie Helen Burroughs (NHB) Avenue intersection; and the Benning Road and 36th Street intersection.

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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*.

This crash data and safety analysis technical memorandum identifies existing safety problems along the project corridor. The analysis provides crash data for the study intersections in order to evaluate safety conditions and identify factors contributing to collisions. The analysis is based on data provided by the District Department of Transportation (DDOT) spanning the period from 2016 through 2018 from TARAS2 (Traffic Accident Reporting and Analysis System 2). Note that no crash data was available at Benning Road and Oklahoma Avenue, Benning Road and 42nd Street, and Benning Road and 44th Street intersections, and thus not included in the analysis.

1.2 Purpose of the Memorandum

This memorandum was prepared to present and document the safety analysis conducted for the Benning Road and Bridges Transportation Improvements Environmental Assessment. The memorandum's primary focus is the type and severity of crashes that have occurred around the

study area's key intersections. Since this subject reflects only the existing condition, the No-Build Alternative and Preferred Alternative are not described in this memorandum.

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

Crash data was provided for twelve key intersections within the study area. The crash data includes type of crashes (e.g., rear end, side swiped), crash severity (e.g., injuries involved), the crash location, and also indicates whether any pedestrians were involved in the accident.

The crash data analysis was performed in two steps. The first step calculated the crash rate at the study intersections and provided a summary of crash data statistics at an intersection level. The second step developed collision diagrams (i.e., visual representation of crashes) at every intersection to identify potential problem areas and safety deficiencies at intersections. Crash rate for intersections is expressed as crashes per million entering vehicles (MEV), and is calculated as follows:

$$Crash\ Rate = (C * 1{,}000{,}000)/(n * 365 * V)$$

where C is the total number of intersection-related crashes (also known as crash frequency) in the study period, n is the number of years data (i.e., analysis period), and V is the daily traffic volumes entering the intersection. Daily traffic volumes were calculated using the peak-period traffic volumes entering the intersection and a peak-period factor of daily volumes calculated based on the historic annual average daily traffic (AADT) data. Because crash data include crashes that occurred between 2016 and 2018, peak-period traffic volumes from the Feasibility Study were used in the analysis because crash data provided occurred between 2011 and 2013.

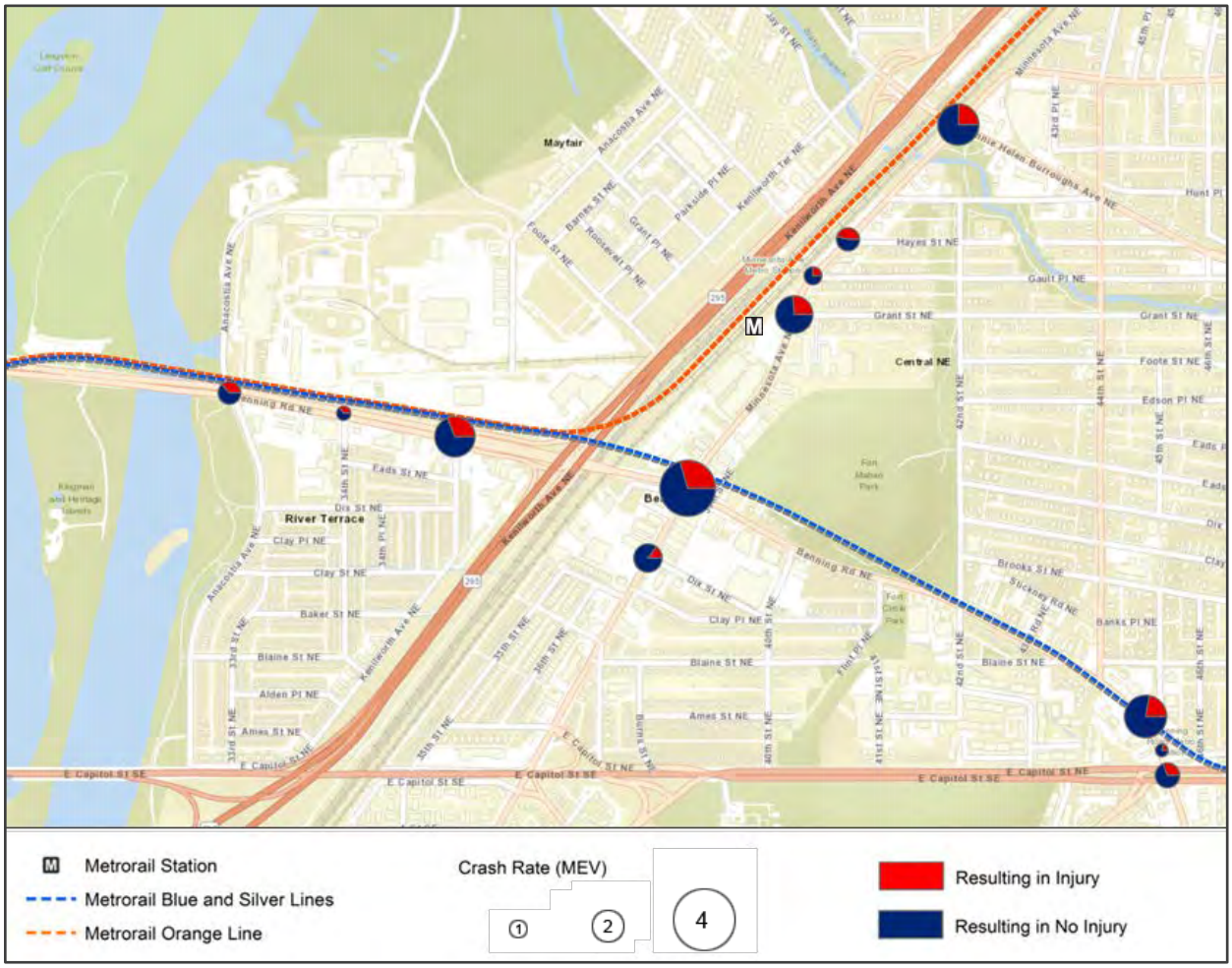
3.0 Results

The summary of crash rate at the study intersections is provided in **Figure 1**. **Table 1** provides detailed statistics about crash data.

Principal observations from **Figure 1** and **Table 1** include:

- Just over half (seven) of the 12 key crash intersections in the study area are located along Benning Road, which is the project corridor for the two build alternatives;
- The highest crash rate location is at Benning Road and Minnesota Avenue with an MEV of 4.17;
- The second highest crash rate location is at Benning Road and 45th Street with an MEV of 2.41;
- The third highest crash rate location is at Minnesota Avenue and Nannie Helen Burroughs Avenue with an MEV of 2.27; and
- The annual average for the number of crashes for the 12 key intersections from 2016 to 2018 was 203, while the annual average for crashes resulting in injury was 58.

Figure 1: Crash Rate (MEV) at the Study Intersections



Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

Table 1: Crash Data Summary at the Study Intersections

Intersection	Number of Crashes	Crash Rate (MEV)	Collision Type (2016-2018)									Crashes Resulting in Injury
			Rear-end	Side-swipe	Right Angle	Head on	Left Turn Hit Veh	Left Turn Hit Ped	Right Turn Hit Veh	Right Turn Hit Ped	Straight Hit Ped	
Benning Road and Anacostia Avenue	35	0.70	43%	29%		6%	3%			6%		13
Benning Road and 34th Street	14	0.27	36%	36%			14%		7%			5
Benning Road and 36th Street	77	2.19	49%	34%	3%	1%			1%	1%	1%	24
Benning Road and Minnesota Avenue	202	4.17	37%	35%		2%	8%		1%	1%	5%	60
Benning Road and 45th Street	59	2.41	27%	42%		2%	8%		5%	2%		13
Benning Road and Central Avenue	5	0.21	20%	20%			20%		20%			1
Benning Road and East Capitol Street	48	0.81	29%	31%	4%		13%		6%			15
Minnesota Avenue and Dix Street	27	1.08	37%	22%		4%	4%		7%	4%	7%	4
Minnesota Avenue and Grant Street	42	1.89	36%	31%	2%	2%	7%			5%	2%	11
Minnesota Avenue and Hayes Street	13	0.71	8%	38%		15%	15%					6
Minnesota Avenue and Gault Place	8	0.43	13%	38%			25%					2
Minnesota Avenue and NHB Avenue	80	2.27	40%	25%	4%		14%		3%	3%	5%	20

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

4.0 Relation of Build Alternative Alignments to Key Intersections

Table 2 lists the 12 key intersections, and show which intersections are located along or close to Alternative 1 and the Preferred Alternative. This table also identifies intersections (with an *) that are near to a potential station. Overall, the table shows that five key intersections are closely associated with both build alternatives.

Table 2: High Crash Intersections Along the Build Alternatives

Intersection	Build Alternative 1	Preferred Alternative
Benning Road and Anacostia Avenue		
Benning Road and 34th Street		
Benning Road and 36th Street	X	X
Benning Road and Minnesota Avenue	X*	X*
Benning Road and 45th Street	X	X
Benning Road and Central Avenue		
Benning Road and East Capitol Street	X*	X*
Minnesota Avenue and Dix Street		
Minnesota Avenue and Grant Street		
Minnesota Avenue and Hayes Street		
Minnesota Avenue and Gault Place		
Minnesota Avenue and NHB Avenue	X	X

*Denotes potential station at intersection.

5.0 Intersection Collision Diagrams and Detailed Analysis of Collisions

This section displays collision diagrams for each intersection and provides a brief discussion for the potential causes of crashes. Collision diagrams are prepared in order to understand the crash patterns, safety problems, and deficiencies of the intersection operation. Tables with a list of potential causes for crashes are provided at intersections where there is a high crash frequency. Four of the 12 intersections are considered to have a high crash frequency: the Benning Road and Minnesota Avenue intersection; the Benning Road and East Capitol Street intersection; the Minnesota Avenue and Nannie Helen Burroughs (NHB) Avenue intersection; and the Benning Road and 36th Street intersection.

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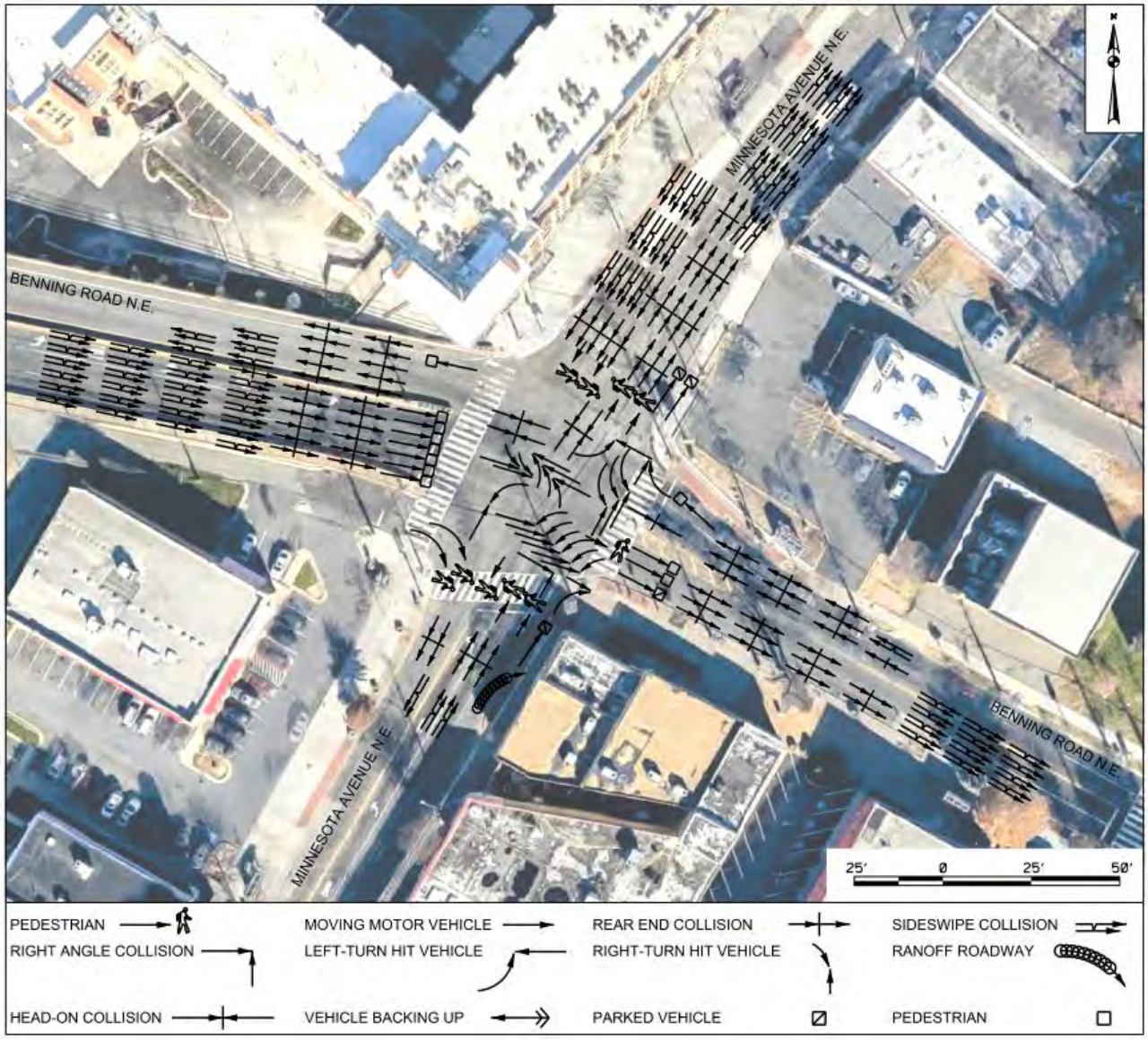
5.1 Benning Road and Minnesota Avenue Intersection

The distribution of crashes for the Benning Road and Minnesota Avenue intersection is shown in **Figure 2**. After analysis by DDOT, a list of factors contributing to the crashes was compiled and is provided in **Table 3**.

Figure 2: Benning Road and Minnesota Avenue Crash Diagram



Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

Table 3: Potential Causes of Crashes at Benning Road and Minnesota Avenue Intersection

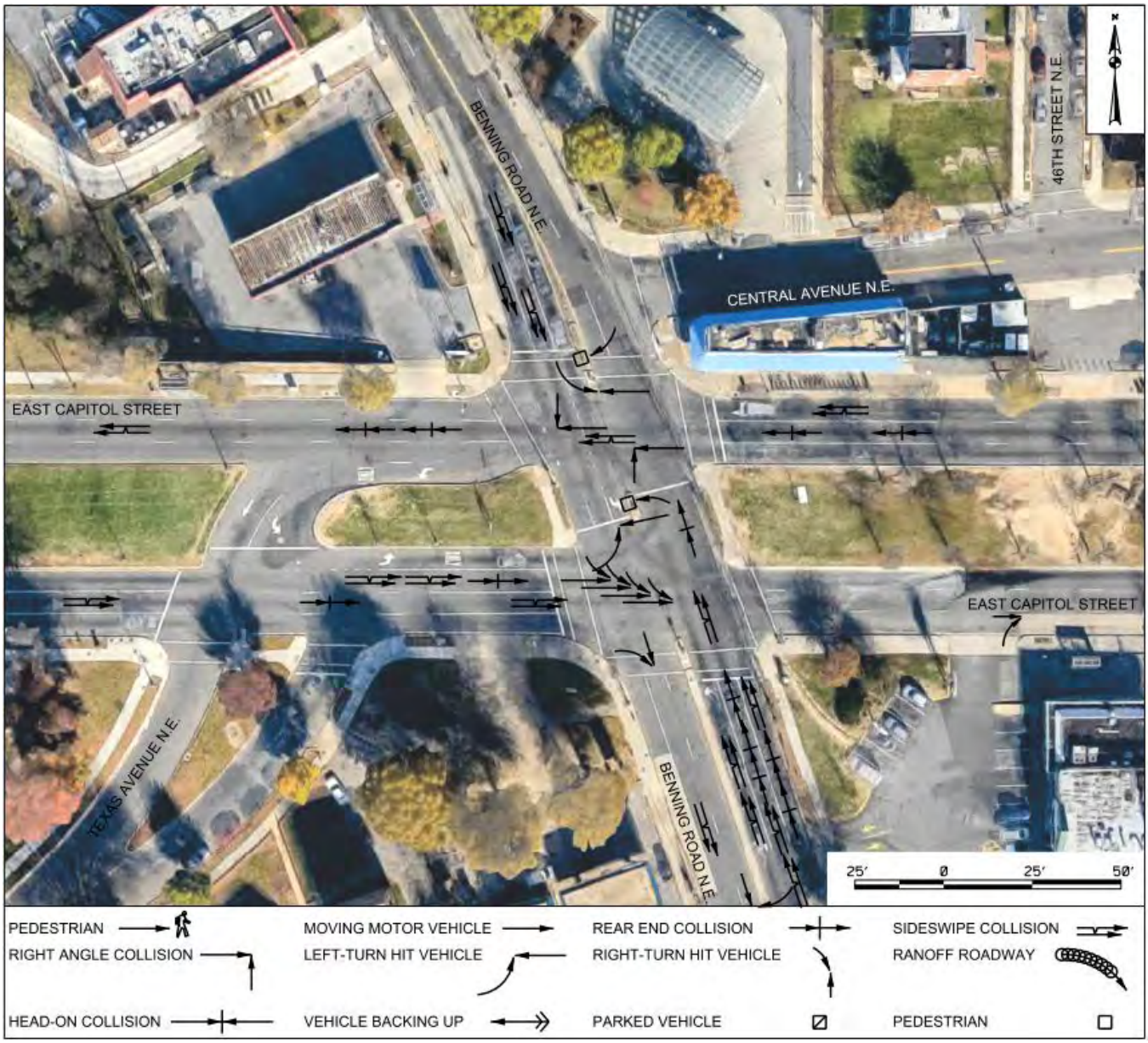
Movement	Collision Type	Potential Causes of Crashes
Eastbound Benning Road	Rear-End	• Speeding (Downhill approach) • Stop and go traffic due to peak-period congestion
	Sideswiped	• Eastbound left turn queue spillover due to heavy left turn volume • Inadequate green time
	Left Turn Hit Vehicle	• Protected and permissive phasing • Not adequate green time during the protected phase leading to more aggressive gap acceptance during the permitted phase
	Right Turn Hit Pedestrians	• Location of crosswalk (not at the tangent point)
Westbound Benning Road	Left Turn Hit Vehicle	• Only permissive phase is permitted • Heavy opposing through traffic causing more aggressive gap acceptance
	Rear-End	• Stop and go traffic due to peak-period congestion • Driveway is very close to intersection
Northbound Minnesota Avenue	Rear-End	• Stop and go traffic due to peak-period congestion • Speeding and more aggressive behavior due to cycle overflows (i.e., queue cannot clear the intersection in the current cycle)
	Left Turn Hit Vehicle	• Permissive only left turn phasing
Southbound Minnesota Avenue	Sideswiped	• Inadequate storage lane, causing queue spillover and lane change for the through vehicles
	Left Turn Hit Vehicle	• Permissive only left turn phasing

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.2 Benning Road and East Capitol Street Intersection

The Distribution of crashes for the Benning Road and East Capitol Street intersection is shown in **Figure 3**. After analysis by DDOT, a list of factors contributing to the crashes was compiled and is provided in **Table 4**.

Figure 3: Benning Road and East Capitol Street Crash Diagram



Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

Table 4: Potential Causes of Crashes at Benning Road and East Capitol Street Intersection

Movement	Collision Type	Potential Causes of Crashes
Northbound Benning Road	Sideswiped	• Inadequate storage space for northbound left turn traffic • Heavy left turn volume in the morning peak-period (450 vehicles) • Split phasing, which may cause lane changes during queue clearance
	Rear-End	• Stop and go traffic due to peak-period congestion • Speeding and more aggressive behavior due to cycle overflows (i.e., queue cannot clear the intersection in the current cycle)
	Left Turn Hit Vehicles	• Short left turn lane • Signal Timing
Eastbound East Capitol Street	Rear-End	• Stop and go traffic due to peak-period congestion • Speeding and more aggressive behavior due to cycle overflows (i.e., queue cannot clear the intersection in the current cycle)

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

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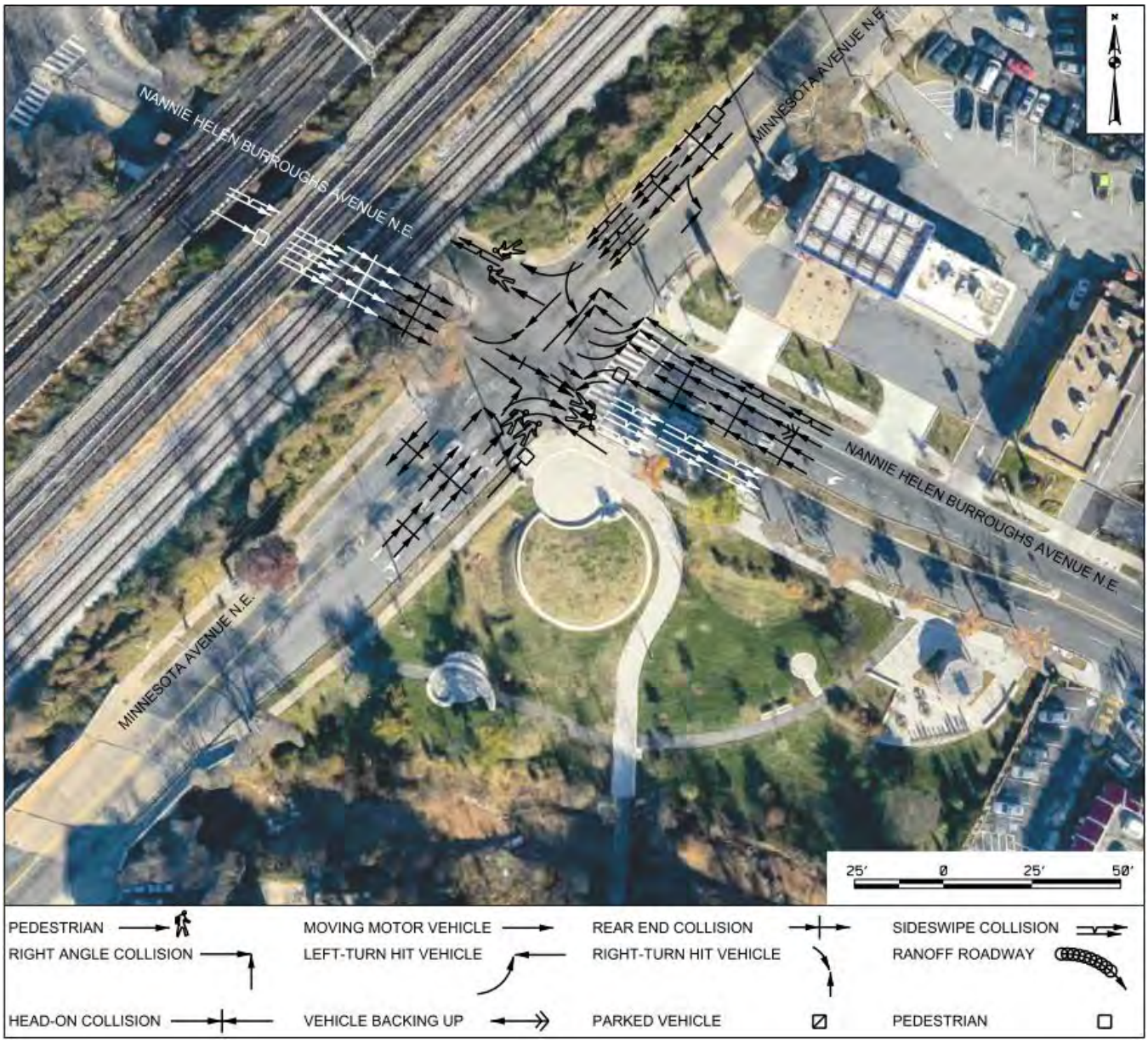
5.3 Minnesota Avenue and Nannie Helen Burroughs (NHB) Avenue Intersection

The distribution of crashes for the Minnesota Avenue and Nannie Helen Burroughs (NHB) Avenue intersection is shown in **Figure 4.** After analysis by DDOT, a list of factors contributing to the crashes was compiled and is provided in **Table 5.**

Figure 4: Minnesota Avenue and Nannie Helen Burroughs Avenue Crash Diagram



Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

Table 5: Potential Causes of Crashes at Minnesota Avenue and Nannie Helen Burroughs Avenue Intersection

Movement	Collision Type	Potential Causes of Crashes
Eastbound Nannie Helen Burroughs Avenue	Rear-End	• Visibility issues due to the existing bridge • Left turn is shared with through (also lagging left turn), which may cause sudden stops (sideswiped collisions can also be attributed to shared left turn operation)
	Sideswiped	• Visibility issues due to the existing bridge • Narrow lanes
	Left Turn Hit Veh.	• Visibility issues due to the existing bridge • Signal/Left turn volume
Westbound Nannie Helen Burroughs Avenue	Rear-End	• Downhill and lane change
	Sideswiped	• Downhill and lane change
Northbound Minnesota Avenue	Rear-End	• Stop and go traffic due to peak-period congestion • Speeding and more aggressive behavior due to cycle overflows (i.e., queue cannot clear the intersection in the current cycle)

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

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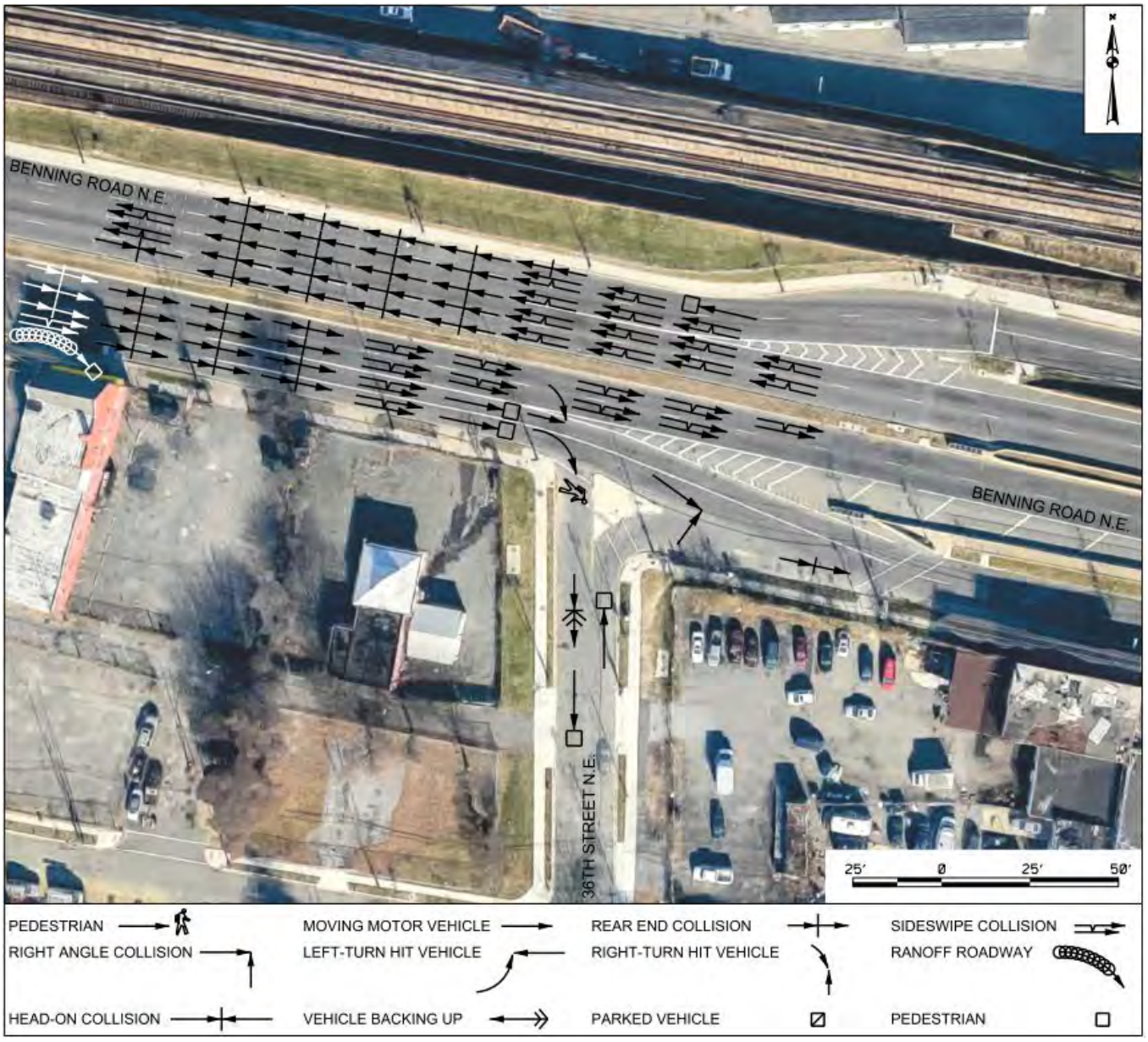
5.4 Benning Road and 36th Street Intersection

The distribution of crashes for the Benning Road and 36th Street intersection is shown in **Figure 5**. After analysis by DDOT, a list of factors contributing to the crashes was compiled and is provided in **Table 6**.

Figure 5: Benning Road and 36th Street Crash Diagram



Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

Table 6: Potential Causes of Crashes at Benning Road and 36th Street Intersection

Movement	Collision Type	Potential Causes of Crashes
Eastbound Benning Road	Rear-End	• Lack of proper signage for the off-ramp • Lane change and slowing down to get onto off-ramp
	Sideswiped	• Lane change and slowing down to get onto off-ramp
Westbound Benning Road	Rear-End	• Possible conflict with merging traffic
	Sideswiped	• Possible conflict with merging traffic

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

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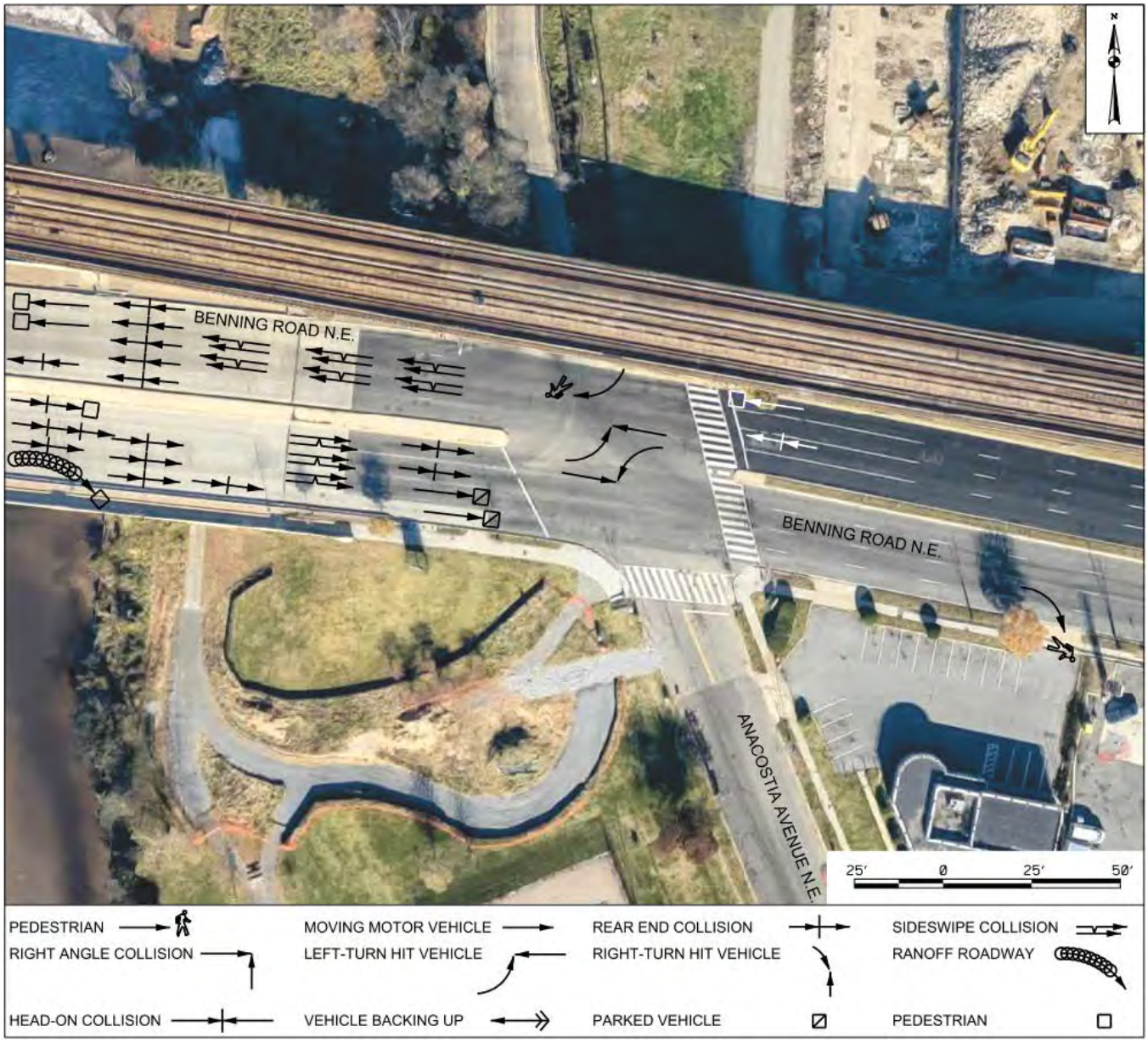
5.5 Benning Road and Anacostia Avenue Intersection

Figure 6 provides crash analysis information for the Benning Road and Anacostia Avenue intersection. This intersection in not classified as a high crash frequency location.

Figure 6: Benning Road and Anacostia Avenue Crash Diagram

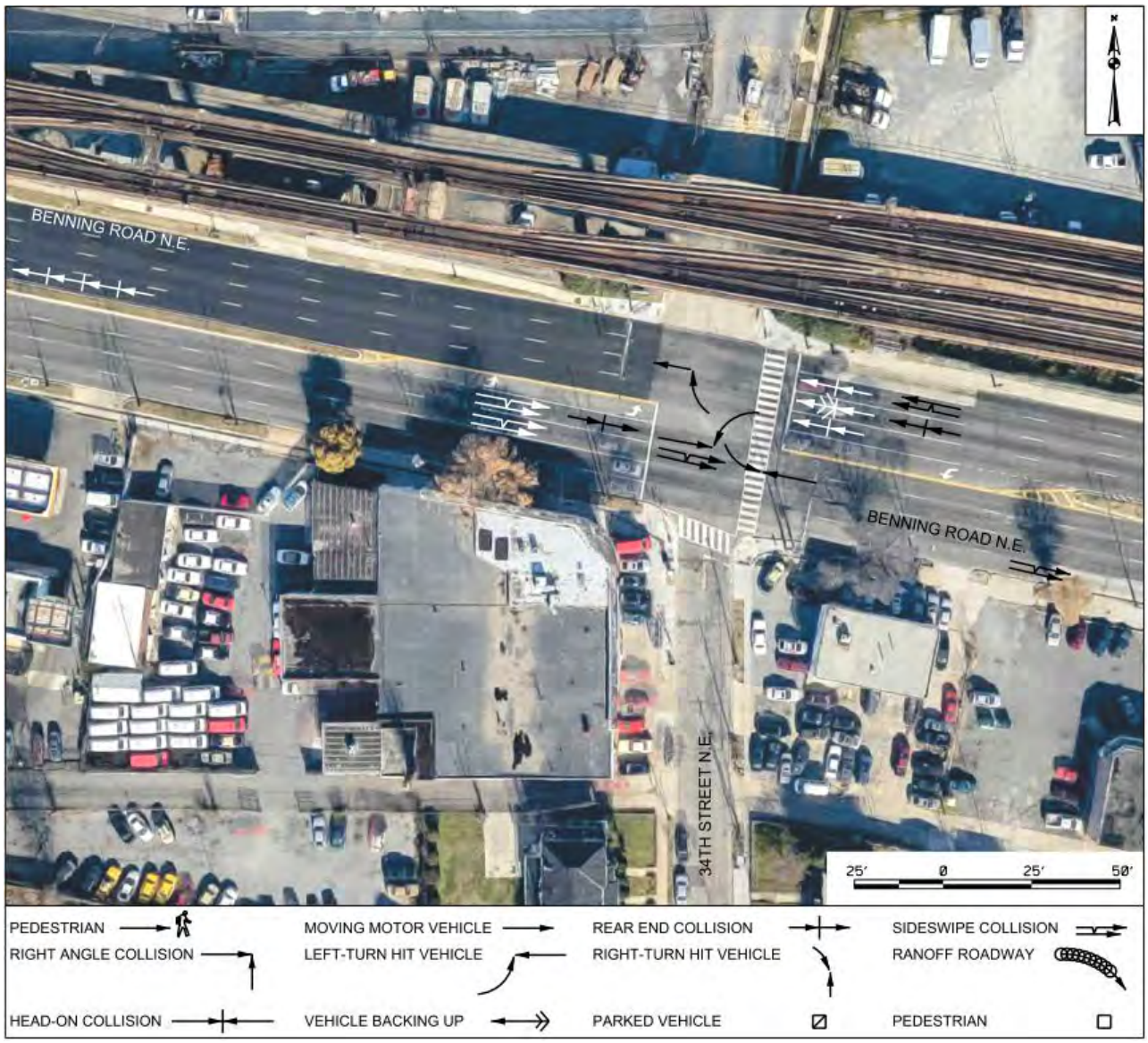


Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.6 Benning Road and 34th Street Intersection

Figure 7 provides crash analysis information for the Benning Road and 34th Street intersection. This intersection in not classified as a high crash frequency location.

Figure 7: Benning Road and 34th Street Crash Diagram



Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.7 Benning Road and 45th Street Intersection

Figure 8 provides crash analysis information for the Benning Road and 45th Street intersection. This intersection in not classified as a high crash frequency location.

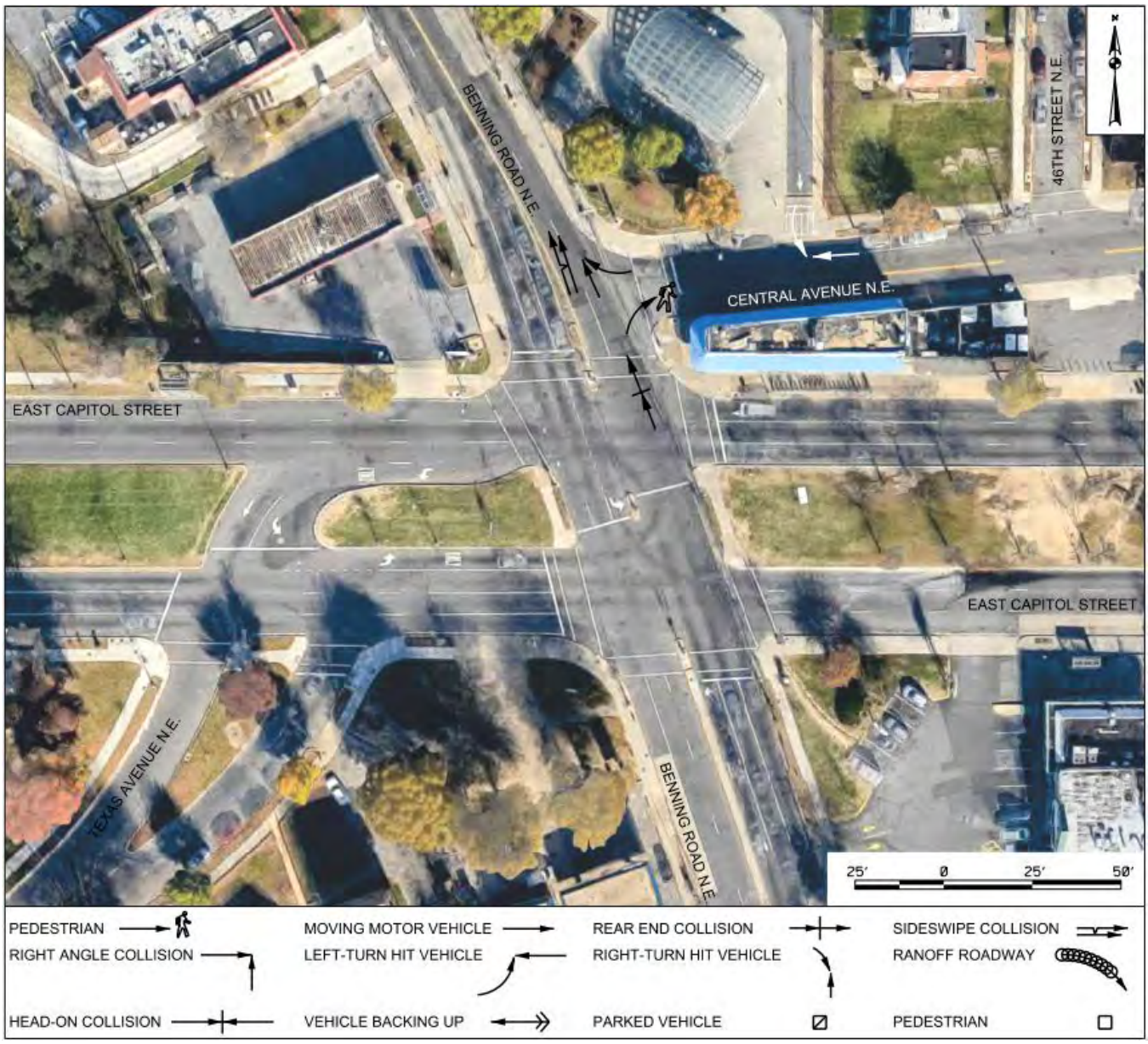
Figure 8: Benning Road and 45th Street Crash Diagram

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.8 Benning Road and Central Avenue Intersection

Figure 9 provides crash analysis information for the Benning Road and Central Avenue intersection. This intersection in not classified as a high crash frequency location.

Figure 9: Benning Road and Central Avenue Crash Diagram

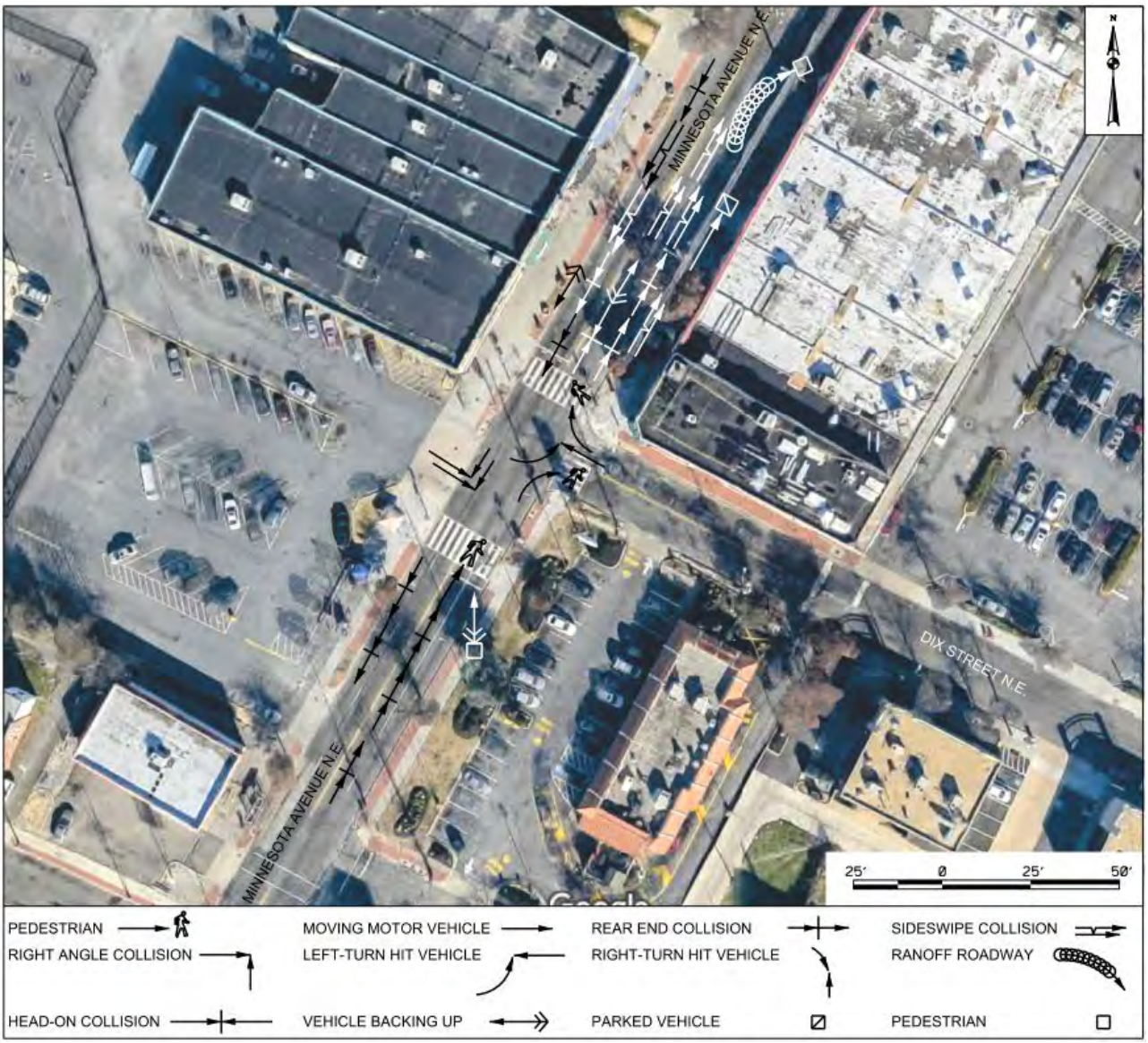


Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.9 Minnesota Avenue and Dix Street Intersection

Figure 10 provides crash analysis information for the Minnesota Avenue and Dix Street intersection. This intersection in not classified as a high crash frequency location.

Figure 10: Minnesota Avenue and Dix Street Crash Diagram

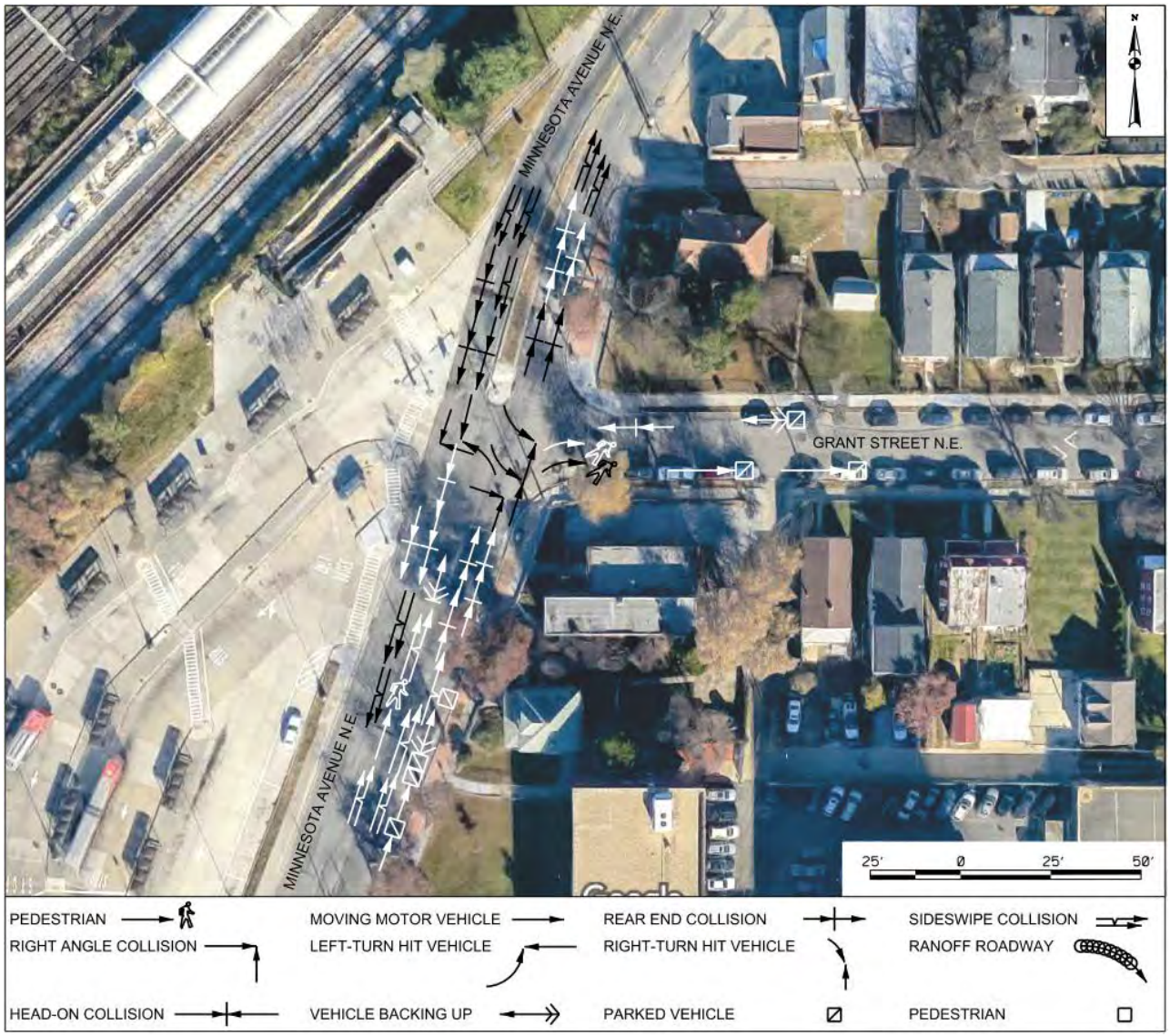


Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.10 Minnesota Avenue and Grant Street Intersection

Figure 11 provides crash analysis information for the Minnesota Avenue and Grant Street intersection. This intersection in not classified as a high crash frequency location.

Figure 11: Minnesota Avenue and Grant Street Crash Diagram



Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.11 Minnesota Avenue and Hayes Street Intersection

Figure 12 provides crash analysis information for the Minnesota Avenue and Hayes Street intersection. This intersection in not classified as a high crash frequency location.

Figure 12: Minnesota Avenue and Hayes Street Crash Diagram

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

5.12 Minnesota Avenue and Gault Place Intersection

Figure 13 provides crash analysis information for the Minnesota Avenue and Gault Place intersection. This intersection in not classified as a high crash frequency location.

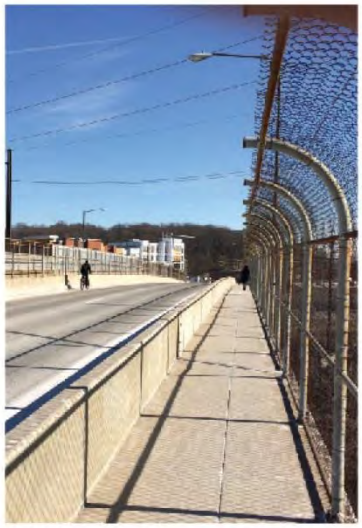
Figure 13: Minnesota Avenue and Gault Place Crash Diagram

Source: TARAS2 (Traffic Accident Reporting and Analysis System 2)

BENNING ROAD & BRIDGES TRANSPORTATION IMPROVEMENTS

GENERAL PLANS

FINAL AUGUST 2020



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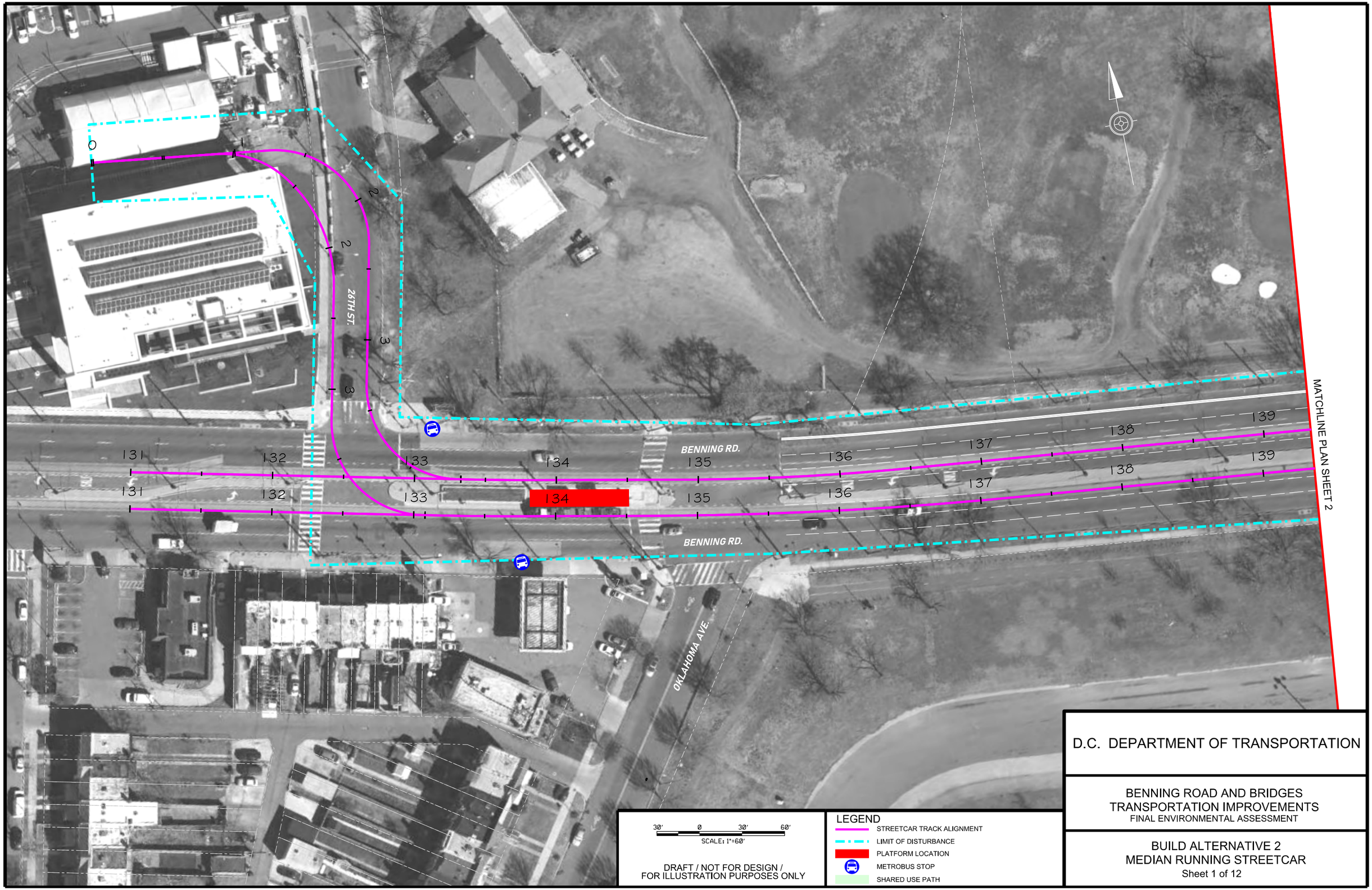

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SCALE: 1"=60′

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FOR ILLUSTRATION PURPOSES ONLY

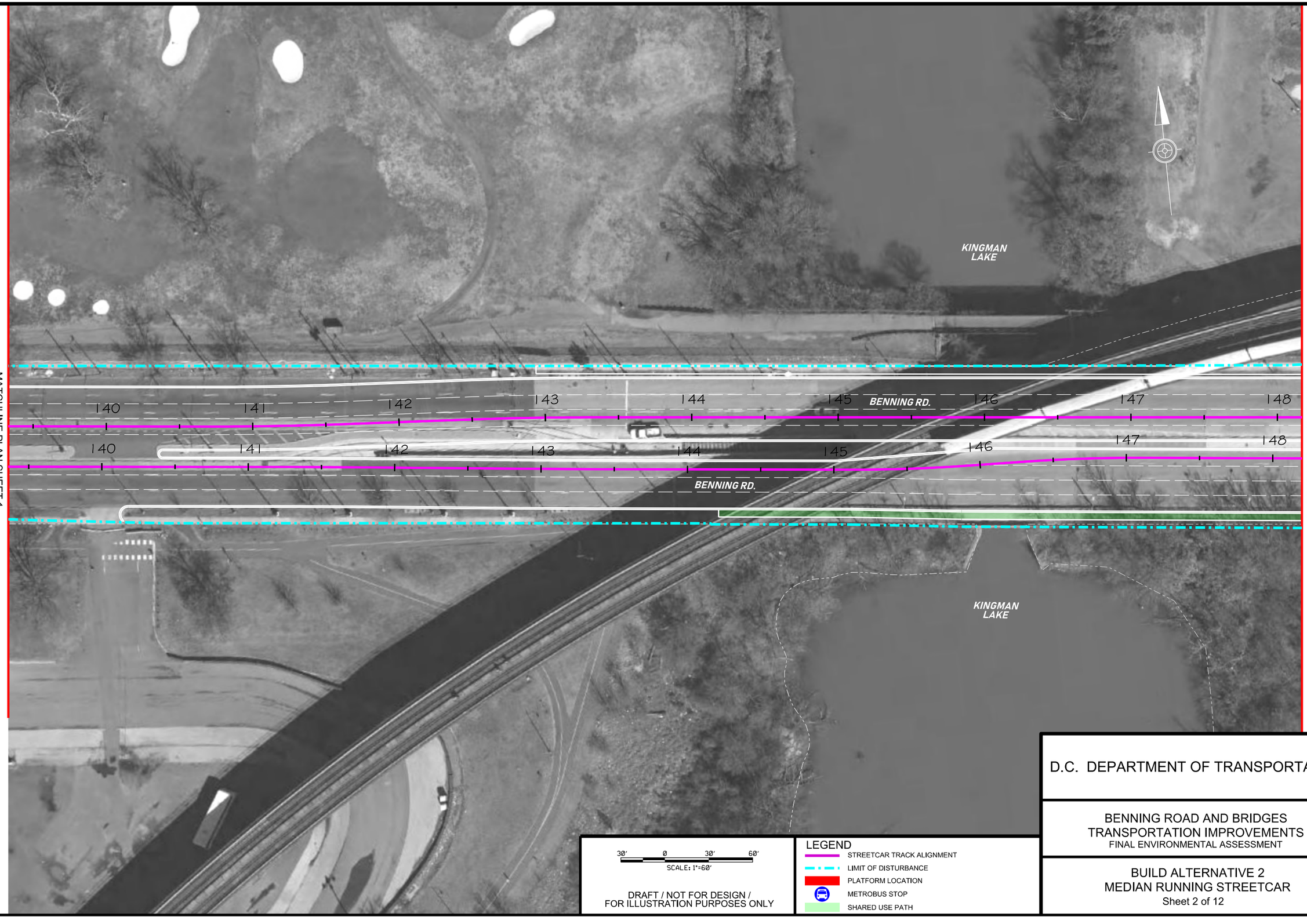
LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

D.C. DEPARTMENT OF TRANSPORTATION

BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
Sheet 1 of 12



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FOR ILLUSTRATION PURPOSES ONLY

LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

D.C. DEPARTMENT OF TRANSPORTATION

BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
Sheet 2 of 12

MATCHLINE PLAN SHEET 2

MATCHLINE PLAN SHEET 4

149 150 151 152 153 154 155 156

BENNING RD.

ANACOSTIA RIVER

30' 0 30' 60'

SCALE: 1"=60'

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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR

ANACOSTIA RIVER

ANACOSTIA AVE.

BENNING RD.

BENNING RD.

ANACOSTIA RIVER

ANACOSTIA AVE.

157 158 159 160 161 162 163 164 165

MATCHLINE PLAN SHEET 3

MATCHLINE PLAN SHEET 5

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SCALE: 1"=60′

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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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BENNING ROAD AND BRIDGES
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FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR

MATCHLINE PLAN SHEET 4

MATCHLINE PLAN SHEET 6

BENNING RD.

166 167 168 169 170 171 172 173 174

BENNING RD.

34TH ST.

30' 0 30' 60'

SCALE: 1"=60'

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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR

MATCHLINE PLAN SHEET 5

MATCHLINE PLAN SHEET 7

BENNING RD.

175 176 177 178 179 180 181 182 183

BENNING RD.

36TH ST.

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SCALE: 1"=60′

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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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BENNING ROAD AND BRIDGES
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BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
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MATCHLINE PLAN SHEET 6

184 185 186 187 BENNING RD. 188 189 190 191

184 185 186 187 188 189 190 191

BENNING RD.

ANACOSTIA FWY

MATCHLINE PLAN SHEET 8

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SCALE: 1"=60′

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FOR ILLUSTRATION PURPOSES ONLY

LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR

MINNESOTA AVE

39TH ST.

BENNING RD.

BENNING RD.

MINNESOTA AVE

MATCHLINE PLAN SHEET 7

MATCHLINE PLAN SHEET 9

30′ 0 30′ 60′

SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
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BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR

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MATCHLINE PLAN SHEET 8

MATCHLINE PLAN SHEET 10

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SCALE: 1"=60′

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LEGEND
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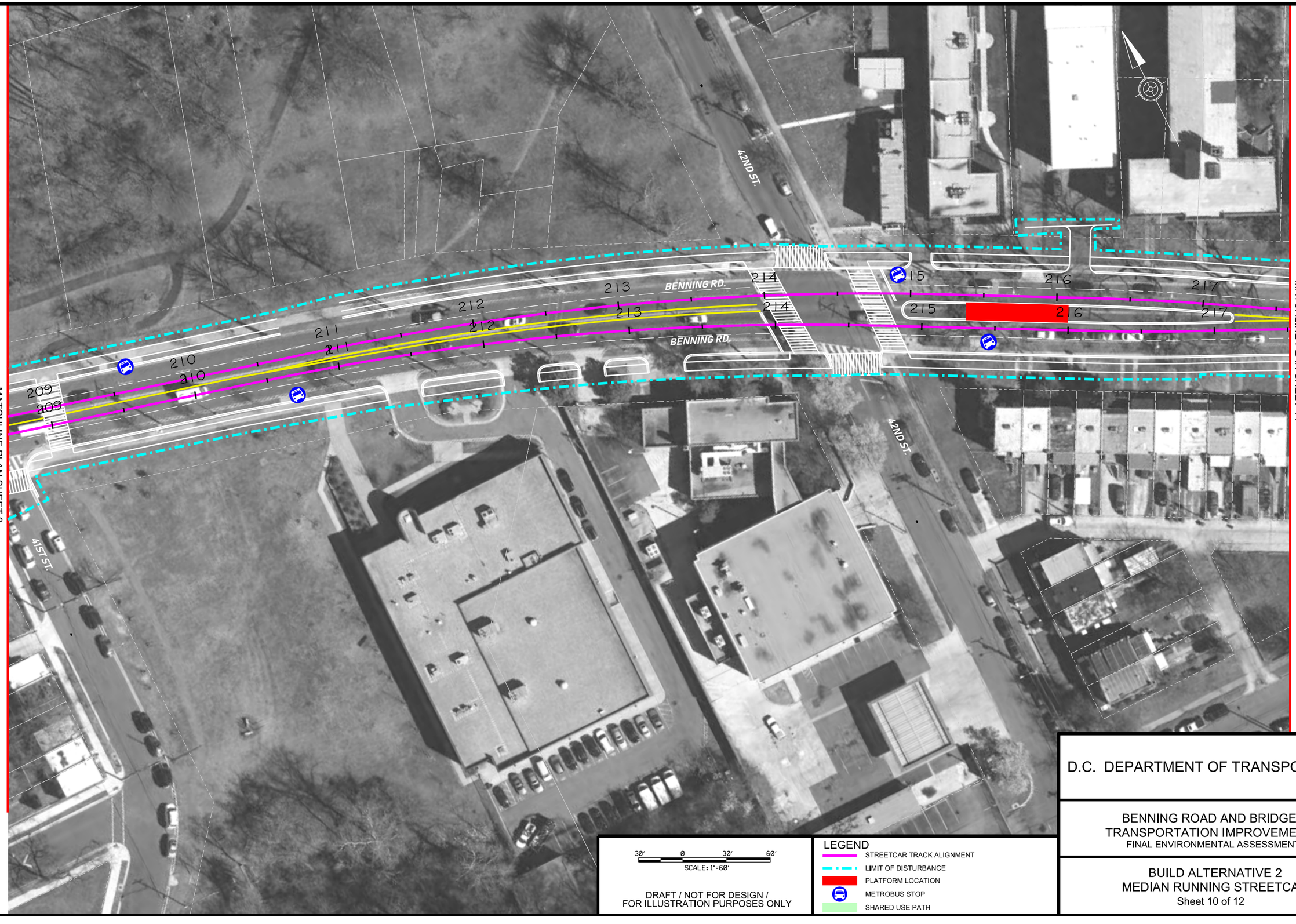
D.C. DEPARTMENT OF TRANSPORTATION

BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
Sheet 9 of 12



MATCHLINE PLAN SHEET 9

MATCHLINE PLAN SHEET 11

30′ 0 30′ 60′

SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
FOR ILLUSTRATION PURPOSES ONLY

LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
Sheet 10 of 12

MATCHLINE PLAN SHEET 10

MATCHLINE PLAN SHEET 12

43RD ST.

44TH ST.

BLAINE ST.

BENNING RD.

BENNING RD.

218 219 220 221 222 223 224 225

218 219 220 221 222 223 224 225

BLAINE ST.

30′ 0 30′ 60′

SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR

MATCHLINE PLAN SHEET 11

45TH ST.

BENNING RD.

BENNING RD.

CENTRAL AVE.

EAST CAPITOL ST.

EAST CAPITOL ST.

226 227 228 229 230 231 232

30′ 0 30′ 60′

SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
FOR ILLUSTRATION PURPOSES ONLY

LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- PLATFORM LOCATION
- METROBUS STOP
- SHARED USE PATH

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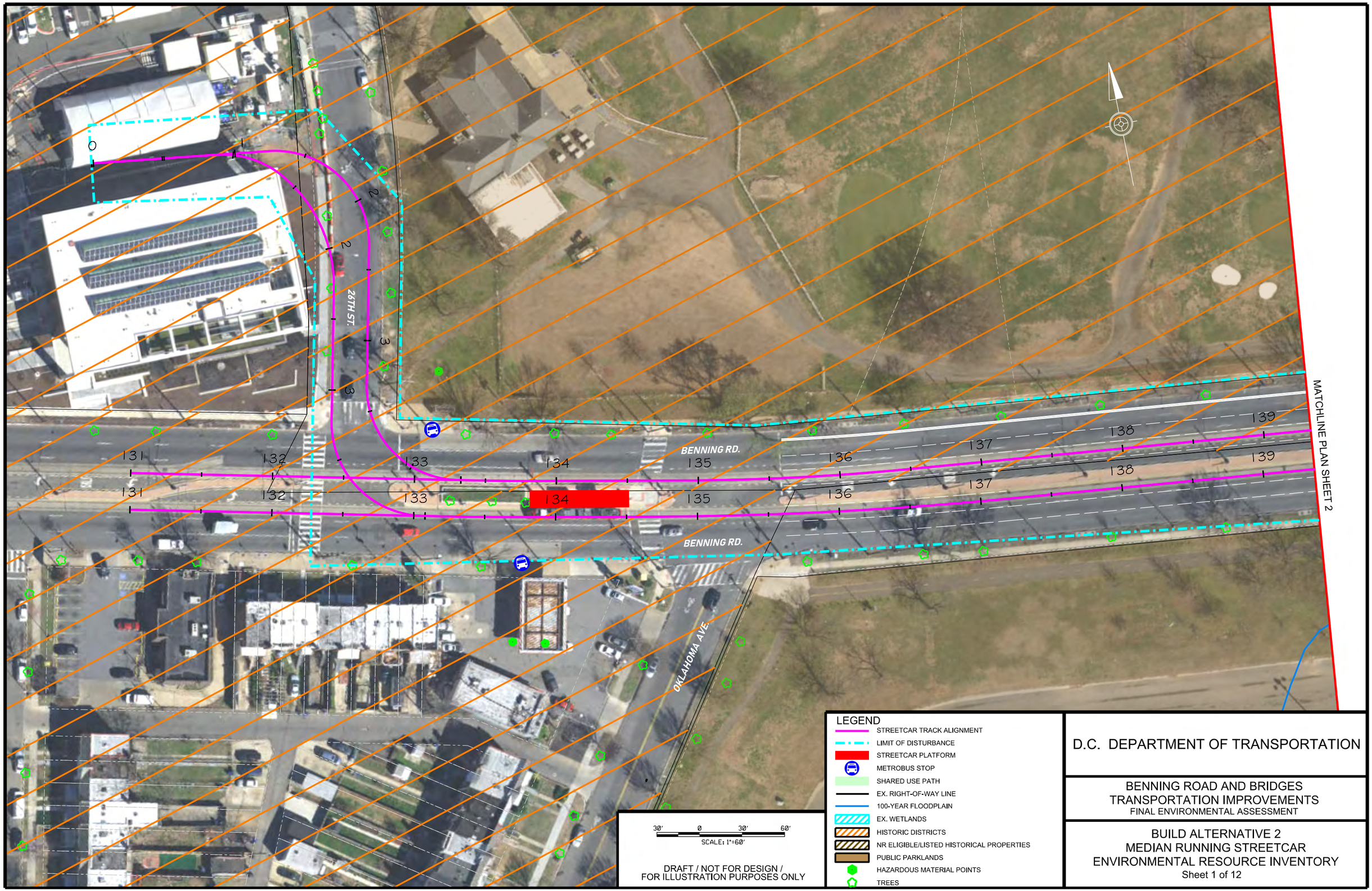
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR



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BENNING ROAD AND BRIDGES
TRANSPORTATION IMPROVEMENTS
FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
ENVIRONMENTAL RESOURCE INVENTORY
Sheet 1 of 12

MATCHLINE PLAN SHEET 1

MATCHLINE PLAN SHEET 3

KINGMAN LAKE

BENNING RD.

140 141 142 143 144 145 146 147 148

KINGMAN LAKE

30′ 0 30′ 60′

SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- STREETCAR PLATFORM
- METROBUS STOP
- SHARED USE PATH
- EX. RIGHT-OF-WAY LINE
- 100-YEAR FLOODPLAIN
- EX. WETLANDS
- HISTORIC DISTRICTS
- NR ELIGIBLE/LISTED HISTORICAL PROPERTIES
- PUBLIC PARKLANDS
- HAZARDOUS MATERIAL POINTS
- TREES

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FINAL ENVIRONMENTAL ASSESSMENT

BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
ENVIRONMENTAL RESOURCE INVENTORY
Sheet 2 of 12

MATCHLINE PLAN SHEET 2

MATCHLINE PLAN SHEET 4

149 150 151 152 153 154 155 156

149 150 151 152 153 154 155 156

BENNING RD.

BENNING RD.

ANACOSTIA RIVER

ANACOSTIA RIVER

30' 0 30' 60'

SCALE: 1"=60'

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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- STREETCAR PLATFORM
- METROBUS STOP
- SHARED USE PATH
- EX. RIGHT-OF-WAY LINE
- 100-YEAR FLOODPLAIN
- EX. WETLANDS
- HISTORIC DISTRICTS
- NR ELIGIBLE/LISTED HISTORICAL PROPERTIES
- PUBLIC PARKLANDS
- HAZARDOUS MATERIAL POINTS
- TREES

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MEDIAN RUNNING STREETCAR
ENVIRONMENTAL RESOURCE INVENTORY
Sheet 3 of 12

ANACOSTIA RIVER

ANACOSTIA AVE.

BENNING RD.

BENNING RD.

ANACOSTIA AVE

ANACOSTIA RIVER

MATCHLINE PLAN SHEET 3

MATCHLINE PLAN SHEET 5

157 158 159 160 161 162 163 164 165

30' 0 30' 60'

SCALE: 1"=60'

DRAFT / NOT FOR DESIGN /
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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- STREETCAR PLATFORM
- METROBUS STOP
- SHARED USE PATH
- EX. RIGHT-OF-WAY LINE
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- EX. WETLANDS
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- NR ELIGIBLE/LISTED HISTORICAL PROPERTIES
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BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
ENVIRONMENTAL RESOURCE INVENTORY
Sheet 4 of 12

MATCHLINE PLAN SHEET 4

MATCHLINE PLAN SHEET 6

BENNING RD.

166 167 168 169 170 171 172 173 174

BENNING RD.

34TH ST.

30′ 0 30′ 60′

SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- STREETCAR PLATFORM
- METROBUS STOP
- SHARED USE PATH
- EX. RIGHT-OF-WAY LINE
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- EX. WETLANDS
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BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
ENVIRONMENTAL RESOURCE INVENTORY
Sheet 5 of 12

MATCHLINE PLAN SHEET 5

MATCHLINE PLAN SHEET 7

BENNING RD.

175 176 177 178 179 180 181 182 183

BENNING RD.

36TH ST.

30′ 0 30′ 60′

SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
FOR ILLUSTRATION PURPOSES ONLY

LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
- STREETCAR PLATFORM
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- SHARED USE PATH
- EX. RIGHT-OF-WAY LINE
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BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
ENVIRONMENTAL RESOURCE INVENTORY
Sheet 6 of 12

MATCHLINE PLAN SHEET 6

184 185 186 187 BENNING RD. 188 189 190 191

BENNING RD.

ANACOSTIA FWY

MATCHLINE PLAN SHEET 8

30′ 0 30′ 60′
SCALE: 1"=60′

DRAFT / NOT FOR DESIGN /
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LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
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BUILD ALTERNATIVE 2
MEDIAN RUNNING STREETCAR
ENVIRONMENTAL RESOURCE INVENTORY
Sheet 7 of 12

MINNESOTA AVE.

39TH ST.

BENNING RD.

BENNING RD.

MINNESOTA AVE.

MATCHLINE PLAN SHEET 7

MATCHLINE PLAN SHEET 9

192 193 194 195 196 197 198 199 200

LEGEND

- STREETCAR TRACK ALIGNMENT
- LIMIT OF DISTURBANCE
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- METROBUS STOP
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- EX. RIGHT-OF-WAY LINE
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- EX. WETLANDS
- HISTORIC DISTRICTS
- NR ELIGIBLE/LISTED HISTORICAL PROPERTIES
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- TREES

30′ 0 30′ 60′

SCALE: 1"=60′

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BUILD ALTERNATIVE 2
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ENVIRONMENTAL RESOURCE INVENTORY

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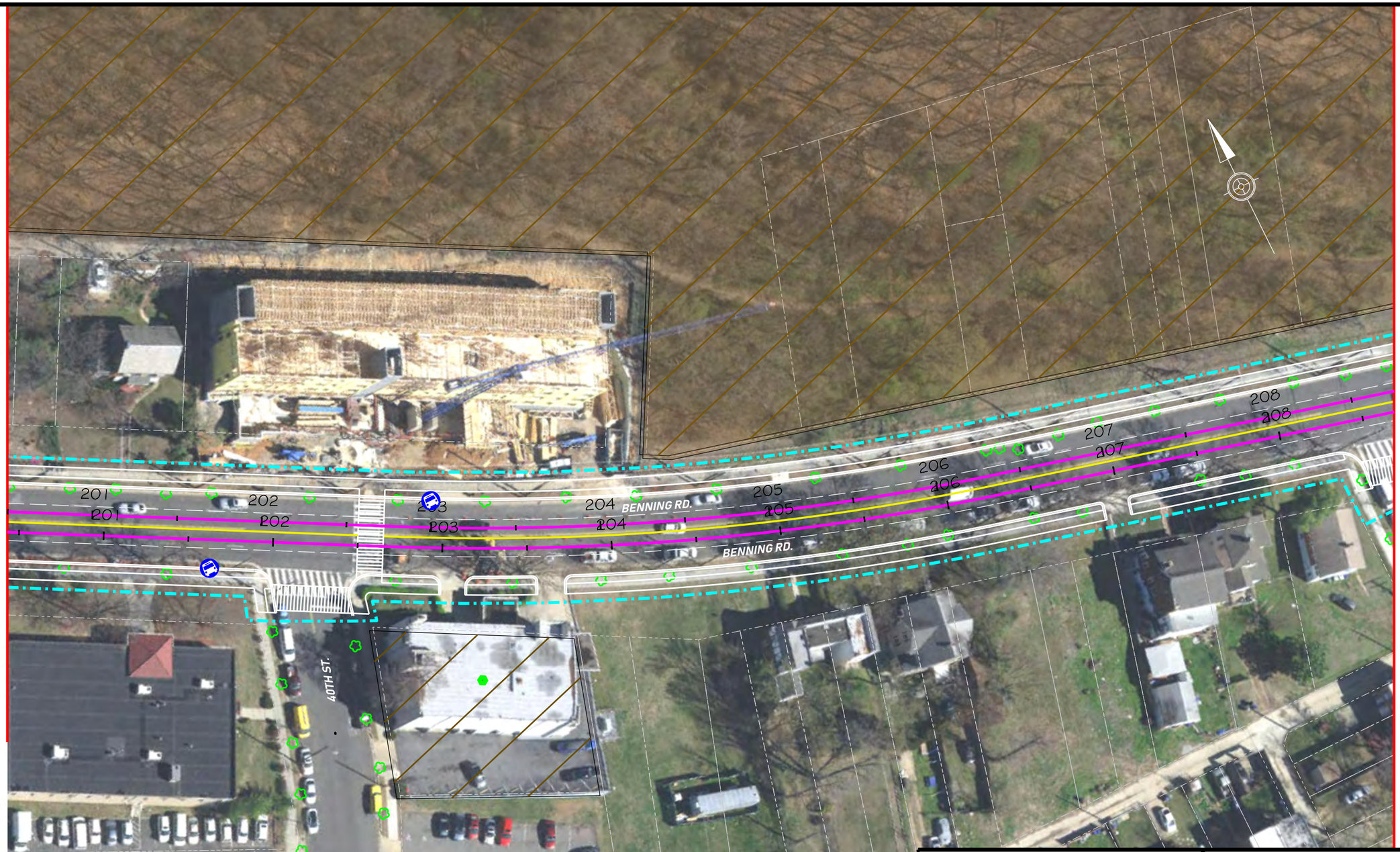
MATCHLINE PLAN SHEET 8

MATCHLINE PLAN SHEET 10



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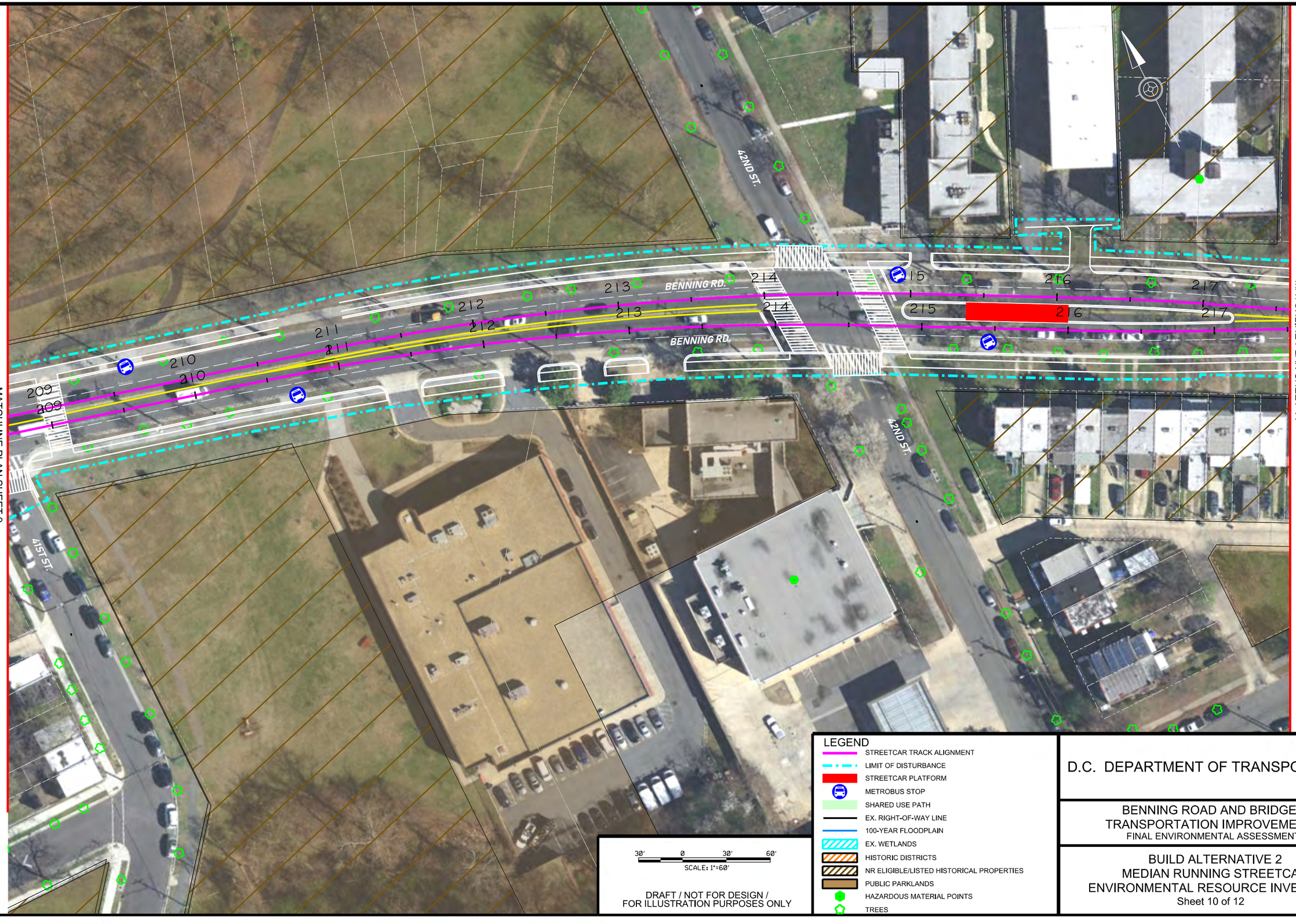

MATCHLINE PLAN SHEET 9

MATCHLINE PLAN SHEET 11

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MATCHLINE PLAN SHEET 10

MATCHLINE PLAN SHEET 12

43RD ST.

44TH ST.

BLAINE ST.

BENNING RD.

BENNING RD.

BLAINE ST.

218 219 220 221 222 223 224 225

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Sheet 11 of 12

MATCHLINE PLAN SHEET 11

45TH ST.

BENNING RD.

BENNING RD.

CENTRAL AVE.

EAST CAPITOL ST.

226 227 228 229 230 231 232

30′ 0 30′ 60′

SCALE: 1"=60′

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