MINNESOTA AVENUE EXTENSION

ENVIRONMENTAL ASSESSMENT

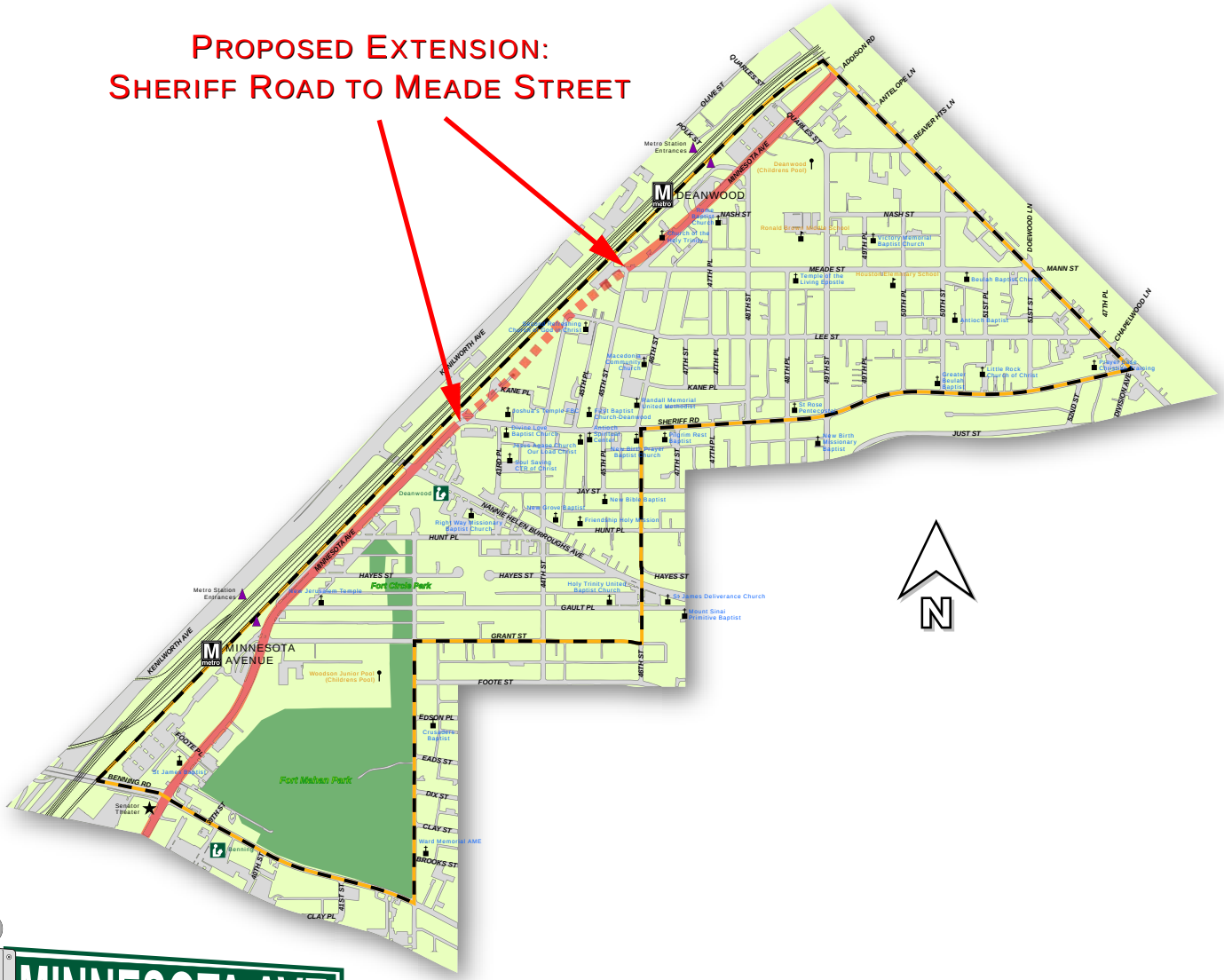
Prepared by:

District Department of Transportation

For:

Federal Highway Administration

June 2007



MINNESOTA AVE EXTENSION

ENVIRONMENTAL ASSESSMENT

for

MINNESOTA AVENUE EXTENSION
WASHINGTON, DC

Prepared pursuant to 42 U.S.C. 4332(2)(c)
by
U.S. Department of Transportation
Federal Highway Administration
and
District Department of Transportation

6/25/07
Date of Approval

Emeka C. Moneme, Director
District Department of Transportation

June 22, 2007
Date of Approval

Mark Kehrli, Division Administrator
Federal Highway Administration
DC Division Office

EXECUTIVE SUMMARY

S.1 PROPOSED ACTION

The District of Columbia Department of Transportation (DDOT) is investigating the extension of Minnesota Avenue, N.E., from Sheriff Road to Meade Street. Minnesota Avenue is a major north-south roadway on the east side of the Anacostia River. It is located wholly within the District of Columbia and extends from Good Hope Road near the 11th Street Bridge in Northeast to Eastern Avenue and the District line to the north. Minnesota Avenue provides convenient access to the approaches of the Benning, John Phillip Sousa, and 11th Street Bridges and to residential and commercial areas, religious institutions, schools and public parks along its route. The proposed project is located in the Deanwood neighborhood of Washington, DC and would consist of constructing of a new four-lane roadway and associated intersection improvements, upgrading and installing traffic control measures, modifying or constructing drainage facilities, and adding pedestrian facilities. The proposed extension would complete a long-planned missing segment of Minnesota Avenue between Sheriff Road and Meade Street in the Deanwood neighborhood of Washington, DC.

Deanwood is located within Ward 7 of the District of Columbia and is one of the oldest African-American neighborhoods in the city. Plans for Minnesota Avenue began to appear as early as the 1930s, including a portion of the roadway from Sheriff Avenue to Meade Street that was never constructed. From the earliest days Minnesota Avenue was envisioned as a boulevard to serve residents of Deanwood and the District. Most of the development in the area was constructed in the 1940s – 1950s and the area is now primarily made up of single-family and low-density residential uses, along with churches, some commercial development, and other community facilities.

Minnesota Avenue is currently a discontinuous four-lane arterial with two posted speed limits within the study area: 35 mph on the portion located south of Sheriff Road and 25 mph on the portion located north of Meade Street. On-street parking is permitted at all times in two of the travel lanes.

Since the early 1900s, historical insurance maps have shown the proposed Minnesota Avenue corridor, including the extension currently under evaluation. Right-of-way for the extension was reserved until very recently for the construction of the missing portion of Minnesota Avenue. Although now privately owned, the land use in the area of Deanwood where the proposed extension would be build is almost exclusively undeveloped. The completion of Minnesota Avenue has been planned for years in advance of this Environmental Assessment and is an element of local and District-wide plans.

Deanwood completed a community assessment in 2001 as part of the Strategic Neighborhood Action Plan (SNAP) process. The completion of Minnesota Avenue was one of the priorities identified by the citizens of Deanwood and the local community as part of the SNAP process. In recent years, there had developed a fundamental conflict between cut-through traffic and residential development that resulted from this missing segment of Minnesota Avenue. This assessment is the first step in the process for fulfilling the community's request for a continuous Minnesota Avenue that has long been envisioned and desired.

S.2 PURPOSE AND NEED

Because this project would receive federal funds, it is subject to the provisions of the National Environmental Policy Act of 1969 (NEPA), as amended, and associated regulations. One of the first steps in the NEPA process is to document the purpose and need for the proposed project. Regulations and technical advisories promulgated by the Federal Highway Administration (FHWA) and the Council on Environmental Quality (CEQ) guide the preparation of the Purpose and Need Statement.

The purpose of the proposed action is to improve the functionality of the local and regional roadway system through the construction of the missing segment of Minnesota Avenue within the project limits. The project is intended to construct the extension of Minnesota Avenue and to support the goals of the SNAP adopted for Ward 7, in which the proposed project is located, that cite the completion of Minnesota Avenue as an element of improving access to the Deanwood and Lincoln Heights areas. The discontinuous configuration of Minnesota Avenue creates circuitous routing of traffic in the study area. In addition, the construction would provide better and more direct access to the Deanwood and Minnesota Avenue Metrorail stations.

The missing transportation link on Minnesota Avenue results in vehicles using minor residential streets within the Deanwood neighborhood as alternatives for north-south travel. In the immediate vicinity of the proposed extension, the existing volumes indicate that motorists are using a combination of Meade Street with 45th and 44th Streets to circumnavigate the missing segment of Minnesota Avenue. The use of these streets causes increased vehicular traffic in residential areas and the potential for unsafe conditions for local traffic, bicycles and pedestrians. These traffic volumes are anticipated to increase in future years as investment along the Anacostia waterfront increases.

S.3 ALTERNATIVES

Several alternatives have been analyzed as possible extensions for Minnesota Avenue. Traditionally, the extension has been shown on right-of-way maps for the District as a linear extension located immediately adjacent and east of the current Metrorail Orange Line rail facilities. However, several alternatives were analyzed because a portion of this previously identified right-of-way was purchased and because the northern segment of Minnesota Avenue was constructed slightly to the east of the location depicted in historic maps.

Two build alternatives are being evaluated in this EA: Alternative 4A and Alternative 5. In addition, the No-Build Alternative is also being evaluated as required by the National Environmental Policy Act of 1969, as amended.

No-Build Alternative

No-Build Alternative assumes that no improvements would be made to the existing Minnesota Avenue. The southern portion of Minnesota Avenue would continue to end at Minnesota Avenue's divergence from Sheriff Road; even though a small portion of Minnesota Avenue right-of-way extends approximately 420 feet north from this divergence point (this right-of-way is only about 20 feet wide). At the north end of the study area, Minnesota Avenue would continue to be a 90-foot-wide, four-lane arterial between Meade Street and Eastern Avenue. The No-Build Alternative provides a baseline for comparing the operational benefits and potential impacts of the other Build Alternatives being studied.

Alternative 4A: Modified 90-foot Right-of-Way with Meade Street Segment

Alternative 4A would consist of a 90-foot right-of-way and would provide a continuous Minnesota Avenue from Sheriff Road to Meade Street. The use of the 90-foot right-of-way is consistent with the historical right-of-way anticipated for the extension of Minnesota and also matches the right-of-way on the sections of Minnesota Avenue that already exist. Starting from Sheriff Road, Alternative 4A would

be constructed using the existing dead-end section of Minnesota Avenue that provides access to Kane Place. The alignment would be located along the existing rail line to the point at which it would intersect 44th Street and Lee Street. Alternative 4A would provide a consistent 90-foot right-of-way until the point at which the roadway would merge with a short section of Meade Street, where the right-of-way would be reduced to minimize impacts to residential and commercial properties. Approximately 200 feet of Meade Street would be re-designated as Minnesota Avenue, and intersection improvements would be incorporated for 45th Street and Meade Street. Minnesota Avenue would then continue its current alignment to Eastern Avenue with no additional improvements.

Alternative 5: 60-foot Right-of-Way with Meade Street Segment

Alternative 5 would include the same infrastructure improvements as Alternative 4A in terms of the number of lanes, buffering, and sidewalks provided, but would provide only a 60-foot right-of-way. In addition to the right-of-way, Alternative 5 would have setbacks along Minnesota Avenue. These setbacks would not be required as part of the public right-of-way, but building restrictions would be imposed along the setbacks to ensure proper sight distances for the extension of Minnesota Avenue. However, it is currently proposed to eliminate the setback requirement to the west of the proposed extension along the rail lines because no development would be feasible in any event along this setback. This proposal would allow the roadway center line of the extension to be shifted closer to the rail facilities and farther away from residential properties, requiring less property acquisition (see Figure 2.3). Alternative 5 would consist of a new four-lane arterial with dedicated right-of-way for trees and sidewalks (see Figure 2.4). This alternative also would provide the same connections and require the same reconstruction of intersections at Kane Place, 44th Street, Lee Street, 45th Street, and Meade Street. Alternative 5 also uses approximately 200 feet of Meade Street.

One difference between Alternatives 4A and 5 would occur along the narrow portion of existing Minnesota Avenue north of Sheriff Road that currently exists and provides access to Kane Place. Because only 60 feet of right-of-way is required for Alternative 5 and the alignment would be shifted close to the existing rail line, this existing dead-end segment of Minnesota Avenue would not be required for construction.

The proposed action would provide a continuous Minnesota Avenue and reduce cut-through traffic on residential streets in Deanwood. It would provide increased and more direct access to the area and provide a more direct transportation corridor for transit, cyclists, and pedestrians between the Deanwood and Minnesota Avenue Metrorail stations. Both alternatives would enhance safety by not only reducing traffic along residential streets, but also by providing additional bicycle and pedestrian facilities.

Cost estimates are an important consideration in the evaluation of EA alternatives. The cost estimates were prepared using standard construction quantity analysis and assumptions with regard to standard pay items and average unit prices. The cost estimates for each alternative are presented in 2006 dollars and include a 20% cost contingency. Alternative 4A is anticipated to cost $2.72 million, including $513,000 for right-of-way acquisition and Alternative 5 is estimated to cost $2.62 million, including $422,000 for right-of-way acquisition.

S.4 SUMMARY OF IMPACTS

There are several benefits of the proposed action for either build alternative. Construction of the extension would remove traffic from neighborhood streets, create safer operating conditions with the improved facility, allow more direct access to the Metrorail stations, and implement an improvement that is highly desired by the community as included in the SNAP. Making Minnesota Avenue continuous would also provide better access to the community because of improved circulation within the study area as through-traffic is located on an arterial street rather than residential streets. In addition, the proposed extension would provide a connection to the portion of Minnesota Avenue that is part of the Great Streets

program. Finally, the proposed design for the project will incorporate sidewalks that are missing on most of the local streets in the study area, thus providing a better environment for pedestrians going to the Metrorail stations.

Either alternative built would require the purchase of right-of-way from private land owners in the study area, as addressed in this Environmental Assessment. Either alternative would also impact one single-family residence in the study area that would have to be relocated. In addition, there is a potential for hazardous material contamination in the study area since a portion of the proposed right-of-way was at one time used as a dumping ground. The presence of any hazardous materials and mitigation of such materials would be identified in the design of any alternative selected. In addition, construction of the project would result in noise impacts within the study area for some residences since noise walls would not be feasible as part of the proposed improvements. This Environmental Assessment documents all other areas of potential impact within the study area.

TABLE OF CONTENTS

EXECUTIVE SUMMARY

S.1 Proposed Action ES-1

S.2 Purpose and Need ES-2

S.3 Alternatives ES-2

S.4 Summary of Impacts ES-3

List of Tables iii

List of Figures iii

SECTION 1 – PURPOSE AND NEED

1.1 Project Overview 1-1

1.2 Purpose and Need for Action 1-3

1.3 Relationship to Other Studies and Plans 1-4

1.3.1 Transit Alternatives Analysis and Anacostia Streetcar Project 1-4

1.3.2 Anacostia Waterfront Initiative 1-5

1.3.3. Comprehensive Plan for the District of Columbia 1-5

1.3.4 Cluster 31 Strategic Neighborhood Action Plan (SNAP) 1-5

1.3.5 Government Centers Initiative 1-5

SECTION – ALTERNATIVES

2.1 No-Build Alternative 2-1

2.2 Proposed Action 2-1

2.2.1 Alternative 4A: Modified 90-Foot Right-Of-Way with Meade Street Segment 2-1

2.2.2 Alternative 5: 60-Foot Right-of-Way with Meade Street Segment 2-2

2.3 Alternatives Removed from Consideration 2-2

SECTION 3 – ENVIRONMENTAL EFFECTS

3.1 Land Use and Zoning 3-1

3.1.1 Land Use 3-3

3.1.2 Zoning 3-4
3.1.3 Consistency with Local Plans 3-6
3.2 Land Acquisitions, Displacements and Relocation Impacts 3-6
3.3 Community Resources and Cohesion 3-9
3.3.1 Community Facility Impacts 3-9
3.3.2 Community Cohesion 3-10
3.4 Traffic and Transportation 3-13
3.4.1 Traffic Data Collection 3-13
3.4.2 Existing Traffic Conditions 3-13
3.4.3 Existing Bus Routes 3-18
3.4.4 Pedestrian and Bicycle Conditions 3-19
3.4.5 Traffic Forecasts 3-19
3.5 Cultural Resources 3-25
3.5.1 Regulatory Requirements 3-25
3.5.2 Area of Potential Effect Definition 3-27
3.5.3 Efforts to Identify Archaeological and Architectural Resources 3-27
3.5.4 Archaeological Resources 3-27
3.5.5 Historical Resources 3-29
3.6 Air Quality 3-30
3.6.1 Methodology 3-30
3.6.2 Impact Analysis 3-30
3.6.3 Temporary Construction-Related Impacts 3-37
3.6.4 Mitigation 3-38
3.7 Noise 3-38
3.7.1 Fundamentals of Noise 3-38
3.7.2 Regulatory Overview 3-39
3.7.3 Existing Noise Environment 3-40
3.7.4 Noise Impacts 3-40
3.7.5 Mitigation 3-43
3.8 Natural Environment 3-45
3.8.1 Physiography and Topography 3-46
3.8.2 Geology 3-46
3.8.3 Soils 3-46
3.8.4 Water Resources 3-47
3.8.5 Terrestrial and Aquatic Wildlife and Habitat 3-51

3.9 Parklands, Recreation Resources and Section 4(f) 3-56
3.10 Visual and Aesthetic Resources 3-57
3.11 Hazardous Materials 3-58
3.11.1 Records Search Results 3-60
3.11.2 Impacts 3-60
3.11.3 Mitigation 3-62
3.12 Construction Impacts 3-62
3.13 Environmental Justice Impacts 3-64
SECTION 4 – AGENCY COORDINATION AND PUBLIC INVOLVEMENT
4.1 Agency Coordination 4-1
4.2 Public Involvement 4-2
4.2.1 August 13, 2003 Meeting 4-3
4.2.2 February 17, 2004 Meeting 4-3
SECTION 5 – PREPARERS
SECTION 6 – LITERATURE CITED
APPENDIX A –HAZARDOUS MATERIALS DATA SEARCH
APPENDIX B – PUBLIC INVOLVEMENT PROCESS

List of Tables

Table 3.1 Study Area Land Use 3-3
Table 3.2 Estimated Land Acquisitions by Type 3-4
Table 3.3 Study Area Zoning 3-4
Table 3.4 Community Facilities and Services 3-9
Table 3.5 2003 Existing Levels of Service 3-18
Table 3.6 Intersection Level of Service Comparison 3-26
Table 3.7 CO Concentrations, 2003 (with Background CO) 3-32
Table 3.8 CO Concentrations, Alternatives 3-33
Table 3.9 Estimated Study Area Pollutant Emission Rates 3-33
Table 3.10 Noise Abatement Criteria for Highway Projects for Protected Land Uses 3-39
Table 3.11 Noise Measurement Results 3-40
Table 3.12 Alternative 4A Noise Impact Results 3-43
Table 3.13 Alternative 5 Noise Impact Results 3-43
Table 3.14 Potential Engineering Constraints of Soils within the Project Study Area 3-47
Table 3.15 Invasive Plant Species Observed or With Potential to Occur within the Project Area 3-54
Table 4.1 Agencies and Officials Contacted During Agency Coordination 4-2

List of Figures

Figure 1.1 Project Study Area 1-2
Figure 2.1 Alternative 4A: Modified 90-Foot Right-of-Way with Lee Street Segment 2-3
Figure 2.2 Typical Section for 90-Foot Right of Way 2-4
Figure 2.3 Alternative 5: 60-Foot Right-of-Way with Lee Street Segment 2-5
Figure 2.4 Typical Section for 60-Foot Right-of-Way 2-6
Figure 2.5 Alternative 1: 90-Foot Right-of-Way 2-7
Figure 2.6 Alternative 2: 60-Foot Right-of-Way 2-8
Figure 2.7 Alternative 3: Transportation System Management 2-9
Figure 3.1 Land Use 3-2
Figure 3.2 Zoning 3-5
Figure 3.3 Right-of-Way Requirements 3-8
Figure 3.4 Community Facilities 3-11
Figure 3.5 Study Area Intersections 3-14
Figure 3.6 2003 Existing Peak Hour Traffic Conditions 3-15
Figure 3.7 2003 Existing Average Daily Traffic Volumes 3-16
Figure 3.8 Study Area Bus Routes 3-17
Figure 3.9 2025 No-Build Average Daily Traffic 3-20
Figure 3.10 2025 Build Average Daily Traffic 3-21
Figure 3.11 2025 No-Build Peak Hour Traffic Conditions 3-23
Figure 3.12 2025 Build Peak Hour Traffic Conditions 3-24
Figure 3.13 Noise Receptors/Monitoring Locations 3-41
Figure 3.14 Water Resources 3-48
Figure 3.15 Potential Hazardous Material Locations 3-59

1

PURPOSE AND NEED

This chapter presents the purpose and need for the extension of Minnesota Avenue.

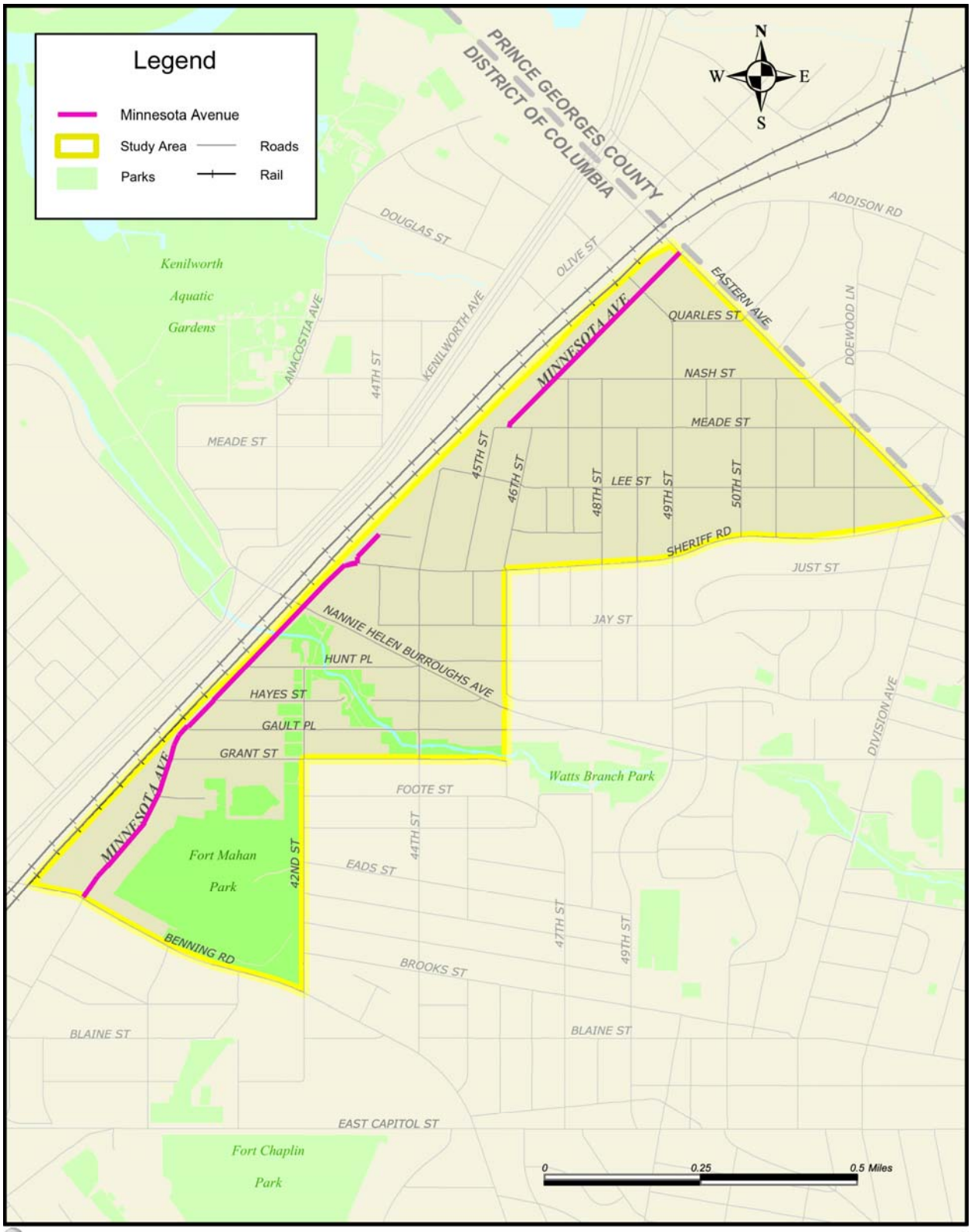
1.1 PROJECT OVERVIEW

The District of Columbia Department of Transportation (DDOT) is investigating the extension of Minnesota Avenue, N.E., from Sheriff Road to Meade Street. Minnesota Avenue is a major north-south roadway on the east side of the Anacostia River. It is located wholly within the District of Columbia and extends from Good Hope Road near the 11th Street Bridge in Northeast to Eastern Avenue and the District line to the north. Minnesota Avenue provides convenient access to the approaches of the Benning, John Phillip Sousa, and 11th Street Bridges and to residential and commercial areas, religious institutions, schools and public parks along its route. The proposed project is located in the Deanwood neighborhood of Washington, DC (see **Figure 1.1**) and would consist of constructing of a new four-lane roadway and associated intersection improvements, upgrading and installing traffic control measures, modifying or constructing drainage facilities, and adding pedestrian facilities. The proposed extension would complete a long-planned missing segment of Minnesota Avenue between Sheriff Road and Meade Street in the Deanwood neighborhood of Washington, DC.

Deanwood is located within Ward 7 of the District of Columbia and is one of the oldest African-American neighborhoods in the city. The Deanwood area was first settled by the Nacotchtank Indians and the earliest settlements began in the 1800s. Settlement in the area has always been driven by transportation – in 1871 the Southern Maryland Railroad Company laid the railroad tracks that serve as one of the boundaries of the study area used for this analysis. At that time the land was subdivided into three neighborhoods loosely known by the name of Deanwood.

Settlement occurred between that period and 1910 when Deanwood had already become a nucleus of blue and white collar African American families. Important community elements such as the George Washington Carver School and the Nannie Helen Burroughs School were founded, although the community remained semi-rural in character because of its distance from downtown DC. Plans for Minnesota Avenue began to appear as early as the 1930s, including a portion of the roadway from Sheriff Avenue to Meade Street that was never constructed. From the earliest days Minnesota Avenue was envisioned as a boulevard to serve residents of Deanwood and the District. Most of the development in the area was constructed in the 1940s – 1950s and the area is now primarily made up of single-family and low-density residential uses, along with churches, some commercial development, and other community facilities.

Minnesota Avenue is currently a four-lane arterial with two posted speed limits within the study area: 35 mph on the portion located south of Sheriff Road and 25 mph on the portion located north of Meade Street. On-street parking is permitted at all times in two of the travel lanes. The project's boundaries have been extended to include intersections with other major arterials in the area in order to assess traffic impacts related to construction of the extension. The boundaries of the study area include: Benning Road to the south, the Metro Orange Line to the west, Eastern Avenue to the north, and 42nd Street, Grant Street, 45th



MINNESOTA AVE EXTENSION

PROJECT STUDY AREA
FIGURE 1.1

Street and Sheriff Road to the west (see Figure 1.1). The study area contains the Minnesota Avenue and Deanwood Metrorail stations and portions of Watts Branch Park, the largest linear city park (more than 1 mile in length). The study area contains portions of the Deanwood and Lincoln Heights neighborhoods.

Since the early 1900s, historical insurance maps have shown the proposed Minnesota Avenue corridor, including the extension currently under evaluation. Right-of-way for the extension was reserved and is almost exclusively undeveloped, although there has been some private acquisition of property along the historic right-of-way in recent years. The completion of Minnesota Avenue has been planned for years in advance of this Environmental Assessment.

Deanwood completed a community assessment in 2001 as part of the Strategic Neighborhood Action Plan (SNAP) process. By this time in its development history, the Deanwood area had experienced a loss of population as had much of the District. Although the area retained much of its historic character and neighborhoods with diverse housing and historical importance, and also had the Deanwood Metro that provided transit access to the neighborhood, several needs were identified by the community. The completion of Minnesota Avenue was one of the priorities identified by the citizens of Deanwood and the local community as part of the SNAP process. In recent years, there had developed a fundamental conflict between cut-through traffic and residential development that resulted from this missing segment of Minnesota Avenue. This assessment is the first step in providing the community their request for a continuous Minnesota Avenue that has long been envisioned and desired.

1.2 PURPOSE AND NEED FOR ACTION

Because this project would receive federal funds, it is subject to the provisions of the National Environmental Policy Act of 1969 (NEPA), as amended, and associated regulations. One of the first steps in the NEPA process is to document the purpose and need for the proposed project. Regulations and technical advisories promulgated by the Federal Highway Administration (FHWA) and the Council on Environmental Quality (CEQ) guide the preparation of the Purpose and Need Statement.

The purpose of the proposed action is to improve the functionality of the local and regional roadway system through the construction of the missing segment of Minnesota Avenue within the project limits. The project is intended to support system linkage, capacity, and multimodal transportation facilities in the area. The elements of need include the following:

- There is a need to improve system linkage by constructing the “missing link” of Minnesota Avenue, which is currently discontinuous. This connection has been identified since the early 1900s as a component of the District’s transportation network.
- There is a need to support the goals of the Strategic Neighborhood Action Plan (SNAP) adopted for Ward 7, in which the proposed project is located, that cite the completion of Minnesota Avenue as an element of improving access to the Deanwood and Lincoln Heights areas. The discontinuous configuration of Minnesota Avenue creates circuitous routing of traffic in the study area.
- There is a need to reduce existing and future traffic diversion through neighborhoods created by the “missing link.” This cut-through traffic occurs on local neighborhood streets that also must accommodate pedestrian and bicycle movements and are not designed for through-traffic.
- There is a need to improve safety by upgrading the transportation network and reducing traffic diversion through residential areas.
- There is a need to support multimodal connections by providing better access to transit and incorporating pedestrian improvements in the neighborhood. Currently, travelers desiring to access both the Deanwood and Minnesota Avenue Metrorail stations have to

be diverted to Kenilworth Avenue due to the missing segment of Minnesota Avenue or onto local streets that cut through the neighborhood.

In addition to these basic elements of need, two goals have been incorporated into the development of project alternatives: support of area economic development activities, and the improvement of the quality of life in the study area neighborhood.

The missing transportation link on Minnesota Avenue results in vehicles using minor residential streets within the Deanwood neighborhood as alternatives for north-south travel. In the immediate vicinity of the proposed extension, the existing volumes indicate that motorists are using a combination of Meade Street with 45th and 44th Streets to circumnavigate the missing segment of Minnesota Avenue. The use of these streets causes increased vehicular traffic in residential areas and the potential for unsafe conditions for local traffic, bicycles and pedestrians. These traffic volumes are anticipated to increase in future years as investment along the Anacostia waterfront increases.

1.3 RELATIONSHIP TO OTHER STUDIES AND PLANS

DDOT is in the process of studying major components of the Anacostia-area transportation network that are related to the Minnesota Avenue Extension, as discussed in more detail below.

1.3.1 Transit Alternatives Analysis and Anacostia Streetcar Project

DDOT and the Washington Metropolitan Area Transit Authority (WMATA) are conducting a multi-corridor study of transit alternatives in the District. This study explores the concept of introducing a third transit mode into the District to bridge the gap between the Metrorail and Metrobus systems.

This third mode -- surface rapid transit using either rail or bus technology -- would compliment the existing transit system. It would provide a network of efficient, high-quality, high-capacity surface transit routes across the District to provide additional connections between communities, commerce, and Metrorail. This new network is expected to bring economic development opportunities to every corner of the District and further enhance the quality of life enjoyed by District residents.

Among the four alternative corridors considered for this transit study is the Anacostia Corridor from Minnesota Avenue to National Harbor. Known originally as the Anacostia Demonstration Project, this project will test the feasibility of light rail or streetcar technology. The demonstration project supports the Anacostia Waterfront Initiative and supports a valuable right-of-way for future public investment. The Anacostia Corridor Demonstration Project, as originally conceived, was a six-stop, modern streetcar service designed to travel along a 2.7- mile, unused CSX right-of-way adjacent to the neighborhoods of Fairlawn, Anacostia, and Barry Farm.

However, difficulties negotiating a satisfactory agreement for the purchase and/or use of the CSX Shepard Industrial Spur Right-of-Way have prompted consideration of an alignment that uses city streets. The proposed street-running alignment would serve the same communities as the original plan, and it provides an opportunity to identify additional stop locations along the proposed route. Street-running vehicles would better support community and economic development programs and provide direct access to neighborhoods and commercial areas in Anacostia.

The proposed street-running vehicles would start at the intersection of Pennsylvania and Minnesota Avenues SE and proceed southwest on Minnesota Avenue to Good Hope Road SE. Traveling west on Good Hope Road, vehicles would then proceed south onto Martin Luther King, Jr. Avenue to Howard Road. They would then travel northwest to Firth Sterling Avenue and proceed southwest, ending at South Capitol Street in the vicinity of Bolling Air Force Base.

The proximity of the Minnesota Avenue Metrorail station to the study area (less than one mile) indicates a relationship between the two studies. Because a key goal of the extension project is to support multi-

modal connections to the area's transportation system, the extension of Minnesota Avenue has the potential to contribute to regional transit development goals.

1.3.2 Anacostia Waterfront Initiative

On March 22, 2000, Mayor Anthony Williams brought together the 20 federal and District agencies that own or control land along the Anacostia River to sign the Anacostia Waterfront Initiative (AWI).

Under the leadership of the District of Columbia Office of Planning, the partnership has produced a draft AWI Framework Plan to guide the revitalization effort. The AWI includes consideration of the design of transportation infrastructure to gain access to waterfront lands and better serve waterfront neighborhoods. The AWI envisions the provision of streets and bridges that become gateways to the river's parks and amenities.

The Minnesota Avenue extension project is located just to the northeast of the River Gateways portion of the AWI. The AWI has the potential to increase travel along Minnesota Avenue as the area develops and the extension of Minnesota Avenue would provide access to several of the planned gateways and the Anacostia waterfront.

1.3.3 Comprehensive Plan for the District of Columbia

The *DC Comprehensive Plan* sets development goals and objectives for the city. It focuses not only on land use, but also includes broad policy guidance on transportation, economic development, housing, downtown development, the environment, historic preservation, and human services. It also includes specific recommendations for each of the eight wards in the District.

The extension of Minnesota Avenue within the project limits is consistent with the priorities established in the *DC Comprehensive Plan*. Minnesota Avenue is designated as a primary north-south arterial in the *DC Comprehensive Plan*. The Ward 7 section of the plan specifically discusses the extension of Minnesota Avenue, as follows:

(a) Extend Minnesota Avenue from Sheriff Road to Meade Street N.E.:

(1) The extension would allow better access to the Deanwood Metrorail station and would eliminate the private bus service company's encroachment on public space; and

(2) Recommended action: authorize capital improvements funds to construct the extension of Minnesota Avenue N.E., from Sheriff Road to Meade Street;

One of the transportation objectives specified in the Comprehensive Plan is to improve pedestrian, bus and automobile access to the Minnesota Avenue and Deanwood Metrorail stations. The provision of the missing link of Minnesota Avenue will enhance access to both stations by eliminating detours through secondary streets in between Meade Street and Sheriff Road.

1.3.4 Cluster 31 Strategic Neighborhood Action Plan (SNAP)

In the year 2000 the Mayor's office developed a new framework for working with citizens and others to better mobilize and coordinate the resources of government, businesses, nonprofits, the faith community, neighborhood leaders, and citizens. As a part of this new framework, SNAPs for each of the city's 39 neighborhood clusters were developed. The purpose of the SNAP is to identify/develop neighborhood initiatives to solve neighborhood specific issues. The project study area is within the boundaries of the Cluster 31 SNAP and the extension (along with environmental analysis, land acquisition analysis, and engineering design) between Sheriff Road and Meade Street is an important part of the SNAP.

1.3.5 Government Centers Initiative

In accordance with the mayor's City-Wide Strategic Plan for revitalizing neighborhoods, District government officials have launched the Government Centers Initiative. The goal of the initiative is to

locate District agencies within neighborhood commercial districts to spur economic development in areas with the greatest opportunity to influence growth and improve the quality of life.

The District government intends to build up to five new Government Centers in areas of the District to be designated by the Mayor. These new Government Centers are intended to spur economic development, create opportunities for the citizens of the District of Columbia and increase tax revenues for the District. One of the Government Centers sites selected for development is near the northwest intersection of Minnesota Avenue/Benning Road just south of the Minnesota Avenue Metrorail station. This site will be developed to accommodate new office buildings for the DC Department of Human Services (DHS) and the DC Department of Employment Services (DOES). The facilities would contain approximately 325,000 gross square feet of office space and 15,000 gross square feet of ground-floor retail in two five-story buildings. On-site parking would be provided in both an above-grade parking structure and underground and groundbreaking has occurred for the facility. The buildings would replace current facilities on H Street, NE, and Martin Luther King Avenue, SE. It is estimated these facilities would generate an additional 2,145 vehicle trips per day above existing traffic levels. Minnesota Avenue will be the primary access/egress route for these vehicles and the extension will provide additional access to the facilities.

2

ALTERNATIVES

Several alternatives have been analyzed as possible extensions for Minnesota Avenue. Historically, the extension has been shown on right-of-way maps for the District as a linear extension located immediately adjacent and east of the current Metrorail Orange Line rail facilities. However, several alternatives were analyzed because a portion of this previously identified right-of-way was purchased and because the currently existing northern segment of Minnesota Avenue was constructed slightly to the east of the location depicted in the maps that identified the previous corridor location. A total of five alternatives, in addition to the No-Build Alternative were analyzed. Initially, four of the alternatives, Alternatives 1, 2, 4, and 5 were located along the previously identified right-of-way and all would require the acquisition of private land in the study area. Alternative 3 was developed to avoid the purchase of private land associated with the other four alternatives and would be located along existing Sheriff Road and 44th Street. As will be discussed below, based on coordination with the local community and input from the public process, a modified Alternative 4 and Alternative 5 have been carried forward for more detailed analyses in this document.

2.1 NO-BUILD ALTERNATIVE

Under the No-build Alternative, no improvements to Minnesota Avenue would be made. The southern portion of Minnesota Avenue would continue to end at Minnesota Avenue's divergence from Sheriff Road, even though a small portion of Minnesota Avenue right-of-way extends approximately 420 feet north from this divergence point (this right-of-way is only about 20 feet wide). At the north end of the study area Minnesota Avenue would continue to be a 90-foot-wide, four-lane arterial between Meade Street and Eastern Avenue.

2.2 PROPOSED ACTION

The proposed action consists of construction of a continuous segment of Minnesota Avenue from Sheriff Road to Meade Street. Roadway improvements would include the construction of a four-lane arterial consisting of four 12-foot lanes for vehicular traffic, space for trees, lighting and sidewalk facilities on both sides of the roadway, and additional right-of-way. Two right-of-way widths are currently under consideration: Alternative 4A which includes a 90-foot right-of-way and Alternative 5 which includes a 60-foot right-of-way. Both alternatives would require property acquisition in order to be constructed.

2.2.1 Alternative 4A: Modified 90-Foot Right-Of-Way with Meade Street Segment

Alternative 4A would consist of a 90-foot right-of-way and would provide a continuous Minnesota Avenue from Sheriff Road to Meade Street. The use of the 90-foot right-of-way is consistent with the historical right-of-way anticipated for the extension of Minnesota and also matches the right-of-way on the sections of Minnesota Avenue that already exist. Starting from Sheriff Road, Alternative 4A would be constructed using the existing dead-end section of Minnesota Avenue that provides access to Kane Place. The alignment would be located along the existing rail line to the point at which it would intersect 44th Street and Lee Street. Alternative 4A would provide a consistent 90-foot right-of-way until the point at which the roadway would merge with a short section of Meade Street, where the right-of-way would be

reduced to minimize impacts to residential and commercial properties. Approximately 200 feet of Meade Street would be re-designated as Minnesota Avenue, and intersection improvements would be incorporated for 45th Street and Meade Street. Minnesota Avenue would then continue its current alignment to Eastern Avenue with no additional improvements. **Figure 2.1** shows Alternative 4A and **Figure 2.2** shows the proposed typical section using the 90-foot right-of-way.

2.2.2 Alternative 5: 60-Foot Right-of-Way with Meade Street Segment

Alternative 5 would include the same infrastructure improvements as Alternative 4A in terms of the number of lanes, buffering, and sidewalks provided, but would provide only a 60-foot right-of-way. In addition to the right-of-way, Alternative 5 would have setbacks along Minnesota Avenue. These setbacks would not be required as part of the public right-of-way, but building restrictions would be imposed along the setbacks to ensure proper sight distances for the extension of Minnesota Avenue. However, it is currently proposed to eliminate the setback requirement to the west of the proposed extension along the rail lines because no development would be feasible in any event along this setback. This proposal would allow the roadway center line of the extension to be shifted closer to the rail facilities and farther away from residential properties, requiring less property acquisition (see **Figure 2.3**). Alternative 5 would consist of a new four-lane arterial with dedicated right-of-way for trees and sidewalks (see **Figure 2.4**). This alternative also would provide the same connections and require the same reconstruction of intersections at Kane Place, 44th Street, Lee Street, 45th Street, and Meade Street. Alternative 5 also uses approximately 200 feet of Meade Street.

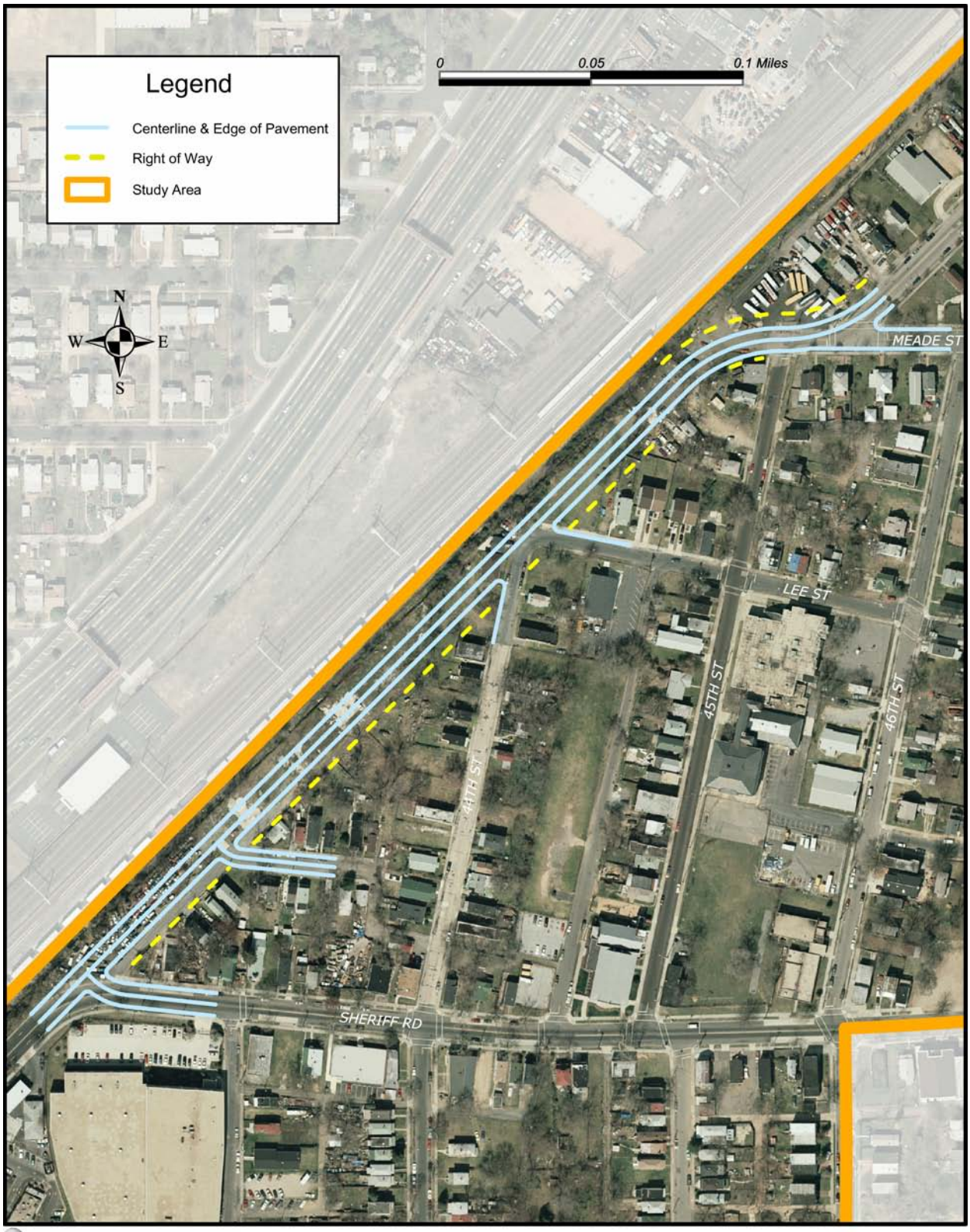
One difference between Alternatives 4A and 5 would occur along the narrow portion of existing Minnesota Avenue north of Sheriff Road that currently exists and provides access to Kane Place. Because only 60 feet of right-of-way is required for Alternative 5 and the alignment would be shifted close to the existing rail line, this existing dead-end segment of Minnesota Avenue would not be required for construction.

The proposed action would provide a continuous Minnesota Avenue and reduce cut-through traffic on residential streets in Deanwood. It would provide increased and more direct access to the area and provide a more direct transportation corridor for transit, cyclists, and pedestrians between the Deanwood and Minnesota Avenue Metrorail stations. Both alternatives would enhance safety by not only reducing traffic along residential streets, but also by providing additional bicycle and pedestrian facilities.

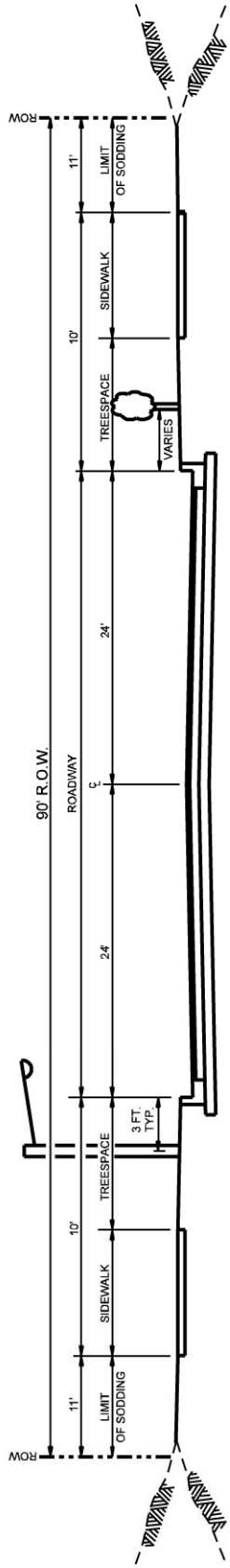
2.3 ALTERNATIVES REMOVED FROM CONSIDERATION

Other alternatives considered as possible extensions of Minnesota Avenue are shown in **Figures 2.5 through 2.7**. Alternatives 1 and 2 would extend Minnesota Avenue without using the Meade Street segment as directly as the proposed action. Alternative 1 would provide a 90-foot right-of-way and Alternative 2 would provide a 60-foot right-of-way. Both alternatives were designed for 40 mph speeds with posted speed limits of 35 mph, which required more direct turning radii at the connection to the northern segment of Minnesota Avenue in the vicinity of Meade Street. Both alternatives required displacement of commercial facilities (a bus repair business and a fuel oil distribution business) and required acquisition of a church property and were eliminated from consideration.

Alternative 3 was developed as a Transportation Systems Management (TSM) alternative, because the full 90-foot right-of-way originally designated for the proposed extension was no longer in public ownership. The TSM alternative was developed to minimize the need for private property acquisition and to use the existing system as a low-cost alternative. Under Alternative 3, Minnesota Avenue would be located along a segment of Sheriff Road and 44th Street, and then a new segment would be constructed from Lee Street to Meade Street in a modified configuration using 10-foot lanes so as to minimize property acquisitions along the residential streets. Alternative 3 was eliminated because of the displacements required at the intersection of 44th Street and Sheriff Road and the continued conflict that would result between vehicular traffic and residences on 44th Street. In addition, the potential increase in traffic along the Minnesota Avenue extension would result in higher levels of noise, a decrease in safety, and visual impacts that were greater than for any of the other alternatives considered.



ALTERNATIVE 4A: MODIFIED 90-FT RIGHT-OF-WAY WITH LEE ST SEGMENT
FIGURE 2.1

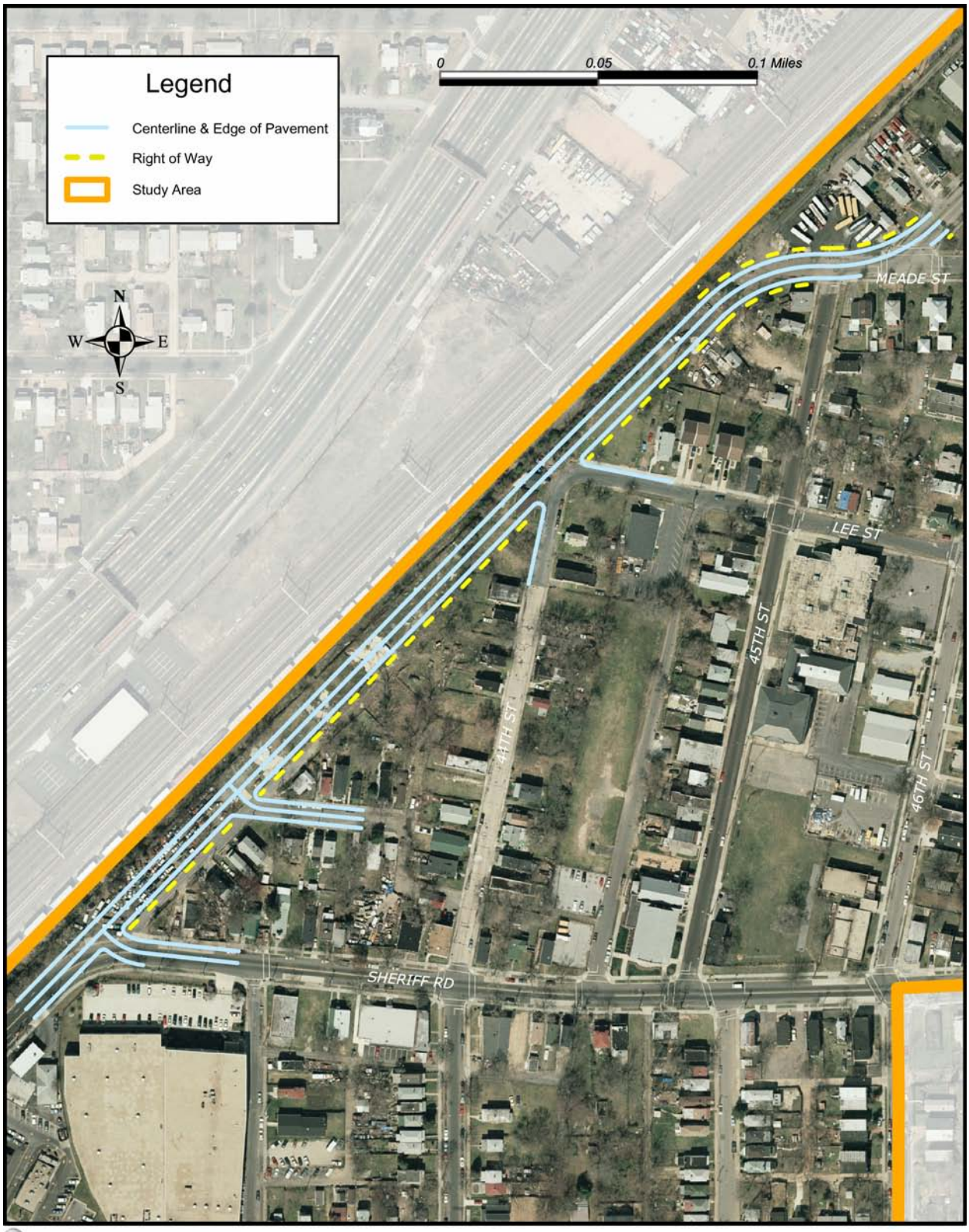


MINNAVE10

TYPICAL SECTION FOR 90 FOOT RIGHT OF WAY

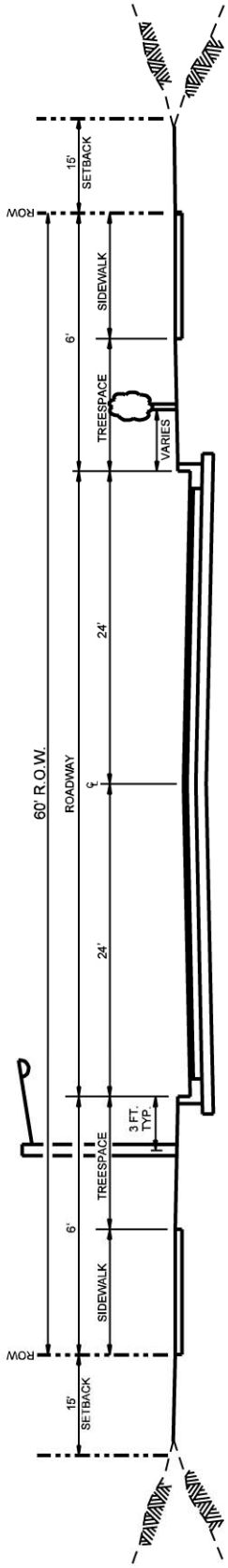
Figure 2.2

MINNESOTA AVE EXTENSION



ALTERNATIVE 5: 60-FT RIGHT-OF-WAY WITH LEE ST SEGEMENT

FIGURE 2.3



MINNAVE09

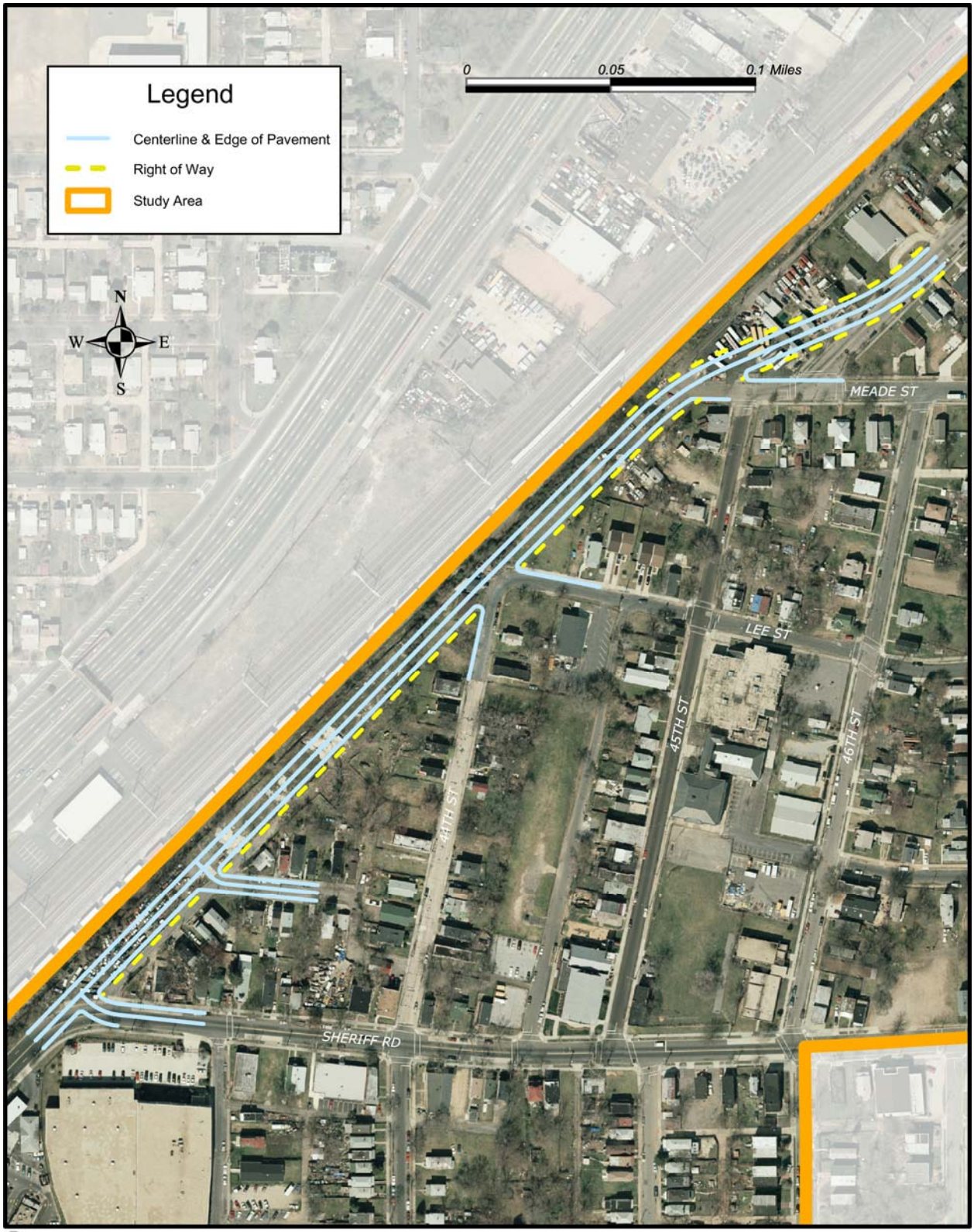
TYPICAL SECTION FOR 60 FOOT RIGHT OF WAY

Figure 2.4

MINNESOTA AVE EXTENSION

MINNESOTA AVE EXTENSION

ALTERNATIVE 1: 90-FT. RIGHT-OF-WAY
FIGURE 2.5



MINNESOTA AVE EXTENSION

ALTERNATIVE 2: 60-FT. RIGHT-OF-WAY
FIGURE 2.6

ALTERNATIVE 3: TRANSPORTATION SYSTEM MANAGEMENT

FIGURE 2.7

3

ENVIRONMENTAL EFFECTS

This section describes the existing environment in the study area and the environmental consequences of the alternatives. Three alternatives, as described in Section 2.0, were analyzed for impacts: Alternative 4A, which has a 90-foot right-of-way, Alternative 5, which has a 60-foot right-of-way, and the No-Build Alternative.

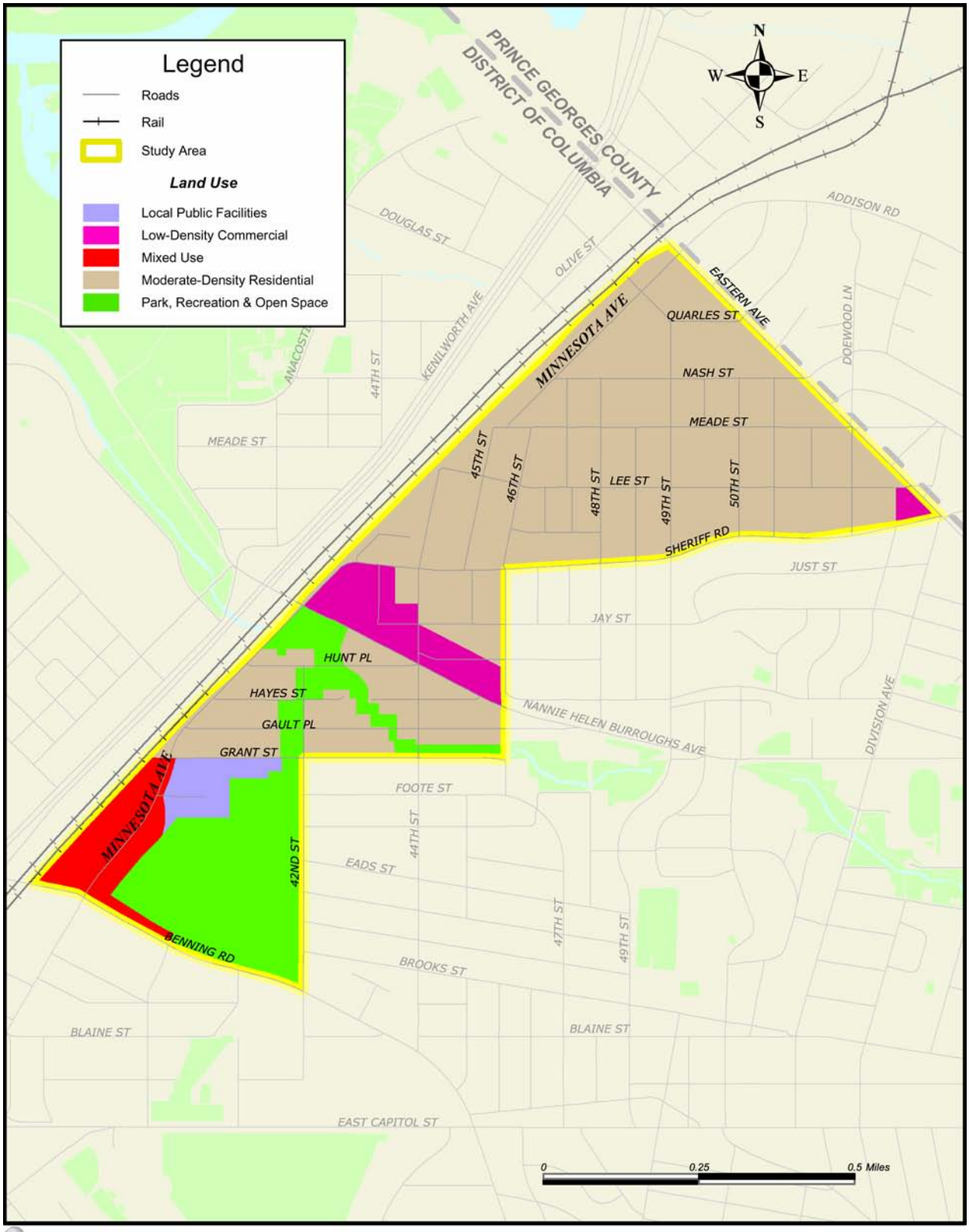
Affected Environment

The proposed project is located within the Deanwood neighborhood of Washington, DC. As shown in the aerials presented in Section 2, both of the alternatives under consideration are located within an undeveloped section of the Deanwood community. The right-of-way proposed for the extension is immediately adjacent and east of the current Metrorail Orange Line rail facilities. Although the land for the proposed extension is primarily vacant and unimproved, the land is privately owned due to recent purchases and will have to be acquired in order to implement the project. In addition, some of the land along the proposed right-of-way has been sub-divided and there is one residential structure on privately-owned land that has been constructed in a location once identified for the proposed Minnesota Avenue extension. As shown in the aerials at the southern segment of existing Minnesota Avenue, land within the primary right-of-way was used at one time unofficially and illegally as a dumping area, which has since been removed.

Immediately adjacent to the right-of-way are residential houses within the Deanwood community. Most of the residential properties are of recent construction and some are multi-family units as well as single-family residences. Along the proposed alternatives there are currently no community facilities, parklands, or improved public open spaces. There are no 4(f) properties and there are no cultural resources that are proposed for or currently eligible for inclusion on the National Register of Historic Places, although no formal surveys have been completed for archeological resources. The area along the proposed extension is highly urbanized and there are no surface waters, forest stands, natural habitats, floodplains, or agricultural features. The following sections describe the environmental consequences of the two alternatives under consideration.

3.1 LAND USE AND ZONING

Both the federal government and the District of Columbia government are responsible for land use planning and control in the District of Columbia. The Comprehensive Plan for the National Capital, developed by the National Capital Planning Commission (NCPC), is a statement of goals, objectives, and planning policies for the growth and development of the National Capital Region as defined pursuant to the National Planning Act of 1952. The plan includes both federal and District of Columbia elements as two separate published documents. The federal elements cover land use on federally owned land, and the District elements cover land use on the District-owned lands. Under the Comprehensive Plan, the NCPC coordinates federal element development activities and the District of Columbia coordinates District element projects. **Figure 3.1** shows current land uses in the study area, as defined in the District of Columbia Generalized Land Use Map of 1995 and verified during site visits.



MINNESOTA AVE EXTENSION

LAND USE
FIGURE 3.1

3.1.1 Land Use

As shown in Figure 3.1, the boundaries of the overall study area include Benning Road to the south, Kenilworth Avenue to the west, Eastern Avenue to the north, and 42nd Street, Grant Street, 46th Street and Sheriff Road to the east. Land use in the study area is predominantly moderate-density residential, interspersed with low-density commercial, parks, recreation and open space, local public facilities, production and technical employment, and mixed use. Transportation uses that include a CSX rail corridor and the Metrorail Orange Line bounds the western edge of the study area, and the Minnesota Avenue and Deanwood Metrorail stations that are located within the study area on Minnesota Avenue. Land use that is classified as parks, recreation and open space include Fort Mahan Park, Fort Circle Park, Woodson Junior Pool, Deanwood (Children's Pool), and Ronald H. Brown Recreation Center. The Ronald Brown Middle School is in the study area as well as a number of churches. Watts Branch Park is located just to the south of Nannie Helen Burroughs Avenue and lines either side of Watts Branch. It is a multi-use park that includes hiking trails as well as a children's playground.

The designated land use for the area (see Figure 3.1) proposed for the extension of Minnesota Avenue between Sheriff Road and Meade Street is moderate-density residential, although much of the land that will have to be acquired for the construction of the project consists of undeveloped, vacant, or abandoned lots. The overall Deanwood area is experiencing little development activity in general that will change the land use in the study area prior to implementation of the project, if a Build Alternative is selected. Within the study area, acquisition of privately-owned land, as discussed in the following section, will be required in order to construct the extension. The land needed to build the extension of Minnesota Avenue was within public ownership until recently. The boundary survey conducted for this project indicates that in 2002 a major portion of right-of-way for the proposed roadway was sold to a private owner, although nothing has been constructed. The owner has indicated that there are plans for the potential development of affordable housing in the study area, although no formal projects have been approved. In addition to the purchase of the previously-reserved right-of-way for Minnesota Avenue Extension, one residential structure has also been constructed within the previously identified right-of-way as a portion of the area was also sub-divided and sold into private ownership. Impacts to these properties are discussed in the following section. This is the only known development in the study area.

Table 3.1 below shows the different land uses in the overall study area and the acreage they cover as defined in the District of Columbia Generalized Land Use Map of 1995 for the broader study area. The locations of these land uses are shown in Figure 3.1.

Table 3.1 STUDY AREA LAND USE

LAND USE	ACREAGE	% OF STUDY AREA
Local Public Facilities	0.7	2.4%
Mixed Use	1.6	5.4%
Park, Recreation & Open Space	5.4	18.3%
Low-Density Commercial	1.5	5.1%
Moderate-Density Residential	20.1	68.1%
Low-Density Commercial	0.2	0.7%
Other	0.5	1.7%
Total Study Area	**30.0**	**100%**

No-Build Alternative

Land and/or property acquisition would not occur under the No-Build Alternative therefore direct land use impacts are not anticipated under this alternative.

Alternative 4A

Direct land use impacts are anticipated under Alternative 4A and would consist of the conversion of 12,632 square feet of land that is currently privately owned to transportation use due to acquisitions of land needed for the construction of the alternative, as discussed in the following section (Acquisitions). **Table 3.2** presents anticipated impacts by type of permitted land use. While land use designations provided in Table 3.2 are consistent with those of the DC Office of Planning, land use within the actual limits of disturbance for the proposed extension is primarily undeveloped, although one residential structure will be affected.

Table 3.2 ESTIMATED LAND ACQUISITIONS BY TYPE

LAND USE TYPE	NO-BUILD	ALT. 4A		ALT. 5	
		SQUARE FEET	ACRES	SQUARE FEET	ACRES
Low-Density Commercial	0	174	.004	218	.005
Moderate-Density Residential	0	12,458	.286	9,409	.216
TOTAL	0	12,632	.290	9,627	.221

Alternative 5

Alternative 5 would have a smaller impact of 9,627 square feet of land converted for transportation use than Alternative 4A due to the smaller 60-foot right-of-way proposed. As with Alternative 4A, land use designations provided in Table 3.2 are consistent with designations those of the DC Office of Planning. In reality, much of the land within the limits of disturbance is primarily undeveloped although one residential structure will be affected and private land will be required to be purchased as discussed in the following section.

3.1.2 Zoning

Table 3.3 below presents the various zoning categories within the study area and the acreage they cover as defined by the Zoning Map of the District of Columbia April 1, 2003. These zoning classifications are shown in **Figure 3.2**. The zoning classification for the area proposed for the extension is Single Family Detached Dwellings.

Table 3.3 STUDY AREA ZONING

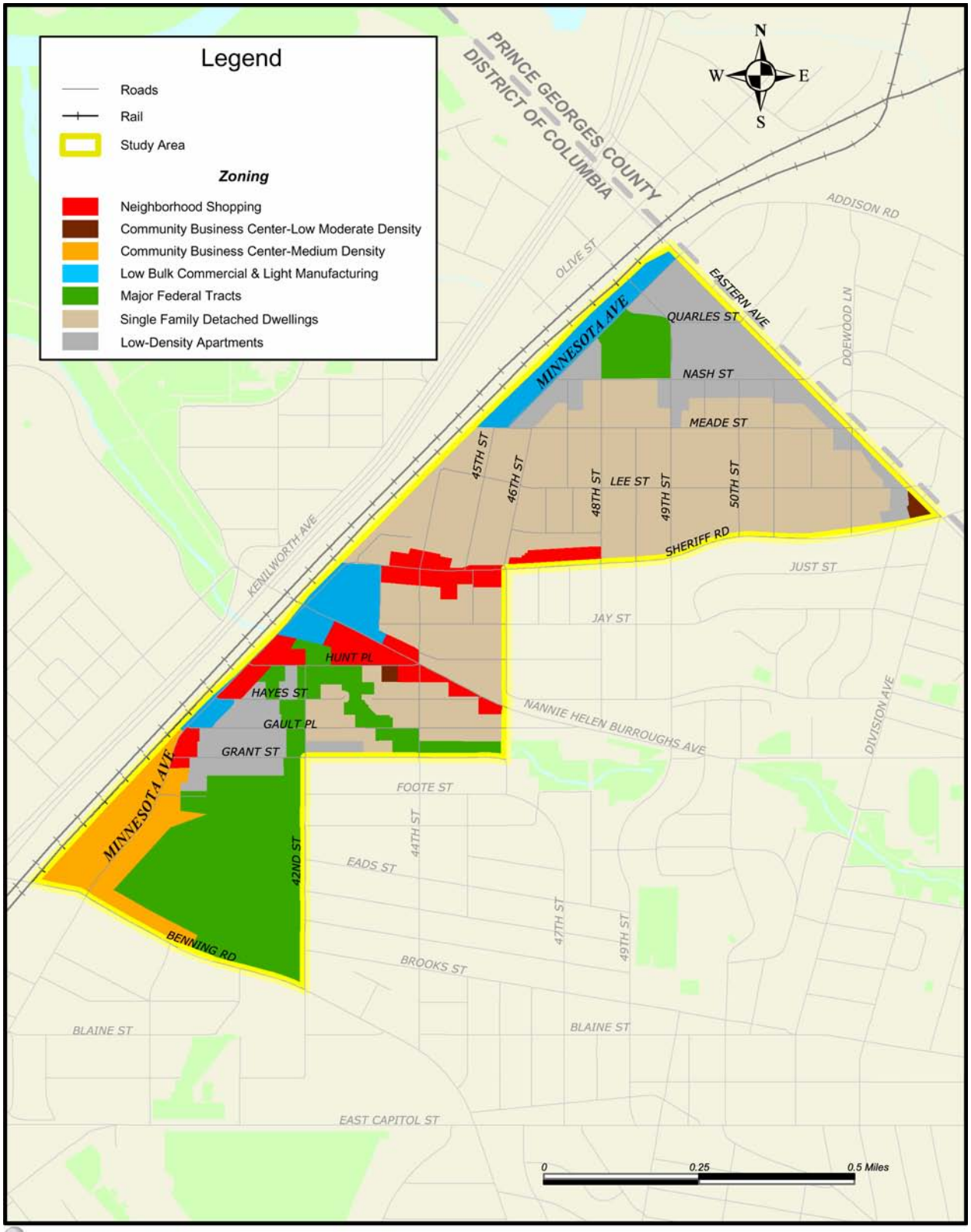
ZONING DESIGNATION	DESCRIPTION	ACRES
C-1	Neighborhood Shopping	1.9
C-2-A	Community Business Center: Low- Moderate–density	0.1
C-3-A	Medium Bulk Major Business and Employment	2.1
C-M-1	Low Bulk Commercial and Light Manufacturing	2.3
GOV	Government (Parkland)	6.1
R-2	Single Family Detached Dwellings	13.2
R-5-A	Low-Density Apartments	4.3
	Total	30.0

No-Build

No changes in study area zoning are anticipated under the No-Build Alternative.

Alternative 4A

No changes in study area zoning are anticipated under Alternative 4A.



MINNESOTA AVE EXTENSION

ZONING
FIGURE 3.2

Alternative 5

No changes in zoning are anticipated under Alternative 5. However, there would be a need for implementation of a zoning overlay to implement the proposed 15-foot setbacks that are proposed. The use of overlays would not change the underlying zoning classification, but would restrict building within the setback.

3.1.3 Consistency With Local Plans

The study area is located within Ward 7 of the District of Columbia. The D.C. Comprehensive Plan for Ward 7 includes policies to support the extension of Minnesota Avenue between Sheriff Road and Meade Street. The plan outlines the following priorities:

- Extension of Minnesota Avenue from Sheriff Road to Meade Street N.E. allowing for access to the Deanwood Metrorail station.
- Authorization of capital improvements funds to construct the extension of Minnesota Avenue N.E., from Sheriff Road to Meade Street.

As an additional goal the Comprehensive Plan designates the Minnesota Avenue and Benning Road area as a regional commercial center which serves all the neighborhoods of Ward 7: "as the overall economy improves, this area should be developed and upgraded in connection with appropriate urban planning concepts to yield a greater variety of retail commercial shops, sufficient parking spaces, adequate lighting and facade and street improvements." Through the improvement of accessibility to the Minnesota Avenue/Benning Road area, the extension of Minnesota Avenue would support the development of this regional commercial center.

The extension of Minnesota Avenue is also included in the Strategic Neighborhood Action Plan (SNAP) for the Deanwood area. The D.C. Department of Planning has defined neighborhood clusters where the resources of neighborhood leaders, businesses, nonprofit organizations, the faith community, and the District government can be combined to address the needs of communities. The Deanwood neighborhood is a part of Cluster 31 and includes the Burrville, Deanwood, Grant Park, Lincoln Heights, and Northeast Boundary neighborhoods. The Cluster 31 SNAP specifically mentions the extension of Minnesota Avenue as an important planning goal for the cluster.

No-Build Alternative

Because the extension of Minnesota Avenue within the project limits is included in the D.C. Comprehensive Plan and the local SNAP, the No-Build Alternative is inconsistent with local plans.

Alternative 4A

The extension of Minnesota Avenue within the project limits is an integral part of the D.C. Comprehensive Plan, Ward 7 Element. The extension of Minnesota Avenue would allow better access to the Deanwood Metrorail Station and would be consistent with the area's Strategic Neighborhood Action Plan.

Alternative 5

Beneficial impacts of this alternative would be similar to those detailed under Alternative 4A.

3.2 LAND ACQUISITIONS, DISPLACEMENTS AND RELOCATION IMPACTS

Public Law 91-646, the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, commonly called the Uniform Relocation Act, is the primary law for acquisition and

relocation activities on federal or federally assisted projects such as the Minnesota Avenue extension. The rules provide uniform policy and procedures for the acquisition of real property by all agencies that receive financial assistance for any program or project of the United States Government. If federal funds are used in any phase of the program or project, the rules of the Uniform Relocation Act apply.

Relocation assistance and benefits will be made available to all individuals displaced by the proposed extension in accordance with the Uniform Relocation Act and Title VI of the Civil Rights Act of 1964. The Uniform Relocation Act requires that no person shall be displaced until adequate, decent, safe, and sanitary housing is made available. The acquisition and relocation program will be conducted in accordance with 49 CFR Part 24, and the DDOT Right-of-Way Policies and Procedures Manual without discrimination.

No-Build Alternative

There would be no relocations, and therefore no impacts, under the No-Build Alternative. No property would be acquired for the construction of the project.

Alternative 4A

Privately owned land will be required for Alternative 4A. One property acquisition that includes a residential relocation due to the taking of a single-family structure, located at 1070 44th Street, would occur as the result of Alternative 4A (see **Figure 3.3**). No commercial or institutional relocations would occur under this Alternative. A review of real estate listings within the study area indicates that comparable replacement housing is available within the study area for the one residential displacement.

Acquisitions will be required for the construction of Alternative 4A, if selected as the preferred alternative. Acquisitions will be required from a total of 16 privately held parcels in the study area. Eight parcels would be acquired in their entirety, one of which includes a single-family residence. The remaining seven parcels acquired in full for construction are completely undeveloped. Partial acquisitions would be needed from an additional eight parcels. A total of 0.290 acres of land will be acquired for construction of Alternative 4A based on the preliminary design.

The potential relocation and the property acquisitions would be covered under the terms of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (42 U.S.C. 4601 et seq., P.L. 91-646) as amended by the Uniform Relocation Act Amendments of 1987 (P.L. 100-17). The Act calls for negotiations with affected persons, relocation assistance, just compensation, and timely notice if a property must be taken. These negotiations will occur following decisions on the preferred alternative. The acquisition and relocation program will be conducted in accordance with the DDOT Right-of-Way Policies and Procedures Manual without discrimination.

Alternative 5

Privately owned land will be required for Alternative 5. One property acquisition that includes a residential relocation due to the taking of a single-family structure, located at 1070 44th Street, would occur as the result of Alternative 5 (see Figure 3.3). No commercial or institutional relocations would occur under this Alternative. A review of real estate listings within the study area indicates that comparable replacement housing is available within the study area for the one residential displacement.

Acquisitions will be required for the construction of Alternative 5, if selected as the preferred alternative. Acquisitions will be required from a total of 13 privately held parcels in the study area. Seven parcels would be acquired in their entirety, one of which includes a single-family residence. The remaining six parcels acquired in full for construction are completely undeveloped. Partial acquisitions would be needed from an additional six parcels. A total of 0.221 acres of land will be acquired for construction of Alternative 5 based on the preliminary design.

MINNESOTA AVE EXTENSION

RIGHT-OF-WAY REQUIREMENTS
FIGURE 3.3

The potential relocation and the acquisitions would be covered under the terms of the Uniform Relocation Assistance and Real Property Acquisition Act of 1970 (42 U.S.C. 4601 et seq., P.L. 91-646) as amended by the Uniform Relocation Act Amendments of 1987 (P.L. 100-17). The Act calls for negotiations with affected persons, relocation assistance, just compensation, and timely notice if a property must be taken. These negotiations will occur following decisions on the preferred alternative. The acquisition and relocation program will be conducted in accordance with the DDOT Right-of-Way Policies and Procedures Manual without discrimination.

3.3 COMMUNITY RESOURCES AND COHESION

3.3.1 Community Facility Impacts

Study area community facilities are listed below in **Table 3.4** and depicted in **Figure 3.4**. Facilities identified include police stations, fire and rescue facilities, medical facilities, parks and recreation areas, libraries and schools. The facilities listed either fall within the boundaries of the study area or serve the study area.

Table 3.4 COMMUNITY FACILITIES AND SERVICES

FIRE STATIONS	SCHOOLS	PARKS AND RECREATION
Engine Company 30 (Truck Company 17) Medic Unit 30, Ambulance 30, Truck 17 2nd Battalion 50 49th Street, NE	Benning Elementary School 100 41st Street, NE	Deanwood Recreation Center 49th and Quarles Streets
Engine Company 27 Medic Unit 27, Ambulance 27 2nd Battalion 4201 Minnesota Avenue, NE	Ronald H. Brown Middle School 4800 Meade Street, NE	Fort Mahan Park Benning Road and 42nd Street
POLICE STATIONS	Houston Elementary School 1100 50th Place, NE	Watts Branch Park Minnesota Avenue to 46th Street, South of Nannie Helen Burroughs
Sixth District Station 100 42nd Street, NE	George Washington Carver School Age Learning Center 4525 Lee Street	Woodson Junior Pool 4101 Minnesota Avenue, NE
	I.D.E.A. Public Charter School 1027 45th Street, NE	**LIBRARIES**
	Friendship Edison Charter School Minnesota Avenue, NE	Deanwood Kiosk Corner of Sheriff Road and Nannie Helen Burroughs Avenue
	Hospitals and Clinics	Benning Road Branch 3935 Benning Road
	Hunt Place Health Center and Clinic 4130 Hunt Place, NE	

No-Build Alternative

Under the No-Build Alternative, Minnesota Avenue would remain as a discontinuous roadway within the project limits. Access to community facilities would not improve under this alternative. Police and fire vehicles will not benefit from more direct access to segments of the Deanwood neighborhood. Emergency vehicles traveling through the study area will continue to be delayed by the circuitous route that they must take along 44th, 45th, 46th or 48th Streets.

Alternative 4A

No community facilities will be directly affected by Alternative 4A. No direct takings or changes in access are anticipated at community facilities under the proposed build alternative except during construction. Under Alternative 4A overall access to and from community facilities in the project area will be improved. In particular, emergency response times would be improved from implementation of a continuous Minnesota Avenue, since Engine Company 27 is located on Minnesota Avenue just south of the proposed extension. In addition, the provision of sidewalks along the route will improve the pedestrian environment and improve access to churches, schools and the Metrorail stations. Another beneficial impact will be the removal of cut-through vehicular traffic from 45th Street to the proposed extension, increasing the pedestrian safety and access to the I.D.E.A. Public Charter School located on 45th Street within the study area.

Alternative 5

No community facilities will be directly affected by the proposed alternative. No direct takings or changes in access are anticipated at community facilities under the proposed build alternatives except during construction. Under Alternative 5 overall access to and from community facilities in the project area will be improved. In particular, emergency response times would be improved from implementation of a continuous Minnesota Avenue, since Engine Company 27 is located on Minnesota Avenue just south of the proposed extension. In addition, the provision of sidewalks along the route will improve the pedestrian environment and improve access to churches, schools and the Metrorail stations. Another beneficial impact will be the removal of cut-through vehicular traffic from 45th Street to the proposed extension, increasing the pedestrian safety and access to the I.D.E.A. Public Charter School located on 45th Street within the study area.

3.3.2 Community Cohesion

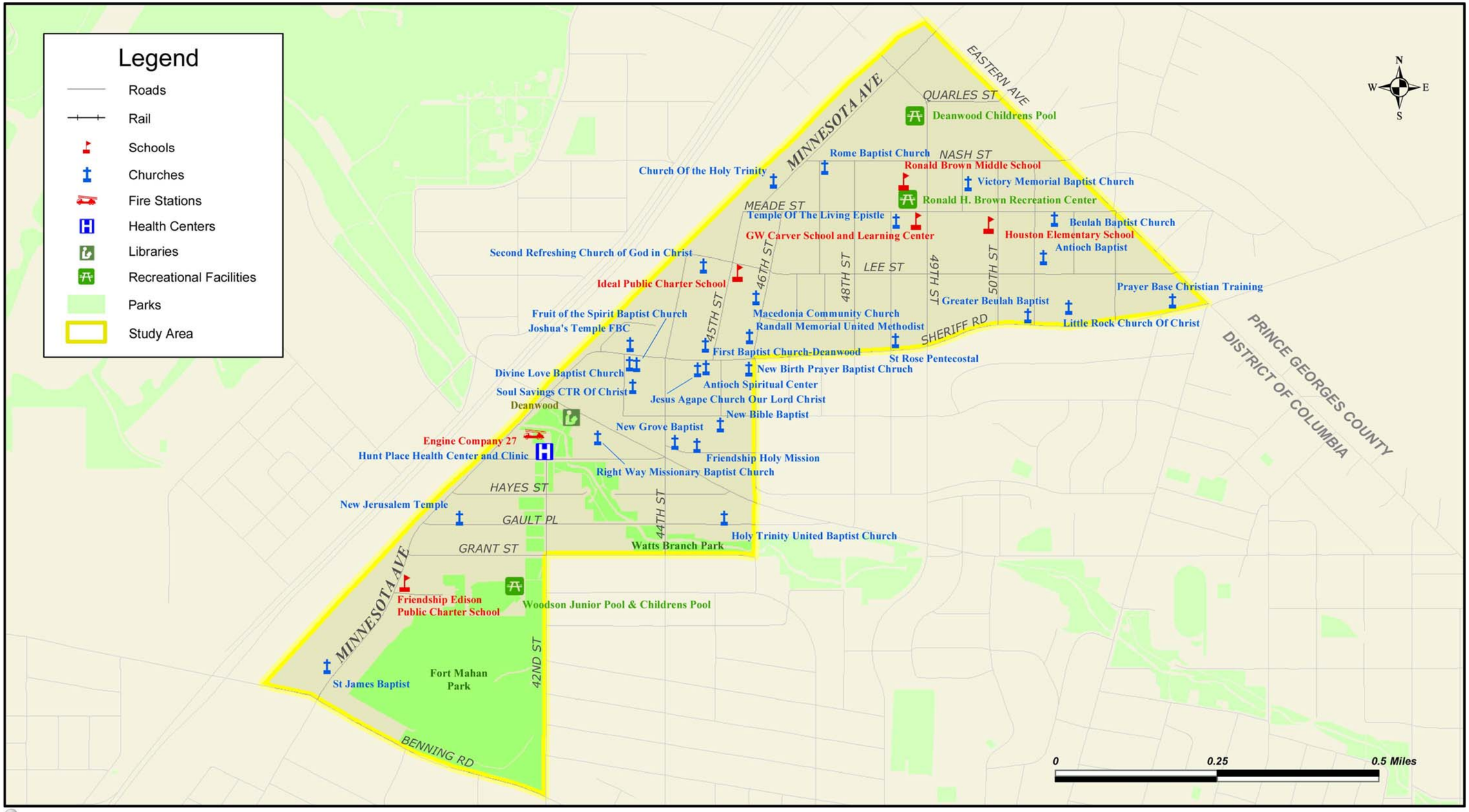
Effects on community cohesion can include the physical taking of land, homes, and businesses that serve as community resources; the construction of physical or psychological barriers that would result from new transportation facilities that divide or isolate a section of the community; changes in access or travel patterns within a community; or physical intrusions such as noise, dust, or visual impacts that can negatively affect a community. Community cohesion impacts have been analyzed for the residential area immediately adjacent to the proposed extension and to the larger community of Deanwood. As discussed in Chapter 2 of this Environmental Assessment, many of the alternatives that were eliminated from consideration had unacceptable community impacts that were identified by local citizens during public workshops held during the study.

No-Build Alternative

Although there are no direct impacts associated with the No-Build Alternative, safety conditions will continue to deteriorate as traffic volumes continue to increase on residential streets experiencing cut-through traffic in the future. Minnesota Avenue vehicular traffic that diverts to 44th, 45th, 46th and 48th Streets will have an increased likelihood of conflicts with pedestrians. There would be no barrier, isolation, or other community impacts associated with the No-Build Alternative.

Alternative 4A

Because the majority of the alignment proposed under Alternative 4A would be located next to the CSX rail corridor, this alternative will not create barriers separating existing residences or isolate any residences from the rest of the community. The re-routing of traffic from residential streets onto a safer arterial will enhance the community by creating a safer, more accessible community. No negative community cohesion impacts are projected.



MINNESOTA AVE EXTENSION

COMMUNITY FACILITIES
FIGURE 3.4

Alternative 5

Impacts for Alternative 5 would be the same as for Alternative 4A.

3.4 TRAFFIC AND TRANSPORTATION

Existing conditions were determined through a process of data collection, and evaluation of vehicular traffic, at locations where conditions might be impacted by the proposed extension of Minnesota Avenue from Sheriff Road to Meade Street. An analysis of base year traffic operations was conducted to identify deficiencies. An assessment of the existing conditions of bus routes and pedestrian and bicycle facilities in the study area was also prepared. Future projections and analysis of impacts are also included.

3.4.1 Traffic Data Collection

Traffic data was obtained for typical weekdays during morning and evening peak traffic periods. Turning movement counts included the identification of pedestrian traffic during the peak periods. The existing lane configurations and intersection control conditions were recorded during the data collection process. Existing signal timings were obtained from DDOT. Turning movement counts were conducted on Tuesday, September 9, 2003 through Thursday, September 11, 2003 from 6:30 to 9:30 AM and 3:30 to 7:00 PM at the following intersections:

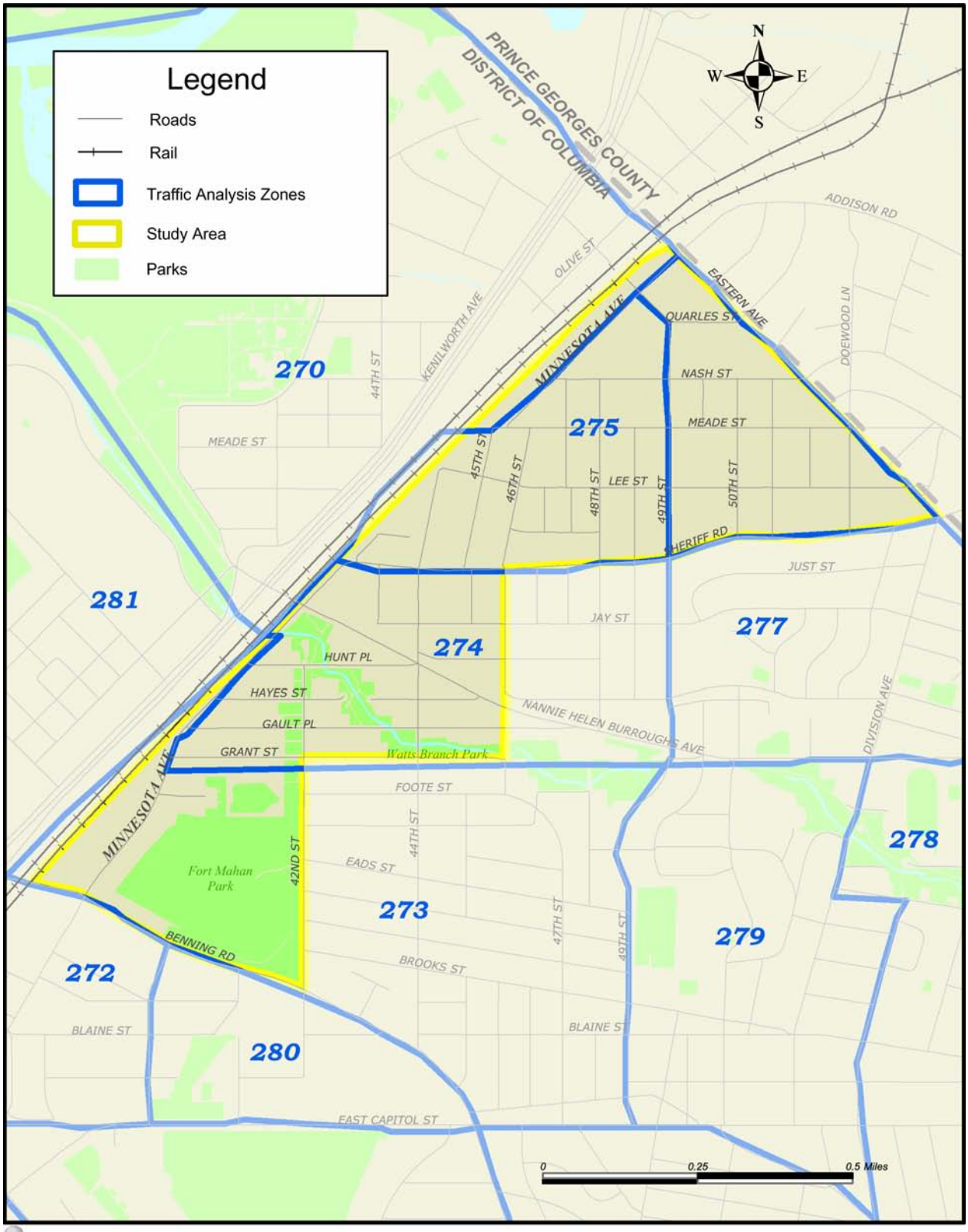
1. Minnesota Avenue/Eastern Avenue
2. Minnesota Avenue/Nash Street/Deanwood Metro Access
3. Minnesota Avenue/Meade Street
4. Sheriff Road/Eastern Avenue/Division Street
5. Sheriff Road/46th Street

Avenue/Nannie Helen Burroughs Avenue were obtained from another study being conducted in the vicinity of this project and are recent counts as well. These intersections are illustrated on **Figure 3.5**. The existing AM and PM peak hour traffic volumes, lane configurations and intersection control for each intersection are illustrated on **Figure 3.6**. Average Daily Traffic (ADT) volumes were calculated for some of the key roadway links in the study area as well. The existing ADT volumes are illustrated on **Figure 3.7**. Bus Route information was obtained from the Washington Metropolitan Area Transit Authority (WMATA). The existing bus routes in the study area are illustrated on **Figure 3.8**.

3.4.2 Existing Traffic Conditions

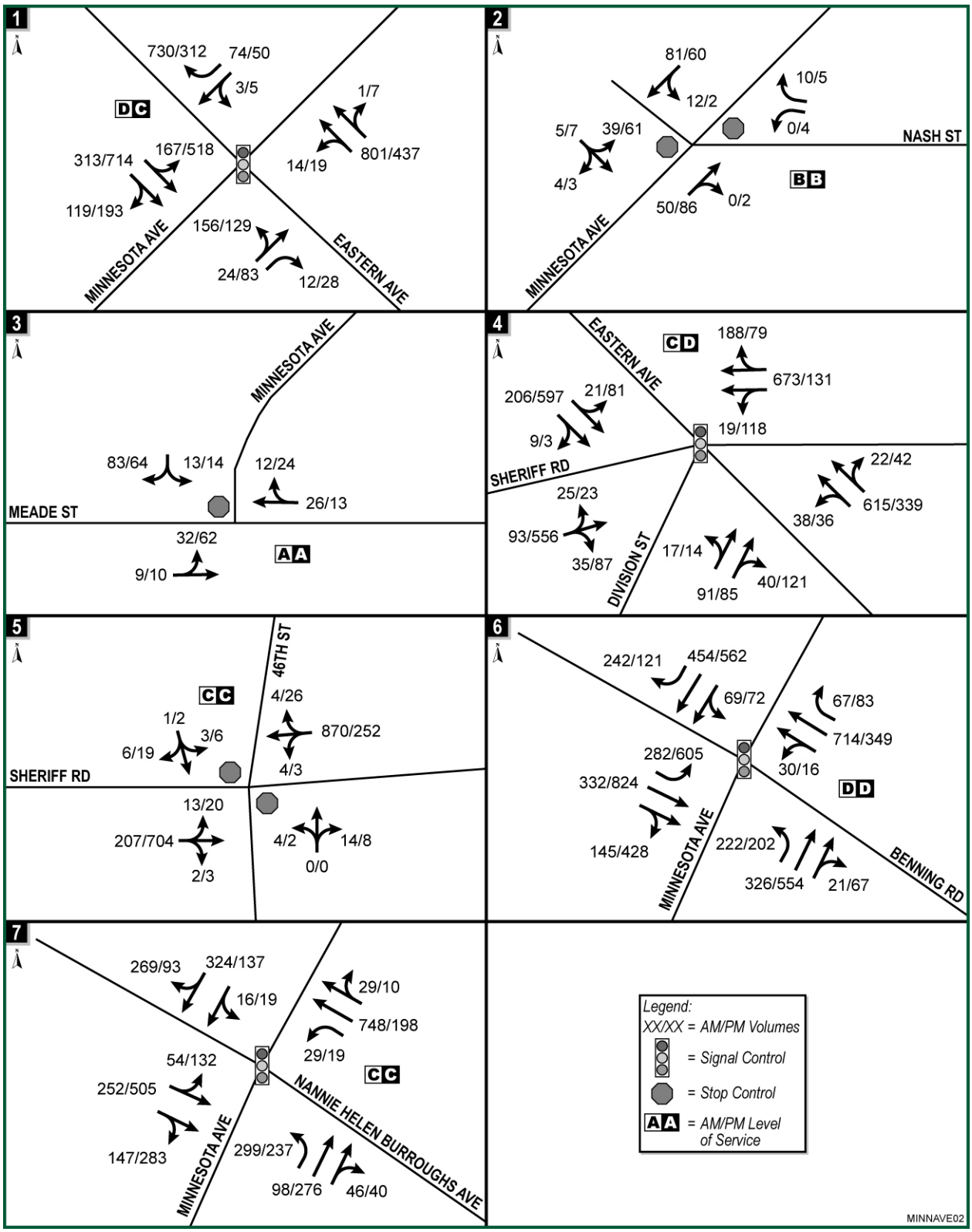
Currently, there are some general traffic patterns that illustrate the need for the extension of Minnesota Avenue. In the immediate vicinity of the proposed extension, the existing volumes indicate that motorists are using a combination of Meade Street with 45th and 44th Streets to circumnavigate the missing segment of Minnesota Avenue. The traffic patterns at the Minnesota Avenue/Eastern Avenue intersection indicate that a significant number of commuters from northeast of the study area travel Addison Road -Eastern Avenue-Kenilworth Avenue for work trips with destinations downtown. The combination of existing congestion for those turning movements at the Minnesota Avenue/Eastern Avenue intersection, existing traffic volumes on Kenilworth Avenue that exceeds the roadway capacity, and the proposed extension of Minnesota Avenue is anticipated to divert some portion of that traffic to Minnesota Avenue as an alternative arterial route.

Existing traffic conditions were analyzed using the Synchro software for all signalized intersections and Highway Capacity Software (HCS) for unsignalized intersections, which are both based on the Highway Capacity Manual (HCM). Both packages calculate levels of service based on the HCM. The analysis built upon the traffic volume and lane use configuration data obtained during the data collection process, as illustrated on Figure 3.6. Figure 3.6 also illustrates the levels of service that were calculated for the study intersections. The overall intersection levels of service along with the approach levels of service



MINNESOTA AVE EXTENSION

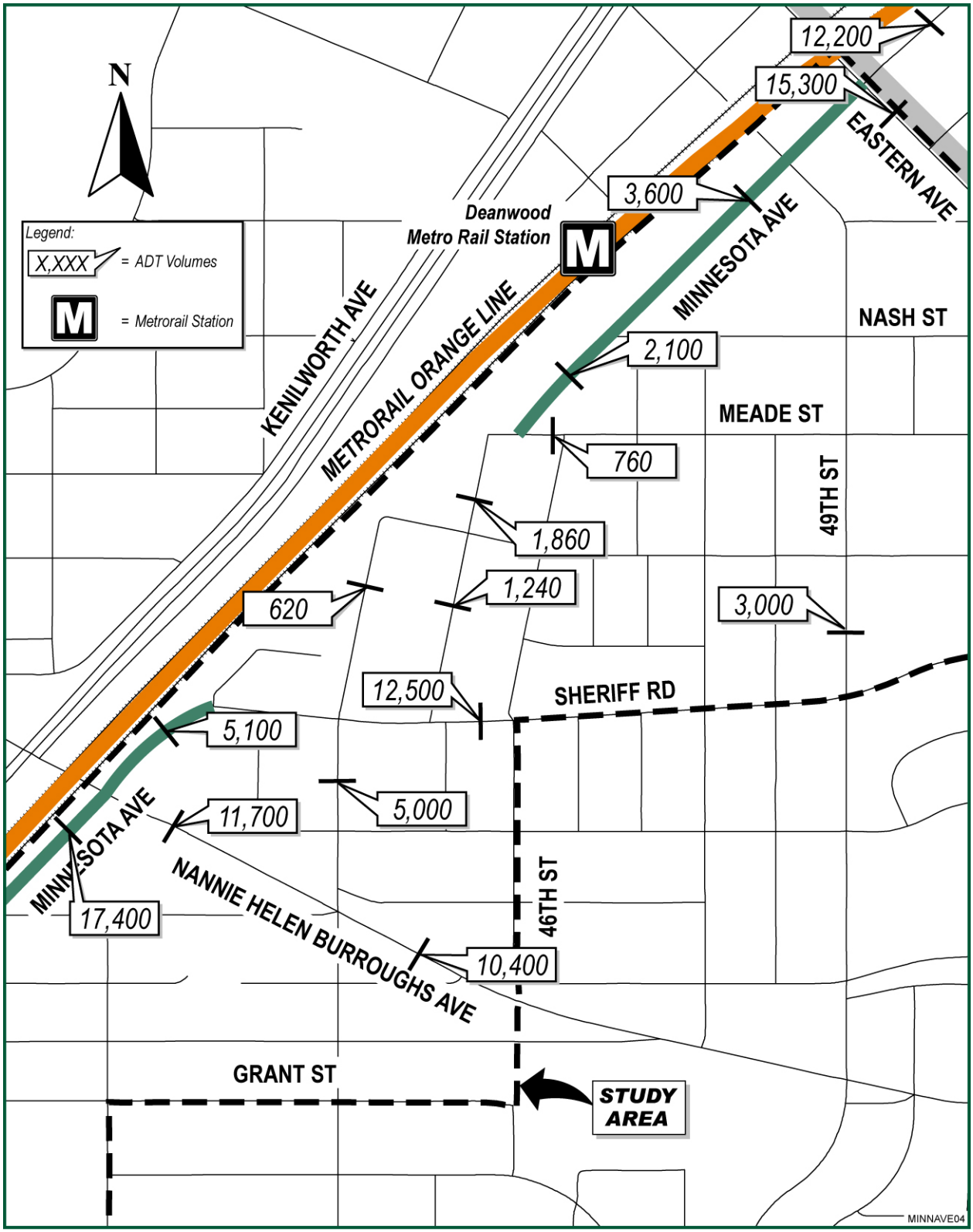
STUDY AREA TRAFFIC ANALYSIS ZONES
FIGURE 3.5



MINNESOTA AVE EXTENSION

2003 EXISTING PEAK HOUR TRAFFIC CONDITIONS

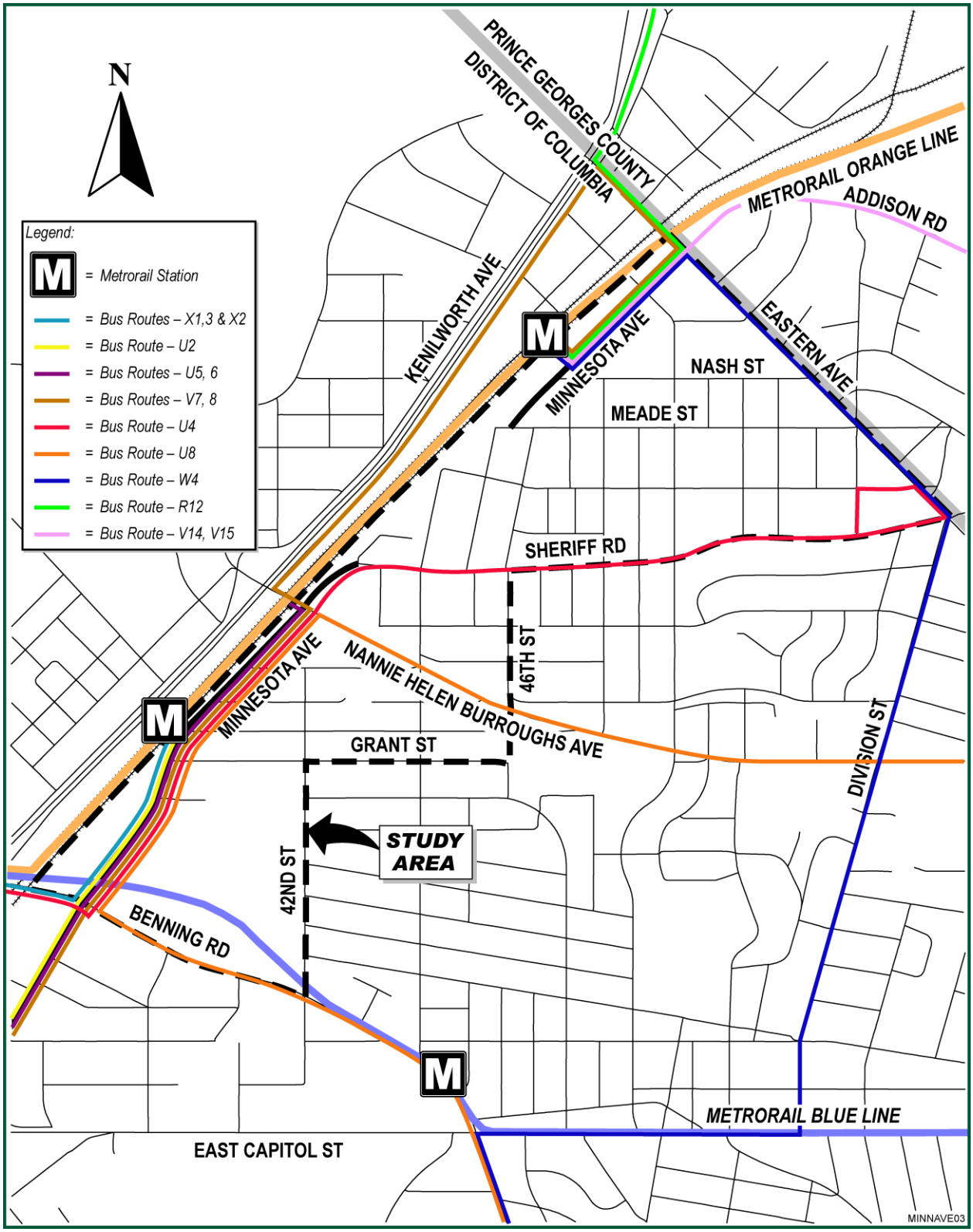
Figure 3.6



MINNESOTA AVE EXTENSION

2003 EXISTING AVERAGE DAILY TRAFFIC VOLUMES

Figure 3.7



MINNESOTA AVE EXTENSION

STUDY AREA BUS ROUTES
Figure 3.8

are summarized in **Table 3.5**. As shown on Figure 3.6, each of the study intersections currently operate at acceptable level of service (LOS) D or better during the peak hours.

Table 3.5 2003 EXISTING LEVELS OF SERVICE

INTERSECTION NUMBER	INTERSECTION	LEVEL OF SERVICE (DELAY)	
		AM PEAK HOUR	PM PEAK HOUR
1	**Minnesota Avenue @ Eastern Avenue**	**D (50.0)**	**C (33.9)**
	Northbound	E (55.4)	E (74.7)
	Southbound	E (75.3)	C (21.6)
	Eastbound	B (14.8)	C (28.0)
	Westbound	D (49.5)	D (40.7)
2	**Minnesota Avenue @ Nash Street**	**B (n/a)**	**B (n/a)**
	Southbound	A (7.5)	A (7.5)
	Eastbound	B (10.6)	B (10.2)
	Westbound	A (9.0)	A (9.3)
3	**Minnesota Avenue @ Meade Street**	**A (n/a)**	**A (n/a)**
	Southbound	A (9.7)	A (9.1)
	Eastbound	A (7.7)	A (7.4)
	Westbound	A (0.0)	A (0.0)
4	**Sheriff Road @ Eastern Avenue**	**C (32.4)**	**D (37.3)**
	Northbound (Eastern Ave)	D (43.8)	C (30.0)
	Northeast bound (Division St)	D (49.2)	D (49.2)
	Southbound	C (30.7)	D (42.3)
	Eastbound	B (14.8)	D (36.8)
	Westbound	C (24.4)	C (28.9)
5	**Sheriff Road @ 46th Street**	**C (n/a)**	**C (n/a)**
	Northbound	B (14.8)	C (18.3)
	Southbound	C (23.3)	C (16.1)
	Eastbound	B (10.3)	A (8.1)
	Westbound	A (7.8)	A (9.5)
6	**Minnesota Avenue @ Benning Road**	**D (39.1)**	**D (52.5)**
	Northbound	C (34.1)	D (37.0)
	Southbound	D (54.7)	D (37.9)
	Eastbound	C (24.0)	D (38.9)
	Westbound	D (42.1)	F (162.0)
7	**Minnesota Avenue @ Nannie Helen Burroughs**	**C (34.3)**	**C (27.7)**
	Northbound	B (19.6)	C (28.9)
	Southbound	D (37.4)	D (47.4)
	Eastbound	C (34.9)	C (23.1)
	Westbound	D (39.9)	C (21.2)

3.4.3 Existing Bus Routes

There are currently eight bus routes that use roadways within the study area. Figure 3.8 shows where the paths for the following routes overlap the study area and the locations of all bus stops:

1. U2- 20 minute headway
2. U4- 12 minute headway
3. U5,6- 15 minute headway
4. U8- 10 minute headway

5. V7,8- 15 minute headway
6. W4- 15 minute headway
7. X1,3- 15 minute headway
8. X2- 10 minute headway
9. R12- 30 minute headway
10. V14 & V15- 20 minute headway

As shown in the route listing and associated figure, the bus routes provide frequent service during the peak period in the study area, some routes with headways as low as 10 minutes. Data at the Deanwood and Minnesota Avenue Metrorail stations indicates that on average about 300 passengers per day arrive at Deanwood on the routes identified and that 1,000 passengers per day arrive at Minnesota Avenue. In addition, there are also a high percentage of bus to bus transfers that occur at the Minnesota Avenue station, about 1,000 per day.

3.4.4 Pedestrian and Bicycle Conditions

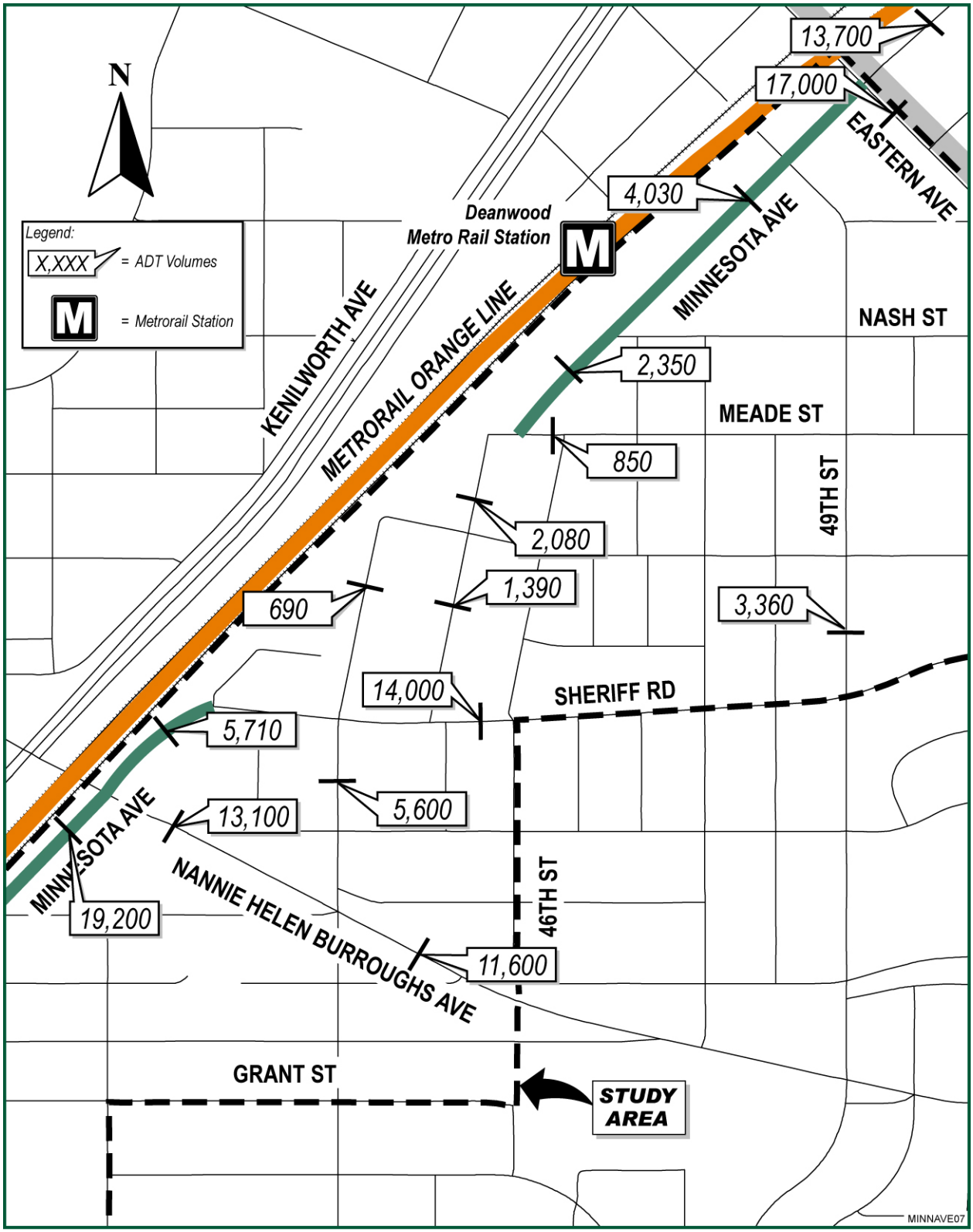
There are two trails on the District of Columbia Bike Plan that have alignments within the study area. The Anacostia Trail approaches the study area from the south, crossing Benning Road just west of 42nd Street and terminating in Fort Mahan Park. The Watts Branch Trail enters the study area from the east, generally runs parallel and south of Nannie Helen Burroughs Avenue and terminates in Watts Branch Park south of the Minnesota Avenue/Nannie Helen Burroughs Avenue intersection. These trails are not close enough to study area intersections to affect traffic operations.

Pedestrian circulation in the study area is primarily accommodated by sidewalks. The roadway sections within the study generally include sidewalks on both sides of the streets. Some sidewalk segments are missing, impeding continuity, however, pedestrian and bicycle circulation is possible.

Pedestrian counts taken within the study area indicate that the highest volumes of pedestrian activity occur at the Metrorail stations and lessen within the more residential areas along 46th, 45th, and Sheriff Road. For example, peak hour pedestrian flows at Minnesota and Nash Street adjacent to the Deanwood station average about 100 persons per hour in the AM peak hour. The highest pedestrian movements within the study area occur at the intersection of Benning Road and Minnesota Avenue where over 200 persons per hour were noted in the AM peak hour. The pedestrian flows at the edge of the study area at Eastern Avenue and Sheriff Road were 68 persons during the AM peak (which is generally higher than any peak in the PM period). Within the center of the study area volumes at Sheriff Road and 46th Street were 29 persons in the AM and 81 persons in the PM peak hour. It is important to note that the counts on the interior neighborhood streets such as along Meade Street and 46th Street indicate that pedestrian flows were almost as high as vehicular flows as people accessed the Metrorail stations.

3.4.5 Traffic Forecasts

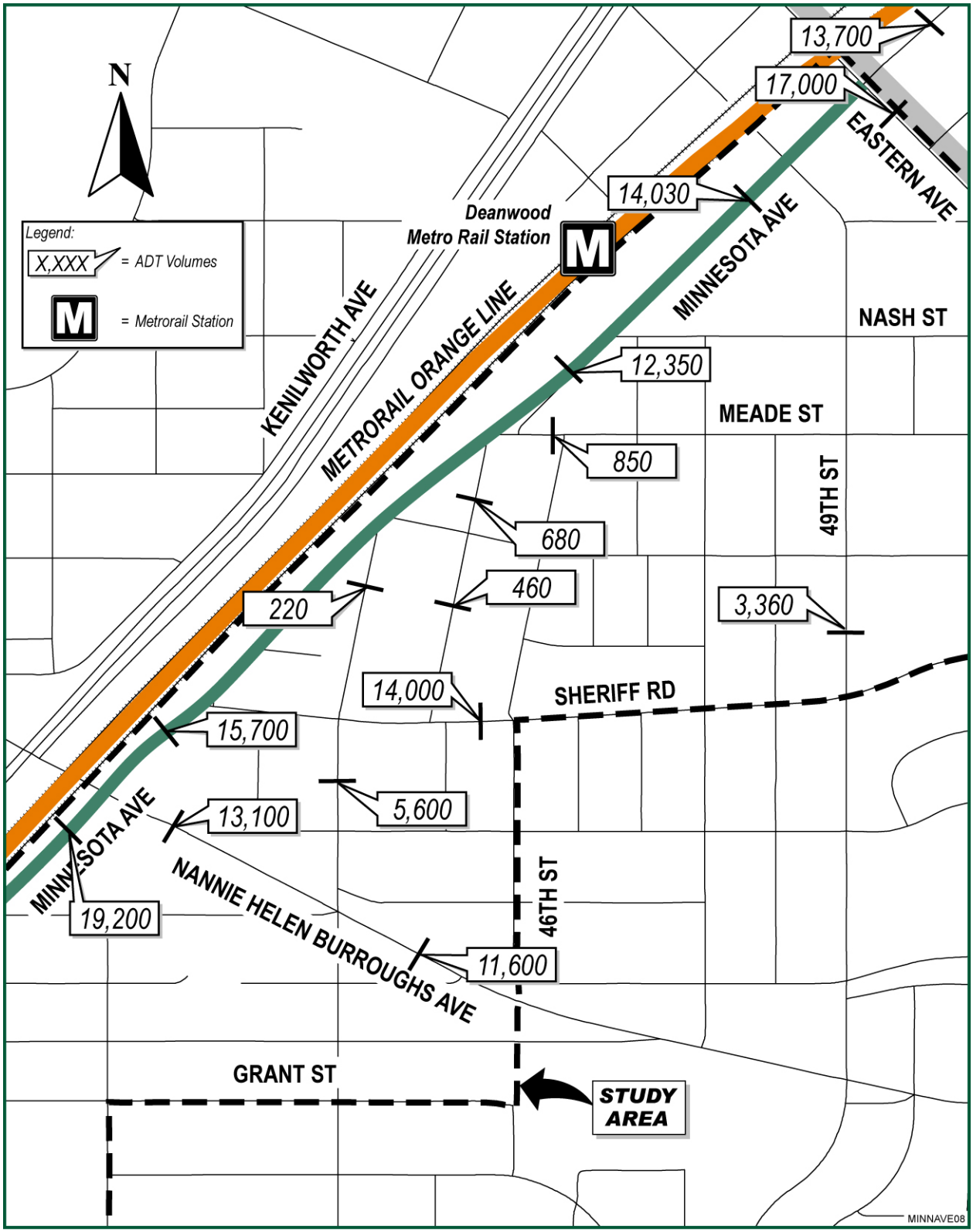
Traffic volumes for the year 2025 were projected for the No-Build and Build Alternatives 4A and 5. Traffic growth and potential traffic diversions that would result from the Minnesota Avenue extension were the factors used to forecast traffic volumes for the 2025 scenarios. The 2025 No-Build Average Daily Traffic Forecasts are illustrated on **Figure 3.9**. The 2025 Build Average Daily Traffic Forecasts are illustrated on **Figure 3.10** and would be identical for Alternatives 4A and 5 due to their similar location and design elements. The forecasts have been prepared for the extension as a four-lane arterial roadway and assume that all lanes would be available for vehicular traffic on the extension during the peak period. In addition, no new commercial development along the roadway is incorporated into the future projections since there is little available land along the proposed extension that would support such development.



MINNESOTA AVE EXTENSION

2025 NO-BUILD AVERAGE DAILY TRAFFIC

Figure 3.9



MINNESOTA AVE EXTENSION

2025 BUILD AVERAGE DAILY TRAFFIC

Figure 3.10

Traffic growth in the study area that will result from planned development projects was also considered. A government center is proposed in the northwest quadrant of the Minnesota Avenue/Benning Road intersection. The planning process for the government center project includes an ongoing traffic impact study. Potential traffic increases associated with the government center were incorporated into the traffic projections for the Minnesota Avenue Extension Study. Trip generation for the government center was based on 325,000 square feet of office, 15,000 square feet of retail, and a 40 percent reduction in trips due to the proximity of the Metro Station.

The traffic impacts of the Minnesota Avenue extension were identified by comparing the projected traffic operations (turning movements and LOS) in 2025 for the no-build and build conditions. The 2025 No-Build Average Daily Traffic conditions are illustrated on **Figure 3.11**. The 2025 Build Average Daily Traffic conditions are illustrated on Figure **3.12**.

No-Build Alternative

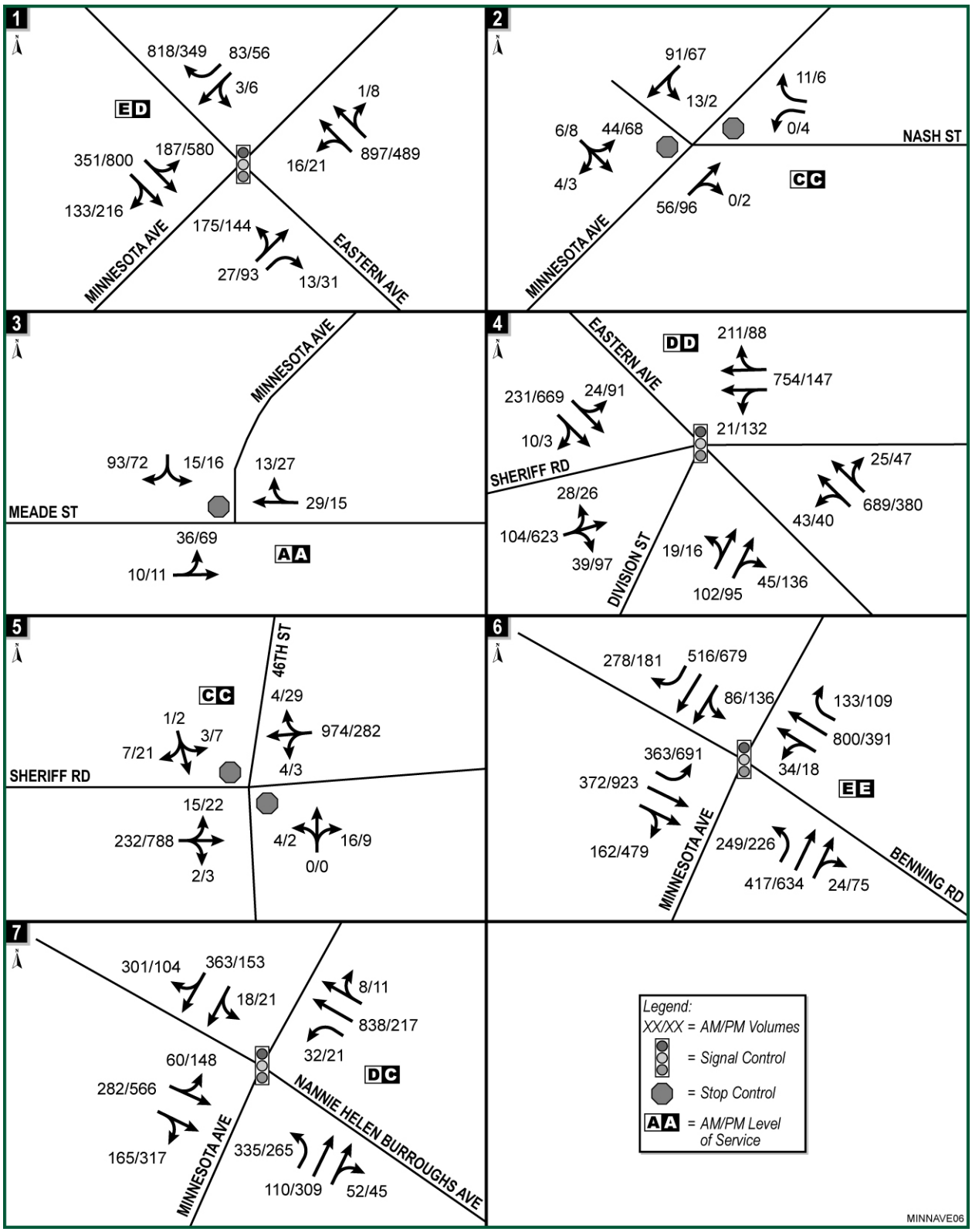
The peak hour traffic forecasts shown on Figure 3.11 reflect the regional growth and traffic generated by the government center project at Minnesota Avenue/Benning Road intersection. Most of the study area intersections would operate at acceptable LOS D or better during the AM and PM peak hours for the no-build conditions. Congestion is projected to occur at the Minnesota Avenue and Benning Road Intersection with both AM and PM peak periods projected at LOS E. Some of this congestion might be addressed through the Government Centers project or through proposed improvements on Benning Road. The configuration tested in this analysis was based on the most recent design proposed for this intersection. In addition, congestion begins to occur in the AM peak period at Minnesota and Eastern Avenue, due primarily to heavy westbound movements toward DC from Eastern and turning from Minnesota Avenue onto Eastern Avenue.

Alternative 4A

The existing roadway network and traffic data was reviewed to determine probable traffic diversions that would result from the Minnesota Avenue extension. Two opportunities for improved traffic flow through diversion to the new segment of Minnesota were identified. A diversion of some local traffic would occur from neighborhood streets such as Meade Street, 45th Street, and 46th Street to the proposed Minnesota Avenue segment. The traffic currently "cuts through" the neighborhood streets to circumvent the missing link of Minnesota Avenue. Approximately 1,400 vehicles per day currently using the neighborhood streets are anticipated to divert to the new Minnesota Avenue segment.

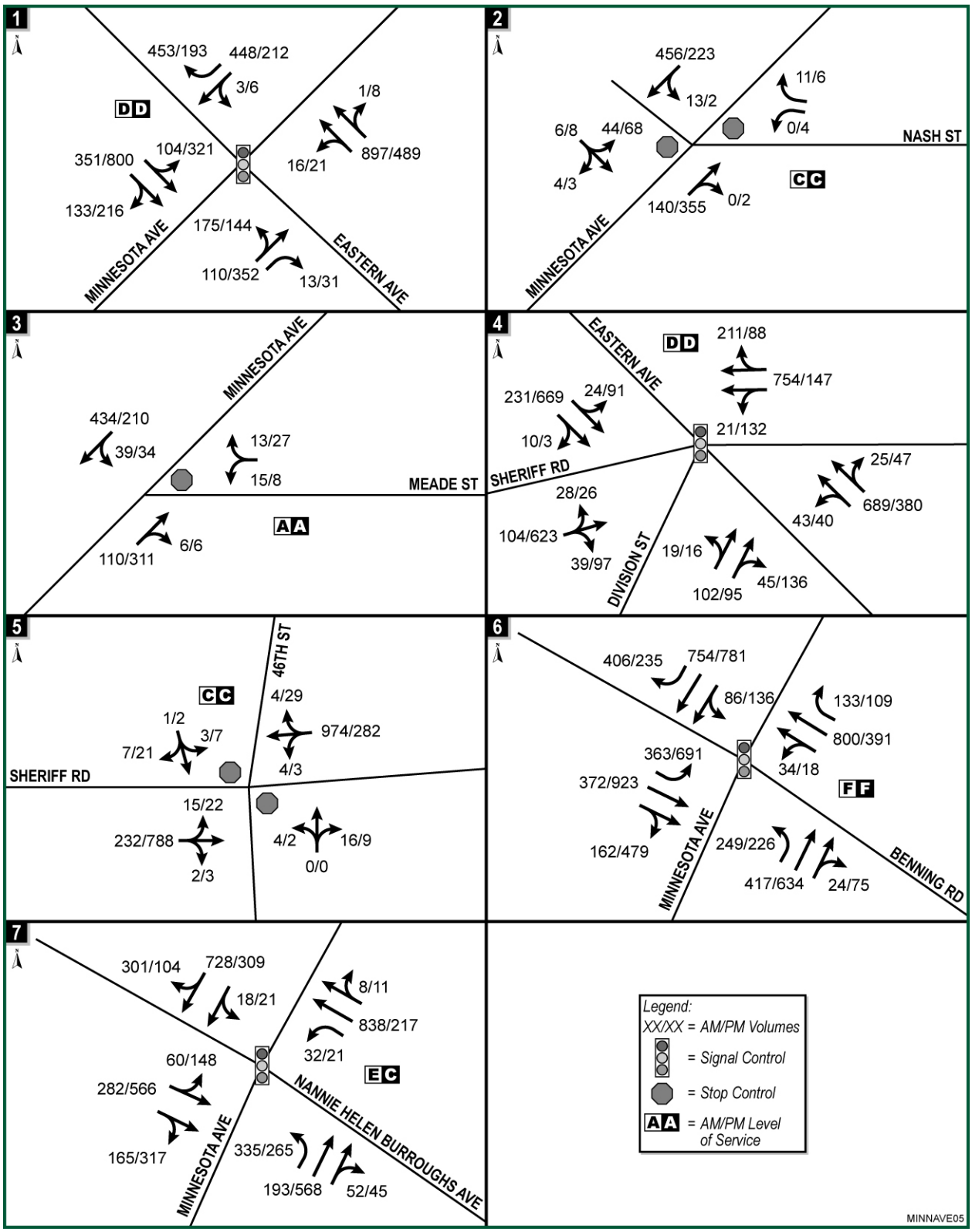
The new segment of Minnesota Avenue would also provide an alternate route for some regional commuter traffic. Kenilworth Avenue is a parallel arterial roadway that functions as a major commuter corridor into the central business district. A significant amount of commuter traffic currently uses Addison Road to Eastern Avenue to Kenilworth Avenue. The completion of the Minnesota Avenue segment would provide these commuters with the option of accessing Kenilworth Avenue at an interchange further down stream such as Nannie Helen Burroughs Avenue, Benning Road or Pennsylvania Avenue. The diversion would reduce the amount of time that the commuters spend on the congested Kenilworth Avenue facility. Approximately 10,000 vehicles per day are anticipated to divert from the Kenilworth Avenue to Minnesota Avenue as a result of the Minnesota Avenue extension.

The peak hour traffic forecasts shown on Figure 3.12 reflect the regional growth and traffic generated by the government center project at Minnesota Avenue/Benning Road intersection, and the traffic diversion caused by the Minnesota Avenue extension. All intersections operate acceptably with the exception of the AM peak period at Minnesota Avenue and Nannie Helen Burroughs Avenue which is projected to be at LOS D in the No-Build and LOS E in the Build scenario. The Minnesota Avenue/Benning Road intersection would operate at unacceptable LOS E in the No Build and at LOS F during the AM and PM peak hours. It is recommended that additional capacity be considered at the intersection of Minnesota and



2025 NO-BUILD PEAK HOUR TRAFFIC CONDITIONS

Figure 3.11



MINNESOTA AVE EXTENSION

2025 BUILD PEAK HOUR TRAFFIC CONDITIONS

Figure 3.12

Nannie Helen Burroughs during the design phase of this project such as signal re-timing or additional turning capacity. In addition, in order to mitigate the impacts of the opening of the Government Center project and the extension of Minnesota Avenue, the additional turning capacity that is being considered as part of the Government Centers project is recommended at the Minnesota Avenue/Benning Road intersection, in addition to signal re-timing.

As shown in **Table 3.6** the traffic operations at the study area intersections will be minimally impacted by the Minnesota Avenue extension. The average vehicle delays at the Minnesota Avenue/Eastern Avenue would decrease due to the shift in turning traffic to through movements. The intersection would improve in operations due to these shifting patterns to LOS D. Increases in average delay are anticipated at the Minnesota Avenue/Benning Road intersection with the completion of the extension and at Nannie Helen Burroughs as traffic volumes on Minnesota Avenue increase. No change in traffic volumes are projected along Sheriff Road or at the Sheriff Road and Eastern Avenue intersection due to the construction of the extension. During the analysis, it was determined that the east-west travel patterns that currently use Sheriff Road as a commuter routes would continue with or without the extension of Minnesota Avenue. The design for the Minnesota Avenue extension does take into account the diversion of traffic onto Minnesota Avenue and would allow for adequate capacity to be provided at the intersection of Minnesota Avenue and Sheriff Road, which would be a controlled intersection in the future.

Positive impacts are anticipated for the neighborhood streets in the project vicinity. The extension would relieve approximately 1,400 vehicles per day from cutting through on Meade Street, 45th Street, and 46th Street. As a result, these streets would return to a more residential quality.

With the extension of Minnesota Avenue, recommendations from WMATA's *Regional Bus Study* could be implemented more efficiently, specifically the extension of existing routes from the Minnesota Avenue station to the Deanwood Station. The more direct route would reduce the bus route travel time and provide improved service to the community in the vicinity of the new Minnesota Avenue segment and would allow the proposed expansion of transit services to be implemented at lower operating costs to WMATA. In addition, the improved transit service would provide enhanced reverse commute opportunities to employment in Maryland through the use of transfers and connections to Maryland routes at Deanwood.

Vehicular access to the Deanwood Metro station would be enhanced for those arriving from south of the station. The improved access provides minimal benefits because of the Minnesota Avenue Metro Station location approximately 1 mile south of the extension.

The Minnesota Avenue Extension Project is not in a location that would significantly enhance the connectivity to the Anacostia and Watts Branch regional bike trails. The extension would provide missing links in the sidewalk system that would enhance pedestrian circulation in the project vicinity neighborhoods. In particular, residents living immediately south of Meade Street would have a more direct pedestrian connection to the Deanwood Metro Station.

Alternative 5

The traffic impacts for Alternative 5 are the same as those for Alternative 4A.

3.5 CULTURAL RESOURCES

3.5.1 Regulatory Requirements

Although archaeological and architectural resources are identified in the National Environmental Policy Act (NEPA), procedures for their identification, evaluation, and treatment are contained in a series of federal and state laws and regulations and agency guidelines. Archaeological and architectural resources are protected by a variety of laws and their implying regulations: the most important of these are the National Historic Preservation Act (NHPA) of 1966 as amended in 2000; the Archeological and Historic

Preservation Act of 1974; and the Archaeological Resources Protection Act (ARPA) of 1979. Treatment of archaeological and architectural resources is further guided by the Advisory Council on Historic Preservation regulations, Protection of Historic Properties (36 CFR 800).

Table 3.6 INTERSECTION LEVEL OF SERVICE COMPARISON

		NO-BUILD		ALTERNATIVES 4A & 5	
INTERSECTION NUMBER	INTERSECTION APPROACH	AM PEAK HOUR	PM PEAK HOUR	AM PEAK HOUR	PM PEAK HOUR
1	**Minnesota Avenue @ Eastern Avenue**	**E (75)**	**D (52)**	**D (36)**	**D (36)**
	Northbound	E (72)	F (97)	C (21)	C (31)
	Southbound	F (111)	C (23)	D (37)	C (34)
	Eastbound	B (11)	D (54)	C (29)	C (32)
	Westbound	F (87)	D (46)	D (44)	D (52)
2	**Minnesota Avenue @ Nash Street**	**C (n/a)**	**C (n/a)**	**C (n/a)**	**C (n/a)**
	Southbound	A (8)	A (8)	A (8)	A (8)
	Eastbound	B (11)	B (10)	C (19)	C (17)
	Westbound	A (9)	A (9)	A (10)	B (12)
3	**Minnesota Avenue @ Meade Street**	**A (n/a)**	**A (n/a)**	**B (13)**	**B (10)**
	Northbound	N/a	n/a	A (9)	B (11)
	Southbound	A (10)	A (9)	B (15)	B (11)
	Northwestbound (45th St)	n/a	n/a	A (8)	A (8)
	Eastbound	A (8)	A (7)	n/a	n/a
	Westbound	A (0)	A (0)	A (7)	A (7)
4	**Sheriff Road @ Eastern Avenue**	**D (38)**	**D (54)**	**D (38)**	**D (54)**
	Northbound (Eastern Ave)	D (50)	C (33)	D (50)	C (33)
	Northeastbound (Division St)	D (52)	D (51)	D (52)	D (51)
	Southbound	C (31)	E (69)	C (31)	E (69)
	Eastbound	B (18)	D (53)	B (18)	D (53)
	Westbound	C (33)	D (50)	C (33)	D (50)
5	**Sheriff Road @ 46th Street**	**C (n/a)**	**C (n/a)**	**C (n/a)**	**C (n/a)**
	Northbound	B (15)	C (20)	B (15)	C (20.2)
	Southbound	C (23)	C (19)	C (23)	C (19)
	Eastbound	B (10)	A (8)	B (10)	A (8)
	Westbound	A (8)	A (10)	A (8)	A (10)
6	**Minnesota Avenue @ Benning Road**	**E (61)**	**E (70)**	**F (98)**	**F (91)**
	Northbound	D (52)	D (54)	E (67)	E (68)
	Southbound	F (81)	F (110)	F (119)	F (99)
	Eastbound	D (45)	D (48)	E (74)	F (92)
	Westbound	E (66)	F (112)	F (116)	F (112)
7	**Minnesota Ave.@ Nannie Helen**	**D (41)**	**C (30)**	**E (75)**	**C (34)**
	Northbound	C (28)	C (26)	E (61)	C (27)
	Southbound	D (45)	D (46)	E (73)	D (53)
	Eastbound	D (39)	C (29)	E (64)	D (36)
	Westbound	D (47)	C (22)	F (93)	C (21)

Identification of archaeological and architectural resources was conducted according to the requirements of 36 CFR 800 for Section 106 of the NHPA and initiation of the process was implemented with the District of Columbia Historic Preservation Office (DCHPO). As stipulated in Section 800.8, Section 106 can be coordinated with the requirements of NEPA. Preparation of an Environmental Assessment or Environmental Impact Statement can be sufficient in fulfilling the required determination of effects for Section 106 compliance and used in coordination with the DCHPO in the determination of effects**.** Coordination with DCHPO in accordance with Section 106 has been initiated for this Environmental Assessment.

3.5.2 Area of Potential Effect Definition

An integral part of the identifying process is to determine the area within which archaeological and architectural resources would be affected or likely to be affected (36 CFR 800.16(d)). The Area of Potential Effect (APE) for archaeology includes the area where archaeological resources might be directly affected by construction or construction staging activities. The APE for archaeology for this project is the right-of-way or construction limits for the proposed Minnesota Avenue Extension since this is the area in which the undertaking may directly or indirectly cause alterations in the character or use of the archeological resources. For architectural resources, the APE was expanded to consider the potential for indirect effects in accordance with 36 CFR 800.16 that allows for the APE to vary for different kinds of effects caused by the undertaking. The APE for architectural resources was expanded to six hundred (600) feet from the centerline to the southeast to include areas where important or potentially important architectural resources might be directly affected or subject to either visual or audible indirect impacts. The rail lines at the northwest of the project area serve as a man-made barrier for the APE boundary. The use of this APE boundary has been coordinated with the DCHPO.

3.5.3 Efforts to Identify Archaeological and Architectural Resources

Archival records and cultural resources site files were reviewed to identify previously recorded archaeological and architectural resources as well as to assess the probability of undiscovered archaeological resources in the APE. Information was collected from the archives at the Geography and Map Division (GMD) of the Library of Congress, the Washingtoniana Division of the Martin Luther King Memorial Library, the David Rumsey Map Collection, the National Oceanic Atmospheric Administration (NOAA) Historical Map and Chart Project, the DCHPO, and the National Register of Historic Places (NRHP). A review of pending landmark applications for inclusion on the D.C. Inventory of Historic Sites and areas proposed by DCHPO for further architectural survey were examined. A site visit to the project area was also conducted to assess the potential for unrecorded historic architectural resources located in the APE.

There are no NRHP listed architectural resources within the APE. However, an architectural survey of historic resources constructed prior to 1945 within the Deanwood neighborhood was conducted by Far East Community Services, Inc. in 1987. Their survey area included the area from Eastern Avenue, Division Avenue, Hayes Street, Nannie Helen Burroughs Avenue, and the railroad tracks (Far East Community Services, Inc. 1987: 3). The APE for this project is located within the boundaries of the 1987 survey. The results of the 1987 study were that the Deanwood survey area was an excellent representative collection of working class homes constructed between ca. 1895 and 1945. A majority of the buildings constructed in the neighborhood were frame buildings with a variety of styles represented including the Colonial Revival and Craftsman styles. A number of the buildings were also designed and constructed by local African-American architects and builders. The Deanwood Elementary School (now the George Washington Carver School) was designed by Snowden Ashford and constructed in 1909 (Smith 1988:153).

3.5.4 Archaeological Resources

No archaeological surveys have been conducted directly within or adjacent to the current project boundaries. As a result, no archaeological resources have yet been identified.

Prehistoric archaeological resources from the Archaic and Woodland periods have been recorded in the District, but most occupations have concentrated along the Potomac and Anacostia Rivers as well as along smaller drainages. The project area is located in the vicinity of Anacostia River and the prehistoric resources most likely to occur within this area include campsites and small hunting sites. Cultural resource surveys and studies indicate a high probability for finding prehistoric archaeological sites along the terraces of the Anacostia River and small tributaries.

Based on archival information, historic archaeological resources possibly located within the APE may include transportation related resources associated with the late 19th century Chesapeake Junction, and residential resources associated with mid 19th century farmsteads and late 19th and early 20th century houses. Transportation related resources, such as curbs, cobblestone streets, rail beds, structural foundations, represent partial or ancillary features to the overall transportation system. These types of features, if intact, would not likely be considered NRHP-eligible. The remnants of the residential resources could include building foundations, refuse scatters, privies and cellars containing extensive archaeological assemblages. If these types of historic archaeological resources are located intact, they can provide information to the mid 19th to early 20th century development of this portion of the District of Columbia; some of these resources may be eligible for the NRHP.

No-Build

No prehistoric or historic archaeological resources will be impacted by the No-Build Alternative because no ground disturbing activities will occur.

Alternative 4A

No previously recorded prehistoric or historic archaeological sites occur in the APE. However, due to the alignment's proximity to the Anacostia River there is a high probability for identifying deeply buried prehistoric archaeological sites. Based on archival information, historic archaeological resources may include 19th century transportation related resources and residential resources associated with mid 19th century farmsteads and late 19th and early 20th century houses. Some of these archaeological resources may be eligible for the NRHP.

Construction activities could potentially disturb or destroy any intact prehistoric or historic archaeological resources. Disturbance of intact prehistoric deposits or intact historic deposits associated with the late 19th century or early 20th century residential activity would destroy the research potential of such sites and subsequently, their NRHP eligibility. As part of the Section 106 process there will be on-going consultation with the DCHPO in the event that deeply buried pre-historic resources are discovered. A Programmatic Agreement may be developed with DCHPO to develop a process to account for undiscovered resources in the design phase, and a notification sent to the ACHP soliciting their participation in the Section 106 process.

Alternative 5

Impacts under Alternative 5 would be the same as those of Alternative 4A.

Mitigation

Although no archeological resources eligible for the National Register of Historic Places have been documented within the study area, there is a potential for prehistoric and historical period archeological resources to exist on the properties to be encroached upon by Alternatives 4A and 5. Coordination with the DC SHPO will continue.

It is uncertain whether either alternative would have any adverse impact on archaeological resources, or individual historic resources. If either build alternative were selected, DDOT would undertake an archaeological survey of the APE associated with the construction zone, to determine whether or not significant archaeological resources are present. If so, DDOT would develop a plan to avoid or minimize adverse effects to such resources. If archaeological resources are discovered during construction, the contractor shall cease construction immediately at the site to allow for appropriate investigation and evaluation. Any data recovery operations will be accomplished in conformance with the National Historic Preservation Act, the Archaeological and Historical Preservation Act, applicable portions of 36 CFR 60-66 and 800, and the *Secretary of the Interior's Standards and Guidelines for Archeology and*

Historic Preservation. All cultural materials and records associated with the data recovery will be collected and curated in accordance with the requirements set forth in 36 CFR 79. The archaeologists assigned to perform the work will meet or exceed the qualifications described in the Secretary of Interior's Professional Qualification Standards.

3.5.5 Historic Resources

There are no NRHP-listed historic resources within the APE. However, an architectural survey of historic resources constructed prior to 1945 within the Deanwood neighborhood was conducted by Far East Community Services, Inc. in 1987.

According to records on file at DCHPO, the historic resources identified as part of the Deanwood survey area were not evaluated for NRHP eligibility. However, the Deanwood area appears to demonstrate architectural cohesiveness and community standards; it is likely that some or all of the residential structures within the larger Deanwood community may be considered NRHP-eligible.

No-Build Alternative

No historic resources will be impacted by the No-Build Alternative because no demolition or visual or audible intrusions will occur.

Alternative 4A

Preliminary limits of disturbance (LOD) studies indicate that one residence could possibly be demolished for the construction of this alternative. This single-family home is located at the southwest corner of Lee Street and 44th Street and is of recent construction. This block contains historic resources and some structures may be considered NRHP-eligible, although significant impacts are not anticipated for these structures. Some of the currently unevaluated structures immediately adjacent to the alternatives within the APE could undergo visual impacts as a result of this alternative. These visual impacts are not anticipated to be significant as the current viewshed includes the existing Metrorail facility. In addition, this alternative includes a designated area for landscaping that could be used to buffer any views of the alternative.

Alternative 5

As with Alternative 4A, LOD studies indicate that one residence could possibly be demolished for the construction of this alternative. This single-family home is located at the southwest corner of Lee Street and 44th Street. This block contains historic resources and some structures may be considered NRHP-eligible, although significant impacts are not anticipated for these structures. Some of the currently unevaluated structures immediately adjacent to the alternatives within the APE could undergo visual impacts as a result of this alternative. These visual impacts are not anticipated to be significant as the current viewshed includes the existing Metrorail facility. In addition, this alternative includes a designated area and setback requirement for landscaping that could be used to buffer any views of the alternative.

Mitigation

The possibility of potentially NRHP eligible resources within the APE requires further study and evaluation of the historic architectural resources, although adverse effects are not anticipated since the overall impacts of both alternatives are minimal. Coordination with the DC SHPO will continue as part of the Section 106 process. The 1987 survey identified numerous historic resources within the current APE, but an assessment and evaluation of NRHP eligibility was not conducted at that time. The possibility of impacts, including demolition of one house at the intersection of Lee Street and 44th Street requires the gathering of further information and the determination of eligibility for the resource that

could be impacted. If the resource is found to be NRHP-eligible and an adverse effect is identified, treatments may include avoidance or mitigation through documentation to Historic American Building Survey (HABS) standards. This architectural information and historic context documentation would be submitted to the DCHPO and local repositories and additional coordination completed as part of the process.

3.6 AIR QUALITY

The FHWA and DDOT propose to complete the missing link of Minnesota Avenue in Washington, DC. If implemented, the project would complete a long-planned local transportation project. The analysis conducted in this section is intended to satisfy the requirements of Transportation Conformity (40 CFR 93) regulations. The Federal Clean Air Act (CAA) amendments of 1990, and the subsequent transportation conformity regulations, require that a proposed transportation project located in a nonattainment or maintenance area demonstrate conformity with the State Implementation Plan (SIP) provisions. Existing concentrations of ozone and PM2.5 exceed the National Ambient Air Quality Standards (NAAQS), resulting in the District, including the project area, having a status of moderate nonattainment for the 8-hour ozone standard and a designation of non-attainment for the PM2.5 standard. Additionally, the project area, as part of the District, is classified as a maintenance area for CO.

Areawide emission estimates for CO, ozone precursors (NOx and VOC), and particulate matter (PM10 and PM2.5) were completed using forecast daily vehicles miles traveled (VMT) and travel speed in the study area for existing conditions (2003) and the project's design year (2025). Additionally, the latest planning assumptions consistent with the current conforming Transportation Plan and Transportation Improvement Program (TIP) for the study area were used. Estimated emission rates under the No-Build and build alternatives for CO, NOx, VOC, and particulate matter are included in this section. Potential short-term air quality construction impacts are also discussed.

DC's CO status as a maintenance area and concentrations of CO were estimated under PM peak hour traffic condition and according to EPA regulation and guidance. Procedures established by EPA were used to estimate localized CO concentrations. Concentrations of CO were estimated under PM (evening) peak hour traffic conditions for several of the worst-case study area intersections. The results were compared with the NAAQS established by EPA. For comparison to NAAQS time frames, worst-case 1-hour and 8-hour CO concentrations were estimated. The result of this analysis is that estimated future air pollution levels under the No-Build and build alternatives are all below (within) the NAAQS.

3.6.1 Methodology

The Transportation Conformity Rule (40 CFR 93.114 and 93.115) requires that a currently conforming regional long-range transportation plan (plan) and a regional short-range transportation improvement program (TIP) must be in place at the time of project approval, and the project must come from the conforming plan and TIP. The Minnesota Avenue Extension has been included as an element in conforming CLRPs and TIPs since 2005. The project is currently included in the 2007 Financially Constrained Long-Range Transportation Plan (CLRP) by the National Capital Region Transportation Planning Board, the metropolitan planning organization (MPO) for the Washington, DC-MD-VA metropolitan area. The 2007 CLRP and TIP are scheduled to be approved in December, 2007.

Analysis methods for the Minnesota Avenue Extension were developed in coordination with MWCOG, EPA, and FHWA. MOBILE 6.2 input files were provided by MWCOG for the metropolitan Washington region.

Pollutant estimates were made for three analysis years: existing conditions (2003), the project's opening year (2015), and its design year (2025). Future-year analyses were conducted with and without the proposed build alternatives.

The methodology for analyzing air quality effects was designed to satisfy NEPA requirements for federally funded transportation projects (23 CFR 771) and the Transportation Conformity regulation (40 CFR 93). This analysis first evaluates effects during operation by determining pollutant concentrations in the vicinity of the most congested intersections affected by the project. The amount of mobile source-related air pollutants generated in the study area is also analyzed. Air quality effects during construction are then analyzed qualitatively.

3.6.2 Impact Analysis

Localized CO Analysis

Based on current EPA and FHWA regulation and guidance, a hot spot analysis was performed for CO via quantitative modeling, The results of the analysis are used both for evaluating effects as required by NEPA and to satisfy the requirements of the project-level conformity requirements. The EPA approved models, MOBILE6.2 and CAL3QHC were used.

This localized analysis estimated CO emission factors (in grams per vehicle mile traveled) using the MOBILE6.2 model and then calculated CO concentrations in the vicinity of selected intersections using the EPA approved CAL3QHC dispersion model. The data inputs to MOBILE 6.2 (specific to the Washington, DC area) were provided by MWCOG. MOBILE 6.2 emission factors were developed for existing conditions (2003), year of opening (2015), and design year (2025). The design year of 2025 has been used for all data projections for this project, and although data is available for 2030 emission factors, they have not been used in this report. All trends indicate that the 2030 emission levels would be below the 2025 emission levels since the analysis shows that concentrations are expected to decrease after 2015.

The CAL3QHC model was used to calculate worst case 1-hour CO concentrations, based on peak-hour traffic and stable meteorological conditions. Eight hour average CO concentrations were calculated by multiplying maximum 1-hour concentrations by a persistence factor, which accounts for the time variance in traffic and meteorological conditions.

Traffic volumes were obtained from the traffic analyses that were completed as part of the study. PM peak period traffic data were used to estimate maximum 1-hour and 8-hour CO concentrations. The PM peak is the highest traffic volume period of the day in downtown Washington, DC.

Selection of Congested Intersections for Detailed CO Analysis

Intersections chosen for this analysis are the heavily congested intersections within the project study area. A screening evaluation was performed to identify which of the signalized intersections in the study area are most congested and most affected by the project. Traffic volumes and the traffic levels of service for the year 2025 at the major signalized intersections that may be affected by proposed alternatives were evaluated with and without the project, and ranked as potential air quality analysis sites. Level of Service (LOS) is a way to categorize intersections according to the delay a vehicle would experience waiting to pass through it.

Intersections with an LOS of A, B, or C did not need to be considered because they do not pose a prolonged delay to vehicles. All intersections with an LOS of D, E, or F for one or more of the build alternatives, and the No-Build Alternative, were chosen for the analysis of localized affects to air quality, also called hot spot analysis. The following intersections were modeled since they are projected to be LOS D, E or F:

- Minnesota Avenue and Eastern Avenue
- Minnesota Avenue and Nannie Helen Burroughs
- Minnesota Avenue and Benning Road

Receptor Locations for CO Analysis

Locations where pollutant concentrations are predicted near the intersections are called receptors. For the purposes of the CO hot spot modeling, the receptors were placed strategically around the intersection because this is where the highest CO concentrations would typically be expected to occur. For this analysis, receptors were identified in the model at the corner of each intersection. The receptors were placed at approximately 12 feet from the edge of the road, representing mid sidewalk, and at a height of 6 feet above ground.

Background Concentrations for CO Analysis

In addition to the contributions from local traffic, an evaluation of localized CO concentrations must include an estimation of the other sources of CO, such as home and commercial heating units. Also known as background concentration, these values were developed based on data collected at the Annandale monitoring station, located southwest of Washington, DC at 6507 Columbia Pike. This is the nearest CO monitoring station located outside the urban city center and away from the influence of local traffic congestion. Analyses were completed using only localized impacts and with the background data provided by MWCOG of 2.2 ppm for 1-hour CO concentration and 1.6 ppm for the 8-hour CO concentration.

Existing Conditions- Localized CO Concentrations near Congested Intersections

Worst-case CO concentrations were estimated at three existing intersections to evaluate the potential to exceed the NAAQS for CO within the study area under existing traffic conditions. The modeled intersections include all of the intersections identified as being most likely to exceed the NAAQS for CO in the future under any of the build alternatives.

Consistent methodology and assumptions were used for modeling existing and future conditions; therefore, modeled CO concentrations for 2003 can be compared with those predicted for future years, to show the trend in air quality expected in the project area. No exceedance of the CO NAAQS was predicted by the model results. The maximum estimated 1-hour CO concentration from vehicle emissions for existing conditions was 6.9 ppm (including the background CO), compared to the 35 ppm NAAAQS. The maximum estimated 8-hour CO concentration was 4.7 ppm (including the background CO), compared to the 9 ppm NAAQS.

Model results are summarized in **Table 3.7**. The highest CO concentrations were modeled in the vicinity of the worst-case intersections anticipated to be affected by the project.

Table 3.7 CO CONCENTRATIONS, 2003 (WITH BACKGROUND CO)

INTERSECTION		CO (PPM)	
STREET	WITH STREET	1-HOUR	8-HOUR
Minnesota Ave	Eastern Ave	6.1	4.1
Minnesota Ave	Benning Rd	6.9	4.7
Minnesota Ave	Nannie Helen Bur.	4.9	3.4

No-Build Alternative- CO Concentrations near Congested Intersections

Because of this overall decrease in emission rates, the modeled CO concentrations for the No-Build Alternative are less than those modeled for existing conditions. No exceedances of the 1-hour average CO NAAQS of 35 ppm were predicted at any location under the No-Build Alternative in 2015 or 2025 (Table 5). Similarly, no exceedances of the 8-hour average CO NAAQS of 9 ppm were predicted for 2015 or 2025.

Build Alternatives 4A and 5 -Localized CO Concentrations Near Congested Intersections

As documented in the traffic section, Alternatives 4A and 5 are predicted to have similar traffic projections within the study area. Thus, the CO concentrations are identical. No exceedances of the 1-hour average CO NAAQS of 35 ppm were predicted at any intersection analyzed under the Build Alternatives in 2015 or 2025 (Table 5). Similarly, no exceedances of the 8-hour average CO NAAQS of 9 ppm were predicted for 2015 or 2025. The highest CO concentrations were modeled in the vicinity of the intersection of Minnesota Avenue and Benning Road and these were well below the NAAQS.

Table 3.8 CO CONCENTRATIONS, ALTERNATIVES

CO CONCENTRATIONS (PPM)									
INTERSECTION		2015 NO BUILD		2025 NO BUILD		2015 BUILD		2025 BUILD	
STREET	WITH STREET	1 HOUR	8 HOUR	1 HOUR	8 HOUR	1 HOUR	8 HOUR	1 HOUR	8 HOUR
Minnesota Ave	Eastern Ave	3.9	2.7	3.7	2.6	3.8	2.6	3.7	2.6
Minnesota Ave	Benning Rd	4.1	2.8	3.8	2.6	4.4	3.0	3.9	2.7
Minnesota Ave	Nannie Helen Bur.	3.4	2.4	3.2	2.3	3.6	2.5	3.4	2.4

Burden Analysis

In addition to the localized analysis described above, an emissions burden analysis was performed to estimate the project study area daily emission rates associated with each of the project alternatives. CO, PM (PM10 and PM2.5), and ozone precursor (VOC and NOX) emission rates were calculated as part of the burden analysis to provide an indication of the effects of the project alternatives throughout the project study area on those air pollutants. Only direct emissions of each of these pollutants were estimated, no attempt was made to estimate secondary formation downwind of the release. Note that NOx is also a PM2.5 precursor. Existing emission estimates are calculated in pounds per day (lbs/day) for the project study area for existing conditions (2003) and the project's design year (2025).

The daily air pollutant emissions rates for the proposed project were estimated multiplying MOBILE 6.2 emission factors by the project-specific daily traffic volumes, by roadway link. Emission rates were estimated for each build alternative and compared to the No-Build Alternative emission rates for the year 2025. These values are useful for comparison between the build alternatives but are not meant to predict air quality effects to the region.

These existing daily emissions were calculated by multiplying the modeled daily VMT for the year 2003 by the MOBILE6.2 emissions factor (in grams/VMT) calculated for an average travel speed of 40 miles per hour for major arterials and 25 mph for Minnesota Avenue itself. The study area emissions provide a comparison between existing conditions and the project alternatives, but not a calibrated estimate of actual emissions.

The estimated existing daily pollution emission rates are shown in **Table 3.9** along with the No Build and Build Alternatives.

Table 3.9 ESTIMATED STUDY AREA POLLUTANT EMISSION RATES (POUNDS/DAY)

ALTERNATIVE	CO	NOX	VOC	PM10	PM2.5
Existing	726.9	77.7	39.8	1.2	0.8
No Build	275.6	12.9	10.2	0.8	0.4
Build	443.4	20.7	16.4	1.2	0.6

Daily pollutant emission rates generated in the study area in 2025 were estimated using the same methodology used to estimate existing emission rates. Although average daily traffic is forecast to increase

between 2003 and 2025, a comparison between existing study area emissions and the No-Build Alternative in 2025 demonstrates the trend towards cleaner operating vehicles for CO, NOX, and VOC in 2025.

Daily pollution emission rates generated in the study area in 2025 were estimated using the same methodology used to estimate existing emissions. The higher daily emission rates for each of the Build Alternatives versus the No-Build Alternative reflect more vehicles using the new segment of Minnesota Avenue within the project study area than under No-Build conditions when the road did not exist. However, this is not an indication that any of the alternatives represent a negative effect on regional air quality. Recognizing that the project study area is a subset of the air quality region (the Washington, DC metropolitan area), the estimate does not account for VMT and emission occurring elsewhere in the region.

Localized PM2.5 Impacts

On a local scale, a PM2.5 hot spot analysis is not required to demonstrate project-level conformity according to the Transportation Conformity Guidance for Qualitative Hot-Spot Analyses in PM2.5 and PM10 Nonattainment and Maintenance Areas FHWA/EPA Guidance. This guidance states that PM2.5 hot spot analysis should be conducted according to qualitative guidance only if the project is a project of air quality concern, defined in 40 CFR 93.123(b)(1) as:

(i) New or expanded highway projects that have a significant number of or significant increase in diesel vehicles;

(ii) Projects affecting intersections that are at Level-of-Service D, E, or F with a significant number of diesel vehicles, or those that will change to Level-of-Service D, E, or F because of increased traffic volumes from a significant number of diesel vehicles related to the project;

(iii) New bus and rail terminals and transfer points that have a significant number of diesel vehicles congregating at a single location;

(iv) Expanded bus and rail terminals and transfer points that significantly increase the number of diesel vehicles congregating at a single location; and

(v) Projects in or affecting locations, areas, or categories of sites which are identified in the PM2.5 or PM10 applicable implementation plan or implementation plan submission, as appropriate, as sites of violation or possible violation.

The proposed project is not a project of air quality concern as it does not meet any of these criteria, and EPA has determined that such projects meet the Clean Air Act's conformity requirements without any further hot-spot analysis.

Mobile Source Air Toxics (MSAT) Impacts

In addition to the criteria air pollutants for which there are National Ambient Air Quality Standards (NAAQS), EPA also regulates air toxics. Most air toxics originate from human-made sources, including on-road mobile sources, non-road mobile sources (e.g., airplanes), area sources (e.g., dry cleaners), and stationary sources (e.g., factories or refineries).

Mobile Source Air Toxics (MSATs) are a subset of the 188 air toxics defined by the Clean Air Act. MSATs are compounds emitted from highway vehicles and non-road equipment. Some toxic compounds are present in fuel and are emitted to the air when the fuel evaporates or passes through the engine unburned. Other toxics are emitted from the incomplete combustion of fuels or as secondary combustion products. Metal air toxics also result from engine wear or from impurities in oil or gasoline.

EPA is the lead Federal Agency for administering the Clean Air Act and has certain responsibilities regarding the health effects of MSATs. EPA has examined the impacts of existing and newly promulgated mobile source control programs, including its reformulated gasoline (RFG) program, its national low emission vehicle (NLEV) standards, its Tier 2 motor vehicle emissions standards and gasoline sulfur control requirements, and its proposed heavy duty engine and vehicle standards and on-highway diesel fuel sulfur control requirements. Between 2000 and 2020, FHWA projects that even with a 64 percent increase in VMT, these programs will reduce on-highway emissions of benzene, formaldehyde, 1,3-butadiene, and acetaldehyde by 57 percent to 65 percent, and will reduce on-highway diesel PM emissions by 87 percent, as shown in the following graph. As a result, EPA concluded that no further motor vehicle emissions standards or fuel standards were necessary to further control MSATs.

UNAVAILABLE INFORMATION FOR PROJECT SPECIFIC MSAT IMPACT ANALYSIS

This document includes a basic analysis of the likely MSAT emission impacts of this project. However, available technical tools do not enable prediction of the project-specific health impacts of the emission changes associated with the alternatives in this document. Due to these limitations, the following discussion is included in accordance with CEQ regulations (40 CFR 1502.22(b)) regarding incomplete or unavailable information:

Information that is Unavailable or Incomplete

Evaluating the environmental and health impacts from MSATs on a proposed highway project would involve several key elements, including emissions modeling, dispersion modeling in order to estimate ambient concentrations resulting from the estimated emissions, exposure modeling in order to estimate human exposure to the estimated concentrations, and then final determination of health impacts based on the estimated exposure. Each of these steps is encumbered by technical shortcomings or uncertain science that prevents a more complete determination of the MSAT health impacts of this project.

Emissions. The EPA tools to estimate MSAT emissions from motor vehicles are not sensitive to key variables determining emissions of MSATs in the context of highway projects. While MOBILE 6.2 is used to predict emissions at a regional level, it has limited applicability at the project level. MOBILE 6.2 is a trip-based model—emission factors are projected based on a typical trip of 7.5 miles—and on average speeds for this typical trip. This means that MOBILE 6.2 does not have the ability to predict emission factors for a specific vehicle operating condition at a specific location at a specific time. Because of this limitation, MOBILE 6.2 can only approximate the operating speeds and levels of congestion likely to be present on the largest-scale projects, and cannot adequately capture emissions effects of smaller projects. For particulate matter, the model results are not sensitive to average trip speed, although the other MSAT emission rates do change with changes in trip speed. Also, the emissions rates used in MOBILE 6.2 for both particulate matter and MSATs are based on a limited number of tests of mostly older-technology vehicles. Lastly, in its discussions of PM under the conformity rule, EPA has identified problems with MOBILE6.2 as an obstacle to quantitative analysis. These deficiencies compromise the capability of MOBILE 6.2 to estimate MSAT emissions. MOBILE6.2 is an adequate tool for projecting emissions trends, and performing relative analyses between alternatives for very large projects, but it is not sensitive enough to capture the effects of travel changes tied to smaller projects like this one or to predict emissions near specific roadside locations.

Dispersion. The tools to predict how MSATs disperse also are limited. EPA's current regulatory models, CALINE3 and CAL3QHC, were developed and validated more than a decade ago for the purpose of predicting episodic concentrations of carbon monoxide to determine compliance with the NAAQS. The performance of dispersion models is more accurate for predicting maximum concentrations that can occur at some time at some location within a geographic area. This limitation makes it difficult to predict accurate exposure patterns at specific times at specific highway project locations across an urban area to assess potential health risk. Along with these general limitations of dispersion models, FHWA is also

faced with a lack of monitoring data in most areas for use in establishing project-specific MSAT background concentrations.

Exposure Levels and Health Effects. Finally, even if emission levels and concentrations of MSATs could be accurately predicted, shortcomings in current techniques for exposure assessment and risk analysis preclude reaching meaningful conclusions about project-specific health impacts. Exposure assessments are difficult because it is difficult to accurately calculate annual concentrations of MSATs near roadways, and to determine the portion of a year that people are actually exposed to those concentrations at a specific location. There are also considerable uncertainties associated with the existing estimates of toxicity of the various MSATs, because of factors such as low-dose extrapolation and translation of occupational exposure data to the general population. Because of these shortcomings, any calculated difference in health impacts between alternatives is likely to be much smaller than the uncertainties associated with calculating the impacts.

SUMMARY OF EXISTING CREDIBLE SCIENTIFIC EVIDENCE RELEVANT TO EVALUATING IMPACTS OF MSATS

Exposure to toxics has been a focus of a number of EPA efforts. Most notably, the agency conducted the National Air Toxics Assessment (NATA) in 1996 to evaluate modeled estimates of human exposure applicable to the county level. While not intended for use as a measure of or benchmark for local exposure, the modeled estimates in the NATA database best illustrate the levels of various toxics when aggregated to a national or State level.

EPA is in the process of assessing the risks of various kinds of exposures to these pollutants. The EPA Integrated Risk Information System (IRIS) is a database of human health effects that may result from exposure to various substances found in the environment. The IRIS database is located at http://www.epa.gov/iris.

There have been other studies that address MSAT health impacts in proximity to roadways. The Health Effects Institute, a non-profit organization funded by EPA, FHWA, and industry, has undertaken a major series of studies to research near-roadway MSAT hot spots, the health implications of the entire mix of mobile source pollutants, and other topics. The final summary of the series is not expected for several years. Some recent studies have reported that proximity to roadways is related to adverse health outcomes, particularly respiratory problems. FHWA cannot evaluate the validity of these studies, but more importantly, the studies do not provide information that would be useful to alleviate the uncertainties listed above and enable a comprehensive evaluation of the health impacts specific to this project.

Because of the uncertainties outlined above, a quantitative assessment of the effects of air toxic emissions impacts on human health cannot be made at the project level. While available tools do allow us to reasonably predict relative emissions changes between alternatives for larger projects, the amount of MSAT emissions from each of the project alternatives and MSAT concentrations or exposures created by each of the project alternatives cannot be predicted with enough accuracy to be useful in estimating health impacts. Therefore, the relevance of the unavailable or incomplete information is that it is not possible to make a determination of whether any of the alternatives would have "significant adverse impacts on the human environment."

In the following discussion, FHWA acknowledges that the project alternatives may result in increased exposure to MSAT emissions in certain locations, although the concentrations and duration of exposures are uncertain, and because of this uncertainty, the health effects from these emissions cannot be estimated.

As discussed above, technical shortcomings of emissions and dispersion models and uncertain science with respect to health effects prevent meaningful or reliable estimates of MSAT emissions and effects of this project. However, even though reliable methods do not exist to accurately estimate the health

impacts of MSATs at the project level, it is possible to qualitatively assess the levels of future MSAT emissions under the project. Although a qualitative analysis cannot identify and measure health impacts from MSATs, it can give a basis for identifying and comparing the potential differences among MSAT emissions—if any—from the various alternatives. The qualitative assessment presented below is derived in part from a study conducted by FHWA entitled A Methodology for Evaluating Mobile Source Air Toxic Emissions Among Transportation Project Alternatives: (www.fhwa.dot.gov/environment/airtoxic/msatcompare/msatemissions.htm).

For this project, the amount of MSATs emitted would be proportional to the vehicle miles traveled, or VMT, and emissions will likely be lower than present levels in the design year as a result of EPA's national control programs that are projected to reduce MSAT emissions by 57 to 87 percent from 2000 to 2020. Local conditions may differ from these national projections in terms of fleet mix and turnover, VMT growth rates, and local control measures. However, the magnitude of the EPA-projected reductions is so great (even after accounting for VMT growth) that MSAT emissions in the study area are likely to be lower in the future in virtually all locations. And in this particular case, the AADTs are well below emission thresholds.

Because of the specific characteristics of this project, there may be localized areas in the vicinity of the project where VMT would increase, and other areas where VMT would decrease. Therefore it is possible that localized increases and decreases in MSAT emissions may occur. The localized increases in MSAT emissions would likely be most pronounced along the new roadway sections. However, even if these increases do occur, they too will be substantially reduced in the future due to implementation of EPA's vehicle and fuel regulations.

In sum, under the Build Alternative in the design year it is expected there would be reduced MSAT emissions in the immediate area of the project, relative to the No Build Alternative, due to the reduced VMT associated with more direct routing, and due to EPA's MSAT reduction programs. MSAT levels could be higher in some locations than others due to localized conditions, but current tools and science are not adequate to quantify them. However, on a regional basis, EPA's vehicle and fuel regulations, coupled with fleet turnover, will over time cause substantial reductions that, in almost all cases, will cause region-wide MSAT levels to be substantially lower than today's levels.

Greenhouse Gas Impacts

From a NEPA perspective, it is analytically problematic to conduct a project level cumulative effects analysis of greenhouse gas emissions on a global-scale problem. Secondly, criteria pollutant emissions last in the atmosphere for perhaps months; CO2 emissions remain in the atmosphere far longer - over 100 years - and therefore require a much more sustained, intergenerational effort. Finally, due to the interactions between elements of the transportation system as a whole, project-level emissions analyses would be less informative than ones conducted at regional, state, or national levels. Because of these concerns, FHWA concludes that the CO2 emissions cannot be usefully evaluated in the same way that other vehicle emissions are addressed.

The NEPA process is meant to concentrate on the analyses of issues that can be truly meaningful to the consideration of project alternatives, rather than simply amassing data. In the absence of a regional or national framework for considering the implications of a project level GHG analysis, FHWA concludes that such an analysis would not inform project decision-making, while adding administrative burden.

3.6.3 Temporary Construction-Related Impacts

Construction impacts were evaluated qualitatively due to the limited availability of detailed information regarding equipment staging during construction. It is not anticipated that construction will last longer than 5 years at any location in the study area. Therefore, a project level conformity analysis is not required, and construction emissions do not need to be accounted for in a "hot spot analysis" per 93.123(c)(5).

Air quality impacts related to the construction phase of the project would occur primarily as a result of emissions from heavy-duty construction equipment (such as bulldozers, backhoes, and cranes), diesel-fueled mobile sources (such as trucks), diesel- and gas-fueled generators, and on- and offsite project-related vehicles (such as service trucks and pickups). Fugitive PM10 and PM2.5 emissions are associated with site preparation, demolition, ground excavation, grading, cut-and-fill operations, and structure erection. Fugitive dust emissions also could be generated as a result of construction-related traffic and wind erosion of uncovered demolition and excavation areas. PM emissions would vary from day to day, depending on the level of activity, specific operations, and weather conditions. Hot, dry weather conditions could aggravate particulate matter emissions. Emission rates would depend on soil moisture, silt content of soil, wind speed, and the amount and type of operating equipment. Larger dust particles (PM10) would settle near the source, and fine particles (PM2.5) would be dispersed over greater distances from the construction site.

In addition there will be engine exhaust from personal vehicles (construction workers), heavy trucks, and construction equipment. These emissions would primarily consist of NOx, SO2, PM, CO, and VOCs, which are common at construction sites. Emissions from operating equipment and vehicles during hot summer months would contribute to ozone formation.

If construction traffic and lane closures were to increase congestion in the area, emissions from traffic would increase temporarily and would be limited to the area surrounding the construction site. Some construction phases (particularly during paving operations using asphalt) would result in short-term odors. These odors might be detectable to some people near the project site, but would be diluted as distance from the site increases.

No-Build Alternative

Under the No-Build Alternative, air pollutant emissions would be limited to those associated with ongoing operations and any maintenance activities in or around the project area.

Build Alternatives

Construction activities and generation of air pollutant emissions would be similar for all alternatives. Air pollutant emissions in all construction phases would result from earthwork, demolition, grading, and paving activities in support of roadway work. Emissions also would result from storing, handling, and transporting construction materials. All construction emissions are expected to be local (that is, confined to the construction site area) and limited to the duration of the construction activities.

3.6.4 Mitigation

Because the air quality analysis indicates that no exceedances of the NAAQS are anticipated, no adverse air quality impacts are expected to result from any of the alternatives and no mitigation measures would be required. Construction impacts could be reduced by incorporating mitigation measures into the construction specifications for the project.

3.7 NOISE

Noise is defined as unwanted sound, and can come from man-made sources or natural sources. Noise can interrupt human activities and can result in annoyance, especially in residential areas. Changes in noise levels occur in the context of the existing noise environment. This means that what may be noisy in a relatively quiet environment, may go unnoticed in a louder environment.

3.7.1 Fundamentals of Noise

Sound occurs whenever pressure waves are generated in the air. Sound pressure levels are used to measure the intensity of sound and are described in terms of decibels. The decibel (dB) is a logarithmic

unit that expresses the ratio of the sound pressure level being measured to a standard reference level. When describing noise and its effect on a human population, the A-weighted (dBA) noise levels are typically used to account for the response of the human ear. The term "A-weighted" refers to a filtering of noise signal to emphasize frequencies in the middle of the audible spectrum and to de-emphasize low and high frequencies in a manner corresponding to the way the human ear perceives sound. The A-weighted noise level has been found to correlate well with people's judgments of the noisiness of different sounds and has been used for many years as a measure of community noise.

Community noise levels usually change continuously during the day. Several descriptors have been developed to compare noise levels over different time periods. One of the most common descriptors is the energy equivalent sound level (Leq). Leq is the equivalent steady-state sound level that, in a specific hour, contains the same acoustic energy as a time-varying sound level during the same hour.

3.7.2 Regulatory Overview

In Washington D.C., noise is regulated by Title 30 of the D.C Code of Municipal Regulations (DCMR). This regulation establishes noise control regulations for all types of noise sources and noise generating activities (such as human activities, construction, etc), but does not establish project noise impact criteria. DDOT has established a noise policy applicable to highway projects (only) that establishes impact criteria and noise assessment methods for that type of project, but is not intended to control traffic noise.

FHWA regulations permit the control of traffic noise on previously constructed highways that are eligible for federal highway funds. Minnesota Avenue within the project limits is eligible for federal highway funds and therefore subject to noise impact guidance and abatement criteria established by FHWA. **Table 3.10** provides details regarding FHWA's Noise Abatement Criteria (NAC) for various types of land use. Since the extension of Minnesota Avenue would occur on new location, this project would be classified as a Type I noise project. Based on FHWA noise-analysis procedures for Type I highway projects, an alternative is considered to create noise impacts if it either increases noise over the existing level by at least 6 dBA or when predicted traffic noise levels approach or exceed the NAC. These impacted locations are eligible for noise abatement. FHWA does not specifically define the terms "substantial increase" or "approach", instead it leaves the interpretation of these terms to the states. Project area land uses fall into NAC category B which has an Leq level of 67 dBA. Consistent with DDOT policy the impact level for which noise mitigation will be considered for this project is 66 dBA.

Table 3.10 NOISE ABATEMENT CRITERIA FOR HIGHWAY PROJECTS FOR PROTECTED LAND USES

ACTIVITY CATEGORY	HOURLY A-WEIGHTED SOUND LEVELS (DBA)		DESCRIPTION OF ACTIVITY CATEGORY
	L_{EQ}(H)	L_{10}(H)	
A	57 Exterior	60 Exterior	Lands on which serenity and quiet are of extraordinary significance and serve an important public need, and where the preservation of those qualities is essential if the area is to continue to serve its intended purpose.
B	67 Exterior	70 Exterior	Picnic areas, recreation areas, playgrounds, active sports areas, parks, residences, motels, hotels, schools, churches, libraries and hospitals.
C	72 Exterior	75 Exterior	Developed lands, properties, or activities not included in Categories A or B above.
D	--		Undeveloped lands.
E	52 Interior	55 Interior	Residences, motels, hotels, public meeting rooms, schools, churches, libraries, hospitals, and auditoriums

Source: FHWA 23 CFR 772.

FHWA has established procedures for assessing project-level noise impacts for highway. The procedure involves assessing the adjacent land uses to identify sensitive receivers and the associated noise threshold levels for any such land uses. Once sensitive land uses are identified, the existing noise levels are

monitored, and future noise levels with the proposed project are predicted. If the noise levels represent a defined impact, then abatement (mitigation) is considered.

3.7.3 Existing Noise Environment

Field visits to measure existing noise levels were conducted in December 2003 and January 2004. Exterior noise measurements were conducted at 6 locations that are representative of the noise-sensitive receptors in close proximity to proposed alignments. Because four alignment alternatives have been eliminated from consideration, results from only 3 monitoring locations are relevant for the candidate build alternatives. The selected sites included two residential structures and a church. Noise measurements were conducted for a minimum of 15-minutes. The location of measurement sites are shown in **Figure 3.13** and measurements results are presented in **Table 3.11**. The sites are representative of groups of structures, since most of the proposed alternatives are linear and of equal distance from the noise measurement sites and other houses located at the same distance.

Table 3.11 NOISE MEASUREMENT RESULTS

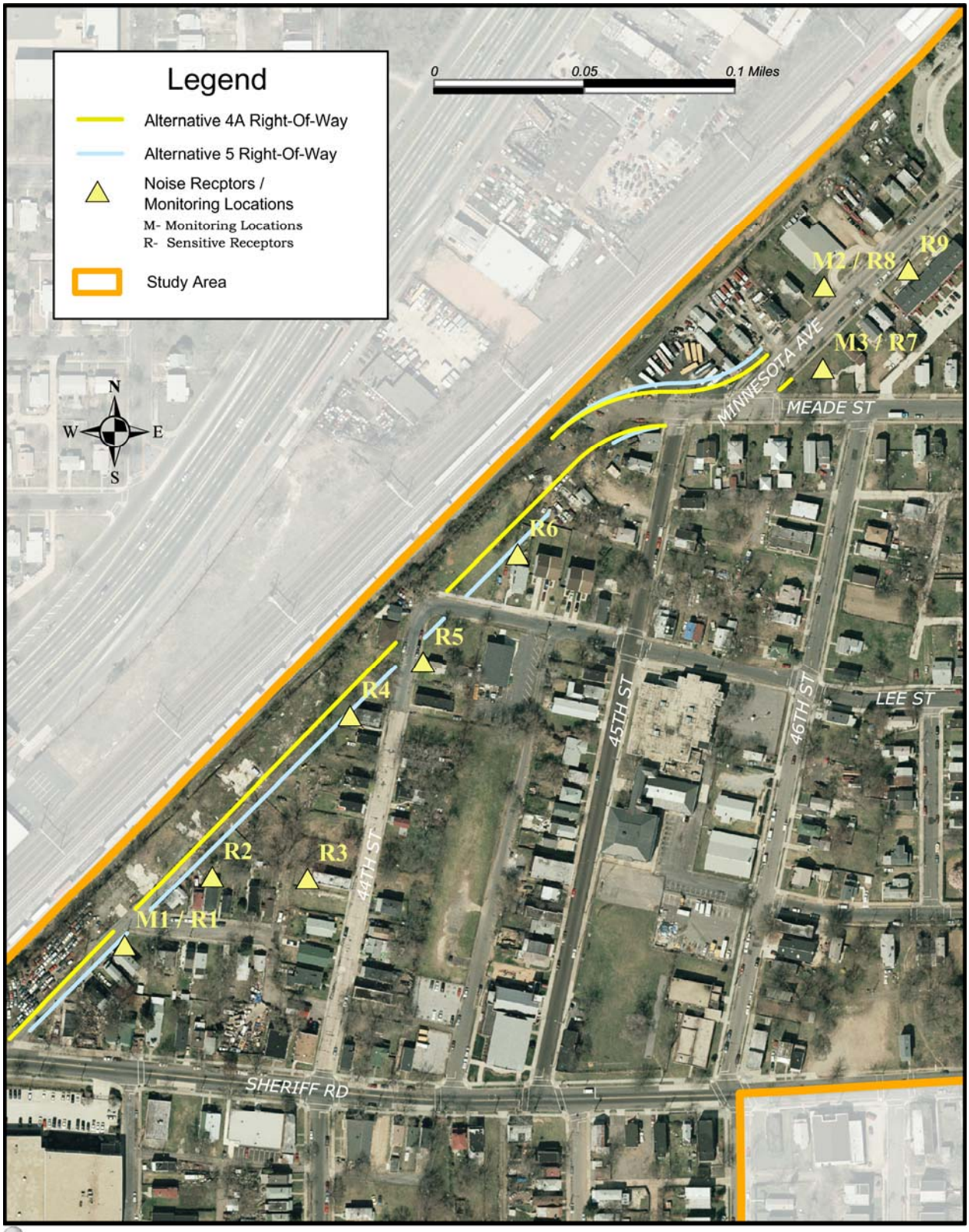
MEASUREMENT SITE NO.	LOCATION	DATE	TIME	LEQ(H), DBA
M1	Residence northeast corner of Kane Street and Minnesota Avenue.	12/2/03	7:30 – 7:46 am	60.5
		12/3/03	8:26 – 8:47 am	60.1
		12/3/03	4:00 – 4:15 pm	59.7
		1/8/04	4:02 – 4:19 pm	61.2
M2	Front side yard of Church of the Holy Trinity on Minnesota Avenue	12/2/03	8:25 – 8:40 am	60.7
		12/3/03	5:16 – 5:32 pm	62.8
		12/3/03	9:22 – 9:38 am	60.3
		1/8/04	5:28 – 5:44 pm	59.7
M3	Residence side yard at the northeast corner of Minnesota Avenue and Meade Street.	12/2/03	9:02 – 9:20 am	60.8
		12/3/03	9:02 – 9:20 am	63.0
		12/3/03	4:53 – 5:13 pm	59.5
		1/8/04	5:08 – 5:24 pm	60.7

Noise measurements were conducted using a Larson Davis (LD) Model 820 sound level meter calibrated according to the manufacturer's specification. The Leq for the measurement periods ranged between 59.5 and 63.0 dBA. The dominant noise sources were either traffic noise or noise from Metro trains, commuter trains, and freight trains in the CSX/Metro rail corridor.

3.7.4 Noise Impacts

The FHWA traffic noise model, TNM 2.0.6, was used for the noise computations (FHWA, 2002). TNM input is based on a three-dimensional grid created for the study area to be modeled. All roadway, barrier and receiver points are defined by their x, y, and z coordinates. Roadways and barriers are coded into TNM as line segments defined by their end points. Receivers, defined as single points, are typically located at sensitive receptors such as residences, schools, and churches. Receivers are modeled at a height of 5 feet above ground elevation.

In order to determine the noise levels generated by traffic, the TNM computer program requires inputs of traffic volumes, speeds, and vehicle types. Three vehicle types were input into the model namely cars, medium trucks, and heavy trucks. The propagation path between source and receiver is modeled in TNM by specifying rows of houses or building structures, special terrain features, and even barriers. Propagation of noise can be further specified by selecting ground types such as hard soil, loose soil, pavement, water, lawn field grass, granular snow, and powder snow. These may be coded separately for every roadway and receiver pair. All other natural obstructions, such as cuts and fills that could affect the future predicted noise levels were also included in the input file.



MINNESOTA AVE EXTENSION

NOISE RECEPTORS/MONITORING LOCATIONS
FIGURE 3.13

For this study future traffic levels were forecasted using level of service (LOS) C traffic volumes to obtain the worst-case noise scenario. LOS C conditions occur when mostly stable traffic flows are present but speeds and maneuverability are constricted by higher volumes.

Based on existing land use in the study area noise sensitive receptors were identified within the project limits. In some cases sensitive receptors were defined to represent groups of houses (see **Table 3.12** next page).

Noise impact analysis has been performed to determine the road and rail traffic noise levels at residences adjacent to the proposed project corridor using Alternative 4A and Alternative 5 alignments. Freight and commuter rail noise levels were calculated using the measured data as well as the following daily train volumes through the corridor:

- 19 Metro trains per hour
- 2 Commuter trains per hour
- 1 Freight train per hour

Minnesota Avenue traffic noise levels were calculated using the TNM noise model with 950 passenger cars per hour per lane for LOS C capacity at 25 mph. Truck distributions used are 4% for medium trucks and 2% for heavy trucks. Model results are presented in Table 3.12 and **Table 3.13** on next page. Overall noise level calculations assume that all three sources are generating noise at the same time. In both alternatives, the calculated overall noise levels at the adjacent receivers ranged between 61 to 68 for Alternative 4A and 61 to 67 for Alternative 5.

No-Build Alternative

There would be no change, and therefore no impact to, the existing noise environment under the No-Build Alternative. However, it should be noted that the model results presented in Tables 3.12 and 3.13 show that noise levels are affected greatly by the freight rail operations projected compared to the levels projected solely for Minnesota Avenue traffic. The dBA level from the freight rail operations are the highest among the sources and range from 66.8 dBA to 70.4 dBA and would occur with or without the alternatives under consideration.

Alternative 4A

Results of the noise model indicate NAC are exceeded at 6 of the 9 sensitive noise receptors under Alternative 4A. The highest noise levels would be experienced at Receptor 8 (front yard of Church of the Holy Trinity), Receptor 4 (rear yard of residence along 44th Street), and Receptor 9 (front yard of residences, east side of Minnesota Avenue north of Meade Street). If criteria of 67 dBA as required by FHWA was used, only Receptor 4 and Receptor 9 would have NAC exceedences as shown in Table 3.12. In addition, noise isolated from the traffic on Minnesota Avenue exceeds DDOT standards only at only 3 of the receptors.

Alternative 5

Noise impacts under Alternative 5 would be similar to those experienced under Alternative 4A, except slightly less because the alignment is shifted slightly closer to the rail facility. Noise model results indicate NAC are exceeded at 5 of the 9 sensitive noise receptors under Alternative 5. The highest noise levels would be experienced at Receptor 8 (front yard of Church of the Holy Trinity), Receptor 4 (rear yard of residence along 44th Street), and Receptor 9 (front yard of residences, east side of Minnesota Avenue north of Meade Street).

Table 3.12 ALTERNATIVE 4A NOISE IMPACT RESULTS

RECEPTOR/ MONITOR NO.	DISTANCE TO ROAD CENTERLINE	DISTANCE TO FREIGHT RR	DISTANCE TO COMMUTER RR	DISTANCE TO METRO RR	HOURLY NOISE (LEQ), DBA				
					MINNESOTA AVE. TRAFFIC	FREIGHT RR	COMMUTER RR	METRORAIL	OVERALL
R1/M1	54 ft	130 ft	224 ft	180 ft	64.5	69.9	63.3	63.2	66.1
R2/M2	70 ft	150 ft	240 ft	192 ft	63.9	69.3	63.0	62.9	65.5
R3/M3	190 ft	264 ft	356 ft	314 ft	57.4	66.8	61.3	60.8	60.9
R4	40 ft	116 ft	210 ft	164 ft	66.4	70.4	63.6	63.6	67.6
R5	76 ft	144 ft	240 ft	194 ft	63.3	69.5	63.0	62.9	65.1
R6	54 ft	134 ft	230 ft	182 ft	64.4	69.8	63.2	63.2	66.0
R7	50	270	364	320	65.9	66.7	61.2	60.7	66.6
R8	46	174	270	220	67.3	68.7	62.5	62.4	68.0
R9	40	264	356	304	66.5	66.8	61.3	60.9	67.1

Note:Overall noise impacts assume all three sources will be generating noise at the same time.

Table 3.13 ALTERNATIVE 5 NOISE IMPACT RESULTS

RECEPTOR/ MONITOR NO.	DISTANCE TO ROAD CENTERLINE	DISTANCE TO FREIGHT RR	DISTANCE TO COMMUTER RR	DISTANCE TO METRO RR	HOURLY NOISE (LEQ), DBA				
					MINNESOTA AVE. TRAFFIC	FREIGHT RR	COMMUTER RR	METRORAIL	OVERALL
R1/M1	60 ft	130 ft	224 ft	180 ft	65.0	69.9	63.3	63.2	66.4
R2/M2	80 ft	150 ft	240 ft	192 ft	63.1	69.3	63.0	62.9	65.0
R3/M3	200 ft	264 ft	356 ft	314 ft	57.4	66.8	61.3	60.8	60.9
R4	50 ft	116 ft	210 ft	164 ft	65.9	70.4	63.6	63.6	67.2
R5	84 ft	144 ft	240 ft	194 ft	62.9	69.5	63.0	62.9	64.9
R6	70 ft	134 ft	230 ft	182 ft	63.3	69.8	63.2	63.2	65.2
R7	50 ft	270 ft	364 ft	320 ft	65.8	66.7	61.2	60.7	66.5
R8	46 ft	174 ft	270 ft	220 ft	66.5	68.7	62.5	62.4	67.4
R9	40 ft	264 ft	356 ft	304 ft	66.3	66.8	61.3	60.9	66.9

Note:Overall noise impacts assume all three sources will be generating noise at the same time.

3.7.5 Mitigation

FHWA requires that feasible and reasonable noise-abatement measures be considered to mitigate a noise impact on developed lands if predicted traffic noise levels approach or exceed NAC. As discussed above, noise levels with each alternative will exceed FHWA NAC.

FHWA regulations permit the control of traffic noise for the construction of a highway on new location or the physical alternation of existing highway which significantly changes either the horizontal or vertical alignment or increases the number of through-traffic lanes. Although Minnesota Avenue is classified as a minor roadway south of Kane Street and classified a collector roadway north of Meade Street, mitigation measures consistent with FHWA guidance have been considered.

Mitigation of Short-Term (Construction) Impacts

Even though no significant noise impacts are expected to occur for the temporary construction period during the daytime hours, several possible mitigation measures are recommended to help reduce annoyance and complaints by residents:

- Conform to all operational provisions of the District noise standards and regulations.
- Use construction methods or equipment that will provide the lowest level of noise impact.
- Use of noise-attenuating jackets around jackhammers to reduce operating noise levels.
- Scheduling of construction such that the minimum amount of equipment would be operating at the same time.
- Use of the latest technology to mitigate construction equipment such as engine enclosures, intake and exhaust silencers, etc.
- Use of offsite locations for activities that can be completed elsewhere, such as concrete grinding, equipment repair, etc.
- Schedule the duration and timing of the construction activities to minimize the noise impacts on exposed individuals, wherever possible.
- Maintain good relations with the community by keeping people informed of the schedule, duration and progress of the construction. To minimize the public objections to unavoidable noise, communities should be notified in advance of the construction about expected temporary noise increases.

In addition, noise control measures should be included as special provisions in construction specifications for this project to mitigate for short-term noise impacts. These specifications should require the following:

- Contractors will prepare detailed noise control plans, prepared by an experienced acoustical engineer with qualifications identified in the specifications, prior to start of construction, and
- Submission of quarterly or semi-annual plans on projects of long duration, since it is difficult to anticipate construction equipment locations and methods far in advance.
- A Noise Control Plan that indicates where the contractor will make baseline noise level measurements (both daytime and nighttime) to establish reasonable noise criteria limits and effectively target mitigation planning and control efforts; a prediction of construction noise based on the contractor's construction methods and proposed equipment. The plan should outline mitigation measures if the noise criteria limits will be exceeded. The project specifications should clearly present the procedures for taking noise measurements and contain the contractor's noise monitoring plan. The plan should require submission of the noise monitoring data; and also include equipment noise emission limits. The plan should require noise certification testing before equipment is brought on the jobsite and periodic recertification testing thereafter; and the plan should contain noise complaint investigation and resolution procedures. Finally the plan should indicate that a Professional Engineer will stamp shop drawings of mitigation measures, such as noise barriers or curtain systems.

Mitigation of Long-Term Impacts

Noise walls are generally the most effective technique for mitigated roadway noise impacts. For a noise wall to be technically feasible however barriers must be constructed as a continuous barrier with no gaps

through which noise can travel to sensitive receptors. For this reason noise walls are effective mitigation measures for highway projects where long uninterrupted spans can be constructed.

In determining effectiveness of noise walls as mitigation, DDOT noise policy requires first a test for feasibility and then a test for reasonableness. In order for a noise barrier to be feasible, it must reduce noise levels by 5 dBA. Noise barriers would not pass this feasibility test for the extension of Minnesota Avenue and are thus not recommended because of the number of gaps that would have to be provided to residences and connecting streets and due to visual disruption within the community. As shown in Tables 3.12 and 3.13, there are impacts to residences for both alternatives located along the southwest corner of the facility near Receptor 1. Noise walls could not be constructed along this portion of Minnesota Avenue as these residences front onto the short stretch of Minnesota Avenue that currently exists in this section and there would need to be a gap in the noise wall to provide a connection to Kane Place. Noise impacts are also projected for a residence at Receptor 4, located at 44th Street. Again, a noise wall would not be feasible because a gap would be required to provide access to 44th Streets and Lee Streets in this section. Finally, all other impacts are located along existing Minnesota Avenue in the vicinity of the Deanwood Station and noise walls would not be feasible as the residences and the church that are impacted front onto and will require access to Minnesota Avenue.

In addition to these constraints, there has been a proposal for the construction of affordable housing within the vicinity of the extension and these residences could face the proposed extension. Driveway and sidewalk entrances into these residences would require gaps in a noise wall along Minnesota Avenue rendering it ineffective. In addition, noise walls would create barrier effects within the community. The project is envisioned as a boulevard that enhances connectivity to the neighborhood by providing ease of access between the residential area and the proposed sidewalks included in both alternatives and the construction of a noise wall on this short segment would have a detrimental effect on this goal of the project and conflict with the creation of a more pedestrian-oriented environment that links the Minnesota Avenue and Deanwood Metrorail stations. Due to the gaps required in the noise walls they would not be able to provide the required dBA reduction and would not meet DDOT's test for feasibility for this project. Since they do not pass the test for feasibility, they have not been tested for reasonableness and no cost estimates have been prepared, in accordance with DDOT noise regulations.

The following alternate noise mitigation measures may be considered for impacted sensitive noise receptors:

- Soundproofing of walls through additional insulation.
- Soundproofing of windows through installation of double-paned glass.
- Provision of air conditioning units for units that depend on open windows for cooling.
- Grading and use of vegetation to minimize noise propagation.

A comparison of the location of Receptors to the structures within the study area indicates that approximately 10 single-family residences and one multi-family unit would require mitigation, as well as the Church of the Holy Trinity. Design of these abatement measures would occur during the design phase to determine the pre-existing condition of the structures needing abatement measures and certified according to DDOT and FHWA policy and coordination.

3.8 NATURAL ENVIRONMENT

This section describes the regulatory requirements related to natural resources as well as the physiography, topography, geology, soils, surface and groundwater resources, floodplains, wetlands, terrestrial and aquatic wildlife and habitat, threatened and endangered species, natural areas, and special jurisdictions present within the study area and its vicinity.

3.8.1 Physiography and Topography

The project area lies entirely within the Western Shore Uplands Region physiographic subdivision of the Atlantic Coastal Plain physiographic province (Maryland Geological Survey, 2003). The Coastal Plain is characterized as generally flat and low, defined by river terraces at several different locations, including along the Anacostia River to the west of the project area. The project area is relatively flat and almost completely developed, with average elevations ranging from 30 feet above mean sea level (MSL) to 50 feet above MSL. The highest elevations (160 feet above MSL) occur at Fort Mahon Park in the southern corner of the project area while the lowest elevations (10 to 15 feet above MSL) occur in response to drainage and erosion along Watts Branch in the central part of the project area. The overall drainage is to the northwest. (U.S. Geological Survey, 1979).

3.8.2 Geology

The eastern portion of the study area is generally underlain to a thickness of up to 100 feet by gravel, clay, and silt with local basal deposits of carbonaceous clay containing tree stumps and other woody debris of the Pleistocene-age Wicomico Formation (Qw). The western portion of the study area is generally older Coastal Plain deposits, underlain with dark-gray massive clay containing lignitized wood saurian bones, and overlain by massive maroon clay and varicolored sand and clay of the Upper Cretaceous-age Patapsco Formation and Arundel Clay (Kp), included in the Potomac Group, which dip to the south east at increments of about 100 feet per mile, thickening to more than 700 feet along the southeastern border of the District, just east of the project study area (Johnson, 1964).

Alluvium and artificial fill (Qal) is associated the low-lying areas adjacent to the Anacostia River and Watts Branch. These deposits of gravel, sand, silt, and clay are found on the lowest stream terraces and bottoms, in a thickness of a few inches to 25 feet. River terrace deposits (Qt) are associated with the higher elevations at Fort Mahon and near Sheriff Road. These deposits are mostly gravel, sand, and loam, in a thickness of about 30 feet. All other portions of the study area are Potomac Group (Kpc) clay and silt facies, overlying crystalline rocks (Smith, 1976). Upland level areas in portions of the District have gravel deposits of commercial value (Lyttle and others, unpublished).

3.8.3 Soils

Soil associations are map units used in soil surveys that are comprised of delineations, each of which shows the size, shape, and location of a landscape unit composed of two or more soil types. Soil series within soil associations are named for the dominant or co-dominant soils represented. The area along the proposed alignment for the extension of Minnesota Avenue, as well as the west side of project area, are generally mapped as Urban land-Galestown-Rumford association (Smith, 1976). The Urban land-Galestown-Rumford association consists of Urban land and deep, nearly level to moderately sloping, somewhat excessively drained soils that are mostly sandy throughout and is typically found on terraces.

The soils along the proposed alignment are mapped as Galestown-Urban land complex (GeB), on nearly level to gently sloping grades of 0 to 8 percent. Along the north end of the existing alignment of Minnesota Ave, the soils are mapped as Urban land (Ub) and GeB; along the south end of the existing alignment, the soils are mapped as Urban land-Galestown complex (UmB), on nearly level to gently sloping grades of 0 to 8 percent, and GeB with areas of smoothed Udorthents of variable composition (U6) associated with the existing railroad tracks.

Table 3.14 lists the potential engineering constraints of soils within the project area.

The Natural Resources Conservation Service (NRCS) administers the Farmland Protection Policy Act of 1981 (FPPA), whose provisions protect agricultural lands from permanent conversion to other land uses by Federal programs and actions. Prime and Unique Farmlands are classified by NRCS according to soil type. Urban areas overlying these identified soil types are excluded from classification consideration by the NRCS. Therefore, there are no Prime and Unique Farmland soils in the project area, which require Federal FPPA compliance procedures.

Table 3.14 Potential Engineering Constraints of Soils Within the Project Study Area

MAPPING UNIT	SOIL SERIES	DRAINAGE CLASS	HAZARD OF EROSION IN DC	DEGREE OF EXCESSIVE SLOPE >15%	SHRINK/SWELL POTENTIAL	HAZARD OF FLOODING	DEPTH IN FEET TO GROUNDWATER	MONTHS WITH HIGH GROUND WATER	DEPTH IN FEET TO BEDROCK
GeB	Galestown-Urban land complex	Somewhat Excessively Drained	Moderate	No	Low	None	>6.0	n/a	>5

Sources: Smith, 1976. *Soil Survey of District of Columbia*. United States Department of Agriculture, Soil Conservation Service, Washington, DC. 194 pages plus plates.

Soil Survey Division, Natural Resources Conservation Service, United States Department of Agriculture. *Official Soil Series Descriptions* [Online WWW]. Available URL: "http://ortho.ftw.nrcs.usda.gov/osd/" [Accessed 29 Oct 2003].

No-Build Alternative

There are no impacts in the No-Build Alternative.

Alternative 4A

The physiography, topography, geology and soils present no constraints to the construction or implementation of the proposed extension. There is no cultivated farmland present in the study area so there are no potential impacts to prime farmland as a result of the project.

Alternative 5

Impacts for Alternative 5 would be the same as for Alternative 4A.

3.8.4 Water Resources

Water resources are defined as groundwater and surface water, such as aquifers, wetlands, streams, rivers, and ponds. These resources typically provide a potential supply of water for wildlife and plant habitat, human consumption and hygiene, industrial and agricultural productions, and recreation. Sources of pollution leading to degradation in overall water quality include sedimentation, organic wastes, industrial wastewater discharges, agricultural and urban runoff, and hazardous substance spills.

Surface Water

The entire study area and vicinity are developed and/or surrounded by paved surfaces, vacant open spaces, dwellings or businesses. There are no natural or man-made surface water bodies, streams, canals, drains, wetlands, floodplains, or special aquatic sites within the study area.

The entire project area is located within the Middle Potomac-Anacostia-Occoquan watershed that is United States Geological Survey (USGS) Hydrologic Unit Code (HUC) 02070010 and is part of the larger Potomac River Basin (U.S. EPA, 2003). Within the region, surface water resources may include oceans, rivers, lakes, streams, tributaries, estuaries, and impoundments.

Watts Branch, which flows generally northwest to the Anacostia River, is the only surface water body identified for evaluation in the study area (**Figure 3.14** - Water Resources). Both Watts Branch and the Anacostia River have existing sediment, water quality, and water quantity problems due to urbanization and inadequate stormwater management measures.

MINNESOTA AVE EXTENSION

WATER RESOURCES
FIGURE 3.14

Water Quality

Water quality is regulated under the Clean Water Act (CWA) of 1977, as amended (33 U.S.C. 1251-1376). The CWA safeguards the quality of water resources and mandates water pollution control measures. Section 303(d) of the CWA requires states to list impaired state water resources every other year. The quality of drinking water is regulated under the Safe Drinking Water Act (SDWA) of 1974 (42 U.S.C. 300(f), *et seq*.).

On September 11, 2002, the DC Department of Health submitted the water quality standards for surface water to the EPA for their review and approval in accordance with 40 CFR 131.6. On January 24, 2003, EPA approved revised provisions of the DC water quality standards for surface water. Watts Branch has both current uses and designated uses as Classes B, C, and D. The numeric criteria established to attain and maintain designated use classes for DC waters are published in Title 21, Section 1104.7, and include water quality standards for bacteriological, physical, and chemical constituents.

Generally, the water quality in the District remains impaired, and many water bodies, including Watts Branch, do not support designated uses for human activities, but some for aquatic life. These impairments are related to concentrations of toxics, pathogens, organic enrichment and low dissolved oxygen (DC Department of Health, 2003a).

Watts Branch, a highly urbanized subwatershed straddling the District of Columbia/Maryland border, is dominated by residential land use. The majority of the development throughout the subwatershed occurred prior to the enactment of stormwater management requirements. The upper portions of the subwatershed contain relatively low-density residential land use and small areas of undeveloped property.

The District's EPA Clean Water Act Section 303(d) list of impaired waters shows that Watts Branch does not meet water quality standards, primarily because excessive channel erosion has degraded aquatic habitat (DC Department of Health, 2003b).

Water quality in Watts Branch is monitored by USGS at sampling station 01645295) (see Figure 3.14). The stream is highly degraded, with major water quality concerns including high levels of fecal coliform, ortho-phosphorus, and ammonia nitrogen. Initiatives by the District government (DCRA-ERA) and the U.S. Natural Resource Conservation Service have included the installation of grade stabilization measures to help reduce the adverse impact of uncontrolled storm flows on the mainstem. Watts Branch specifically has been identified as in needed of intense restoration (DC Department of Health, 2003b).

Within the District portion of Watts Branch, rapid bioassessment results in 1989 found overall water quality rating as poor, and poor quality indicators for species richness, EPT indices, biotic index, and other variables that suggested environmental stressors, toxicity, and nutrient over-enrichment (Anacostia Watershed Network, 2003). More recent 1997 sampling found much the same conditions. The benthic macroinvertebrates structure in Watts Branch is dominated by toxics-tolerant chironomid midge larvae and organics-tolerant oligochaete worms (DC Department of Health, 2003c).

Groundwater

Groundwater is the supply of water that is stored beneath the land surface in porous soil or rock (Virginia Water Resources Research Center, 1999). Groundwater is stored in aquifers, as water-bearing layers of rock or sediment capable of yielding usable quantities of water. The project area lies entirely within the Northern Atlantic Coastal Plain (NACP) aquifer system (Millar, 1998).

The District of Columbia receives its drinking water supply from the Potomac River. Currently, the entire District, including the study area is served by public water supplies, with no reliance on groundwater for potable sources (DC Department of Health, 2003d). However, District regulations (Title 21, Section 1150.2) require that groundwater, wherever encountered in the District, must be protected for beneficial uses, including surface water recharge, drinking water in other jurisdictions, and potential future use as

raw drinking water source in the District. The standards for this protection is established in Title 21, Section 1155. Groundwater numerical criteria for all Class G1 groundwater in the District are set forth in Title 21, section 1155.3 through 1155-13 (DC Department of Health, 2003d).

Long-term land development activities have altered groundwater flow conditions in the study area. Historical development and infrastructure improvements have served to intercept and divert some groundwater resources through the use of sumps, collectors, and underground drainage networks. Persistent sources of groundwater contamination include storage and disposal of hazardous materials and leaking underground storage tanks. The District is presently providing oversight of groundwater remediation activities where necessary.

Shallow groundwater within the project area may vary from one to more than six feet in depth based on soil types, permeability, and site conditions. Perched, very low-yield, or local pockets of shallow groundwater could be anticipated in construction zones associated with implementation of any Build Alternative. Geotechnical studies undertaken in the design phase can determine the engineering properties of any soils affected by groundwater that could influence roadway and infrastructure design parameters.

Floodplains

A floodplain is a lowland area adjacent to lakes, streams, and rivers that is covered by water during a flood. The rapid rise in the water level inundates the flat, low-lying areas near the water body for extended periods of time. Besides the flat topography, flooding problems increase due to urban development. Urban development increases surface water runoff, leads to construction in channels (such as bridges) that may “back up” flood waters; and reduces the natural floodway due to construction of levees and channelization, particularly where no compensatory flood storage construction has occurred.

Floodplains often contain wetlands and other areas vital to a diverse and healthy ecosystem. The values and benefits of land located in floodplains include the provision of habitat for plants and animals, the maintenance of water quality and groundwater recharge, and the preservation of open and outdoor recreational spaces.

The Federal Emergency Management Agency (FEMA) delineates 100-year (Zone A) and 500-year (Zone B) floodplains on Flood Hazard Boundary Maps (FHBMs) and on Flood Insurance Rate Maps (FIRMs) as part of the National Flood Insurance Program (NFIP). NFIP maps were consulted to determine potential encroachments of the 100-year floodplain. The 100-year floodplain refers to the area along or adjacent to a stream or body of water that is capable of storing or conveying floodwaters during a 100-year frequency storm. The 500-year floodplain refers to the area capable of storing or conveying floodwaters during a 500-year frequency storm.

There is one 100-year floodplain associated with Watts Branch proper and is located in the southern portion of the study area (Figure 3.14). The base flood elevation of this area ranges from nearly 37 feet in the upstream portions of Watts Branch (located in the southeastern corner of the study area) to 27 feet in the downstream portion of Watts Branch along the existing alignment of Minnesota Avenue (located in the western part of the study area).

In addition, an area to the north of Watts Branch is mapped as Zone B, an area between the limits of the 100-year flood and the 500-year flood which may be subject to 100-year flooding with average depths of less than one foot, or which have a contributing drainage area less than one square mile, or which is protected by levees from the base flood.

Wetlands and Waters of the US

The U.S. Army Corps of Engineers (COE) administers regulations for activities affecting waters of the U.S. and navigable waters pursuant to Section 404 of the Clean Water Act of 1977, as amended, and Section 10 of the Rivers and Harbors Act of 1899. Waters of the U.S. are defined by EPA's 404 (b)(1)

guidelines as rivers, streams, ponds, and special aquatic sites, such as sanctuaries and refuges, wetlands, mud flats, vegetated shallows, coral reefs, and riffle and pool complexes. There are no navigable waters in the project area subject to jurisdiction under the Rivers and Harbors Act.

All waters of the U.S., including wetlands, within the natural resources study area were identified for the study area, using methods approved by the U. S. Army Corps of Engineers, Baltimore District (Environmental Laboratory, 1987, U. S. Department of the Army 1992). Preliminary information was gathered from digital U.S. Fish and Wildlife Service (FWS) National Wetland Inventory (NWI) maps, USDA and county soil maps and reports, aerial photography, and scaled digital/GIS planimetric and topographic maps. Field delineations to locate the boundaries of all waters of the United States identified in the study area generally were conducted subsequent to the synthesis of this information. The U. S. Fish and Wildlife Service (USFWS) system of aquatic habitat classification (Cowardin and others, 1979) was used for categorizing wetland and deepwater habitats, including regulated streams and palustrine and riverine wetland systems, within the study area. Within the region, riverine wetlands include all persistent wetlands and deepwater habitats contained within a defined channel. Typically, riverine wetlands are unvegetated, and thus are usually mapped for regulatory purposes as waters of the U.S.

According to NWI mapping for the natural resources study area (Figure 3.14), Watts Branch contains aquatic habitat that corresponds to excavated, permanently flooded open water, lower perennial riverine (R2OWZx) wetlands under the USFWS mapping conventions (USFWS, 2003). This designation was verified in the field on august 21, 2003. Due to the observed temporary nature and scarcity of aquatic vegetation present, the habitat within Watts Branch is considered waters of the United States for federal regulatory purposes.

No-Build Alternative

There are no impacts to water resources associated with the No-Build Alternative.

Alternative 4A

The proposed action does not involve any construction activities that would result in any impact to surface waters, water quality, groundwater, floodplains, or wetlands and waters of the US. Watts Branch is the closest stream or water resource and is located to the south of the proposed extension. During construction phase, standard provisions for erosion and sediment controls will be implemented. No wetland impacts are projected.

Alternative 5

Impacts for Alternative 5 would be the same as for Alternative 4A.

3.8.5 Terrestrial and Aquatic Wildlife and Habitat

Existing published documentation and federal resource agency data were reviewed for information on existing wildlife populations and their potentially affected habitats as well as for information about particular issues or concerns related to those wildlife populations and habitats. Terrestrial habitats encountered in the study area were characterized during field reconnaissance conducted in August 2003. The potential for particular wildlife species to utilize the fragmented and urbanized remnant natural habitats was determined based on habitat suitability patterns, special habitat requirements, historical range, territory/home range size, reproductive habits, foraging habits, agency database information, and scientific literature. Habitat discontinuity is the result of long-term urbanization effects, infrastructure improvements, and surrounding residential and commercial development in the Deanwood community.

The existing wildlife assemblage within the study area has a variable degree of dependence on existing land use, vegetation cover, and other biotic and abiotic life history requirements. This includes a combination of species typically found in natural habitats, and species those that are strongly adaptable to

disturbed and developed urban areas. A relatively low number of species use the remnant terrestrial and aquatic habitats in the developed areas within the study due to their small size, disturbed nature, unsuitable urbanized surroundings, lack of life history support characteristics, distance from large, less developed habitats, and the presence of numerous dispersal barriers. Estimates of wildlife populations suggest low population densities, primarily owing to the fragmentation, wholesale conversion to urban uses, patchiness and disturbed nature of habitats and the lack of contiguous habitat patches. There are only three (two terrestrial, one aquatic) general cover types available to wildlife in the study area. These are open land/vacant lot type, remnant riparian zone, and riverine bottom habitats.

Terrestrial Habitats and Biota

The open land/vacant lot type is prevalent in the study area. It develops on neglected, undeveloped land that is not maintained in an open condition and has become overgrown with grasses, weeds, brambles and small saplings/shrubs. Typical habitats in the study area have developed on abandoned homesites, back alleyways, vacant lots, fencerows, waste places, road waysides and railroad sidings.

This cover type is present in the vacant land along the proposed alignment. Specifically, open weedy ground exists in a linear strip, parallel to the railroad right-of- way, extending northeast from the intersection of Minnesota Avenue NE at Sheriff Road to the cul-de-sac at Meade Street.

Woody species observed within this cover type include sassafras (*Sassafras albidum*), princess tree *(Paulownia tomentosa*), white mulberry (*Morus rubra*), staghorn sumac (*Rhus typhina),* Chinese and Siberian elm *(Ulmus* spp.), bush honeysuckle (*Lonicera tatarica*), tree of heaven (*Ailanthus altissima*), multiflora rose (*Rosa multiflora*), Chinese privet (*Ligustrum sinense*), and occasional native trees and saplings including black locust (*Robinia pseudo-acacia*), black gum (*Nyssa sylvatica*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), green ash (*Fraxinus pennsylvanica*), American elm (*Ulmus americana*), and persimmon (*Diospyros virginiana*). Neglected areas are covered with herbs and vines including Japanese honeysuckle (*Lonicera japonica*), poison ivy (*Toxicodendron radicans*), trumpet creeper (*Campsis radicans*), virgin's bower (*Clematis terniflora*), porcelainberry (*Ampelopsis brevipedunuculata*), creeper (*Parthenocissus quinquefolia*), and blackberries (*Rubus* spp.). Grasses and weedy herbs (forbs) cover vacant lots throughout the study area. Commonly observed forbs include Bermuda grass (Cynodon dactylon), foxtail grass (*Setaria faberii*), knotweed (*Setaria geniculata*), evening primrose (*Oenothera biennis*), ragweed (*Ambrosia artemisiifolia*), and asters (*Aster* spp.), chiefly hairy aster (*Aster pilosus*), tall goldenrod (*Solidago* altissima), wild carrot (*Daucus carrota*), fleabane (*Erigeron canadensis),* and burdock (*Arctium minus*).

Open land/vacant lot habitat is notably more valuable to wildlife than forested cover in an urban environment because of the structure and amount of cover provided by tall grasses, herbs, weeds, and small sapling and shrubs. Rodent and bird populations are generally most abundant. Because lower trophic level food is abundant, predation is also normally higher in this habitat than in more stable communities (Watts and Paxton, 2000). It is generally recognized that small mammal populations are generally related to habitat availability variables, and that generalist species occupy disturbed areas more frequently and in higher numbers than habitat specialists (Pagels and others, 1992). The only effective small mammal predator in the study area's urbanized habitats is feral domestic cat (Mitchell and Beck, 1992).

However, site conditions in this area are not favorable for sizable populations of any wildlife, and are restricted to mostly transient forms that are very tolerant of human activities. Nesting and foraging are likely restricted only to tolerant forms. Wildlife that would be expected to utilize open land and vacant lots include white-footed mouse (*Peromyscus leucopus*), house mouse, meadow jumping mouse (*Zapus hudsonius*), rats, meadow vole (*Microtus pennsylvanicus*), gray squirrel, and eastern cottontail (*Sylvilagus floridanus*). Several mice, a rat and one squirrel were observed during field surveys. Other mammals that are could also utilize this habitat, but were not observed, are chipmunk (*Tamias sciurus*), raccoon

(*Procyon lotor*), and opossum. Birds that would be expected, or that were observed, include crow, pigeon, starling, mourning dove, mockingbird (*Mimus polyglottos*), catbird, robin (*Turdus migratorius*), house wren (*Troglodydes aedon*), house finch (*Carpodacus mexicanus*), blue jay, grackle (*Quiscalus quiscula*), white-throated sparrow (*Zonotrichia albicollis*), white-crowned sparrow (*Z. leuocophrys*), tree sparrow (*Spizella arborea*), and house sparrow (*Passer domesticus*).

There is also a possibility that a limited number of reptiles and amphibians could utilize the urban habitats within the study area. These might include black racer (*Coluber constrictor*), rat snake, toads, fence lizard (*Sceloporus undulatus*), and skinks.

Aquatic Habitat and Biota

Aquatic habitats within the project area are limited to Watts Branch, which are exclusively unvegetated to sparsely-vegetated perennial habitats within a confined stream channel. Typical aquatic biota observed in Watts Branch are small fish and macroinvertebrates, including insects (and their larval forms), worms, and crustaceans. Species diversity of fish in the upper portion of Watts Branch is low, and includes pollutant-tolerant fishes, blacknose dace (*Rhinichthys atratulus*) and mosquitofish (*Gambusia affinis*) (DC Department of Health, 2003b). Riverine habitat in Watts Branch nearest the Minnesota Avenue Bridge had substrates of cobble-rubble, cobble-gravel, and small pools of sand-silt. Most prominently, the bottom substrate was stone (portions of the stream were lined with concrete and paving stone). Herbs observed within the channel included smartweed (*Polygonum* spp.), three seeded mercury (*Acalypha graciliens*), rushes (*Juncus* spp.), and calico aster (*Aster lateriflorus*).

Regional wetlands provide habitats for many birds, including waterfowl, migratory songbirds, and a few shorebirds. Some species are more water dependent than others, and have higher relative population densities as a result of contiguous riparian forests (Robinson and Bolen, 1984). Some species may populate larger, more stable wetlands year round, while most use them seasonally for breeding, feeding, resting, or over-wintering. The riparian corridor along Watts Branch may provide cover for a variety of birds, reptiles, amphibians, fish, and mammals.

Bird species that forage and nest in wetlands of the region include red-winged blackbird (*Agelaius phoeniceus*), swamp sparrows, great blue heron (*Ardea herodias*), green heron (*Butorides virescens*), and little blue heron (*Egretta caerulea*), bitterns, mallard (*Anas platyrhynchos*), gulls, Canada goose (*Branta canadensis*), black duck (*Anas rubripes*), wood duck (*Aix sponsa*), and rails. No waterfowl were observed in the study area during field surveys. It is more likely that other terrestrial, less-wetland-dependent species utilize the Watts Branch area.

More stable wetland communities located along less urbanized waterways contain mature, living trees and standing dead trees that are suitable for cavity nesting bird species. These cavity trees are lacking in the study area along Watts Branch. Mammalian species that are commonly associated with urban aquatic settings in the project area include raccoon (*Procyon lotor*), opossum (*Didelphis virginiana*), striped skunk (*Mephitis mephitis*), eastern cottontail *(Sylvilagus floridanus*), and gray squirrel (*Sciurus carolinensis pennsylvanicus).* Reptiles and amphibians that might be present include garter snake, northern water snake, green frog, bullfrog, snapping turtle and toads. No other wildlife was observed within Watts Branch section of the study area.

Observations suggested that Watts Branch has degraded aquatic habitat conditions due to urbanization effects, turbidity, water chemistry fluctuations, and water column stressors (*i.e*., pollutant loading, flashy event flow and thermal loading).

A remnant riparian forest community is present along the Watts Branch corridor in the study area. A soil moisture level typical of rarely flooded bottomland habitats characterizes this floodplain area. The scrubby forested strips within the Watts Branch Park section of the study area have well-drained, friable silty soils. Frequent disturbances in the riparian community results in greater species diversity due to

flooding effects including deposition, erosion, and seed/propagule dispersal mechanisms. This high-energy environment also gives rise to conditions favorable for invasive species colonization.

Invasive Species

In accordance with Executive Order 13112, federal agencies are required to evaluate their actions to ensure that they prevent the introduction of invasive plants and provide for their control and to minimize the economic, ecological, and human health impacts that invasive plants cause. As the majority of the study area is developed with road and utility infrastructure, dwellings, businesses, and vacant land, the possibility of creating or supporting conditions that favor the introduction and spread of invasive plant species is not present. To address this, the results from the plant surveys were reviewed to ascertain if any invasive plants were present within the project area. While there is no officially-designated invasive plant list for the District of Columbia, initial listings from Maryland's Department of Natural Resources were used to make this determination (personal communication Ira Palmer, Program Manager, Fisheries and Wildlife Division, DC Department of Health, 9/3/04).

Table 3.15 lists invasive plant species that have been observed or have the potential of becoming established in the project area, if anticipated construction activities do not actively implement controls. All of the species in Table 3.15 have been observed or are expected to occur within a one-mile radius of the project area. Species listed as having high invasiveness may disrupt ecosystem processes and cause major alterations in plant community composition and structure. Highly invasive species establish readily in natural systems, spread rapidly, and generally require aggressive control management. Species with moderate invasiveness, while having a more minor influence on composition and structure, generally require landscape disturbance to get established and spread. Depending on life history and colony size, management of colonies may be required where they are found. Species with low invasiveness generally do not seriously affect ecosystem processes, but can, where established, out compete native species, and spread slower. These species need management occasionally to manage colony size and spread (VDCR, 2003).

Table 3.15 INVASIVE PLANT SPECIES OBSERVED OR WITH POTENTIAL TO OCCUR WITHIN THE PROJECT AREA

COMMON NAME	SCIENTIFIC NAME	PLANT TYPE	INVASIVENESS
Tree-of-heaven	*Ailanthus altissima*	Tree	High
Porcelain-berry	*Ampelopsis brevipedunculata*	Vine	High
Oriental bittersweet	*Celastrus orbiculatus*	Vine	High
Chinese privet	*Ligustrum sinense*	Shrub	High
English ivy	*Hedera helix*	Herb	High
Japanese knotweed	*Polygonum cuspidatum*	Herb	High
Mile-a-minute	*Polygonum perfoliatum*	Herb	High
Kudzu	*Pueraria lobata*	Vine	High
White bush clover	*Melilotus alba*	Herb	High
Yellow bush clover	*Meliotus officinalis*	Herb	High
Bush honeysuckle	*Lonicera maackii*	Shrub	Medium
Amur honeysuckle	*Lonicera tatarica*	Shrub	Medium
Chinese elm	*Ulmus parviflora*	Tree	Moderate
Mugwort	*Artemisia vulgaris*	Herb	Moderate
Princess tree	*Paulownia tomentosa*	Tree	Moderate
Chinese wisteria	*Wisteria sinensis*	Vine	Moderate
White mulberry	*Morus alba*	Tree	Low
Sawtooth oak	*Quercus acutissima*	Tree	Low
Mimosa	*Albizia julibrissin*	Tree	Low
Siberian elm	*Ulmus pumila*	Shrub	Low

Source: Adapted from MDNR Website at: http://www.dnr.state.md.us/wildlifeplists.html

While DDOT is not directly responsible for the encroachment of these plants into the project area, DDOT is responsible for discouraging their introduction and spread, particularly following new construction projects.

Threatened and Endangered Species

The entire project area and vicinity are developed and/or surrounded by transportation corridors, power, utility and drainage infrastructure, and other urban land. There are few, small highly disturbed remnant areas in the study area that could potentially serve as habitat for any listed rare, threatened, or endangered species. However, the potential for the presence or use of disturbed areas in the study area by protected species is very remote.

There are no known occurrences of threatened or endangered species or their critical habitat in the project area. No threatened or endangered species were observed during field investigations conducted August 21-23, 2003. Consultation with federal and state agencies pursuant to Section 7 of the Endangered Species Act of 1973, as amended, has been completed with respect to the presence of rare, threatened, and endangered plant and animal species within the project area. Agencies consulted included the U.S. Fish and Wildlife Service (USFWS), National Marine Fisheries Service (NMFS), and the D.C. Department of the Environment (DCDE).

Habitat of potentially threatened and endangered animal and plant species is lacking within the entire project area. Therefore, these resources are not a regulatory or management issue impeding implementation of either Build Alternative.

Natural Areas

The entire study area is developed and/or surrounded by roads, railroads, buildings and other urban land. There are no federal wildlife sanctuaries, refuges or management areas in the study area. However, there are local DC parks and open space that function as parkland/natural area in

Based on file research and field verification, there is only one property in the study area that is considered a remnant natural area. The northwestern edge of Watts Branch Park is located in a triangular parcel bounded by Minnesota Avenue on the west, Nannie Helen Burroughs Avenue on the north, Hunt Place on the south and the corporate grounds of National Distributing Company on the east. The property at this location has mostly open lawn area, with walkways and benches present. Watts Branch, a tributary of Anacostia River, flows though the parcel. A wooded riparian buffer exists along both banks of this stream, and the floodplain area serves as a community natural area. Minnesota Avenue is bridged over Watts Branch. Additionally, ornamental plantings of sawtooth oak are present along the road frontage of this park area along Burroughs Avenue, at its intersection with Minnesota Avenue.

No national wildlife refuges (NWRs) or wildlife management areas occur within or adjacent to the project study area. The closest NWR is Potomac River NWR Complex, located 18 miles south of the District on the Mason Neck Peninsula in Virginia.

No-Build Alternative

There would be no impacts to terrestrial and aquatic wildlife or to their critical habitats due to the No-Build Alternative.

Alternative 4A

Terrestrial and aquatic wildlife habitats are limited to those associated with vacant lots and urban open lands and are of scrub / shrub variety. Although several species may be present within the construction area proposed for Alternative 4A, none of the species associated with these habitats are rare, threatened or endangered. The proposed extension would have no effect on aquatic habitats. Thus, there are no

impacts to federally listed or proposed endangered species or critical habitat. The proposed project is not likely to introduce or spread any invasive species either.

Alternative 5

Impacts for Alternative 5 would be the same as for Alternative 4A.

3.9 PARKLANDS, RECREATION RESOURCES AND SECTION 4(F)

Under the Department of Transportation Act of 1966 (23 CFR 771.135; 49 USC 303), the use of land from a significant publicly owned park, recreation area, or wildlife and waterfowl refuge, or from any significant historic site, for a DOT funded or approved project is permissible only if no prudent and feasible alternative exists. If Section 4(f) land must be used, DOT must document that all possible planning has been done to minimize harm to the property resulting from the use.

A Section 4(f) evaluation would also be initiated if the DCHPO determines that there is an adverse effect to any historic site, including those that may be discovered or affected during the demolition or construction phase of the project. If archaeological resources are discovered during construction, the contractor shall cease construction immediately at the site to allow for appropriate investigation and evaluation. Any data recovery operations will be accomplished in conformance with the National Historic Preservation Act, the Archaeological and Historical Preservation Act, applicable portions of 36 CFR 60-66 and 800, and the *Secretary of the Interior's Standards and Guidelines for Archeology and Historic Preservation*. All cultural materials and records associated with the data recovery will be collected and curated in accordance with the requirements set forth in 36 CFR 79. The archaeologists assigned to perform the work will meet or exceed the qualifications described in the Secretary of Interior's Professional Qualification Standards.

One Section 4(f) park has been identified within the study area. This park is a public playground, located northwest of the Ronald Brown Middle School at 48th and Meade Streets, is situated along Minnesota Avenue just south of Quarles Street. The playground has a public pool and extensive open space. While this public playground is considered a 4(f) property, it is sufficiently far enough from project alignments so that project impacts are not anticipated. No wildlife refuges are identified within the immediate project area.

Due to some of the historic development trends in this area of Washington, DC there is a potential that archaeological resources related to prehistoric occupations, historic archaeological farmsteads, residences and railroad activity, and historic architectural resources associated with the Deanwood area could be discovered during the construction phase that are not currently identified as on or eligible for the NRHP. Further study and evaluation, in coordination with the assessment and evaluation required under Section 106, would need to be conducted if undocumented and undiscovered resources are found. The 1987 survey discussed in Section 3.5 identified several potential historic resources within the study area, but an assessment and evaluation of NRHP eligibility was not conducted at that time. The possibility of impacts, including demolition, to resources along the project corridor would require the gathering of further information and the determination of eligibility for historic resources that could be impacted.

No-Build Alternative

No impacts to parkland or Section 4(f) resources would occur under the No-Build Alternative.

Alternative 4A

No impacts to parkland including Section 4(f) parks would occur under Alternative 4A. Alternative 4A would also have no impact on known Section 4(f) historic sites (sites on or eligible for the National Register of Historic Places).

Alternative 5

No impacts to parkland including Section 4(f) parks would occur under Alternative 5. Alternative 4A would also have no impact on known Section 4(f) historic sites (sites on or eligible for the National Register of Historic Places).

3.10 VISUAL AND AESTHETIC RESOURCES

Historically, the majority of the project area was not developed until the late 19th century. Prior to that, sporadic farm building complexes scattered across the landscape were located nearby. The establishment of the Baltimore and Potomac Railroad in the 1870s was the first major development in the project area and would have visually separated the area west of the tracks along Kenilworth Avenue from the study area. Since that time, small residential subdivisions have been built within the study area, which are now referred to as the Deanwood Community. Since the early 1900s, historical insurance maps have shown the proposed Minnesota Avenue extension, although the majority of the road within the study area was never built to that configuration. Other secondary roads and streets have been built in segments of the historic location where Minnesota Avenue was not built, therefore limiting the potential development of the footprint.

The viewshed along the length of the project area is defined by the rail lines to the northwest and the Deanwood neighborhood to the southeast. The rail lines, which are located at and above grade, provide a man-made barrier between the Deanwood neighborhood and Minnesota Avenue, from Kenilworth Avenue and the neighborhoods to the northwest. The viewshed of the project area beyond Minnesota Avenue is limited due to the expansive residential and commercial development at the southeast side of the project area.

No-Build Alternative

No visual or aesthetic resource impacts would occur under the No-Build Alternative.

Alternative 4A

Many of the residences that are in close proximity to the proposed extension would experience visual impacts due to the construction and physical presence of the roadway in a location that is currently undeveloped, vacant land. The proposed extension of Minnesota Avenue would have minimal visual impact within the study area. There are twenty homes within 100 feet of the proposed extension. However, due to the poor visual condition that currently exists within the proposed area considered for the extension and the visual presence of the rail corridor already within the sight lines proposed for Minnesota Avenue, these homes are expected to have minimal visual change. Most of the homes that will experience a change in visual character would not directly face the proposed extension, as it is located behind the homes. The proposed extension does include right-of-way for treespace that could be used to mitigate any visual impacts.

Alternative 5

As with Alternative 4A, Alternative 5 could have a minimal impact on the visual and aesthetic environment within the study area. Since Alternative 5 is shifted slightly to the north of the location of Alternative 4A, it would be located at a greater distance from residential areas. Many of the residences that are in close proximity to the proposed extension would experience visual impacts due to the construction and physical presence of the roadway in a location that is currently undeveloped, vacant land. Therefore the proposed extension of Minnesota Avenue would have minimal visual impact within the study area. There are twenty homes within 100 feet of the proposed extension. However, due to the poor visual condition that currently exists within the proposed area considered for the extension and the visual presence of the rail corridor already within the sight lines proposed for Minnesota Avenue, these homes are expected to have minimal visual change. Most of the homes that will experience a change in visual character would not directly face

the proposed extension, as it is located behind the homes. The proposed extension does include right-of-way for treespace that could be used to mitigate any visual impacts.

3.11 HAZARDOUS MATERIALS

During early planning of federal actions, or other actions utilizing federal funding or permits, the location of permitted and non-regulated hazardous waste sites are determined using a combination of reasonably ascertainable records, agency coordination, field reconnaissance and interviews to aid in identifying known or potential hazardous waste sites. If known or potential waste sites are identified using these methods, the locations are clearly marked on a map showing their relationship to the alternatives under consideration. If a known or potential hazardous waste site is affected by any build alternative, information about the site, the potential involvement, impacts and public health concerns of the affected alternative(s), and the proposed mitigation measures to eliminate or minimize impacts or public health concerns are presented.

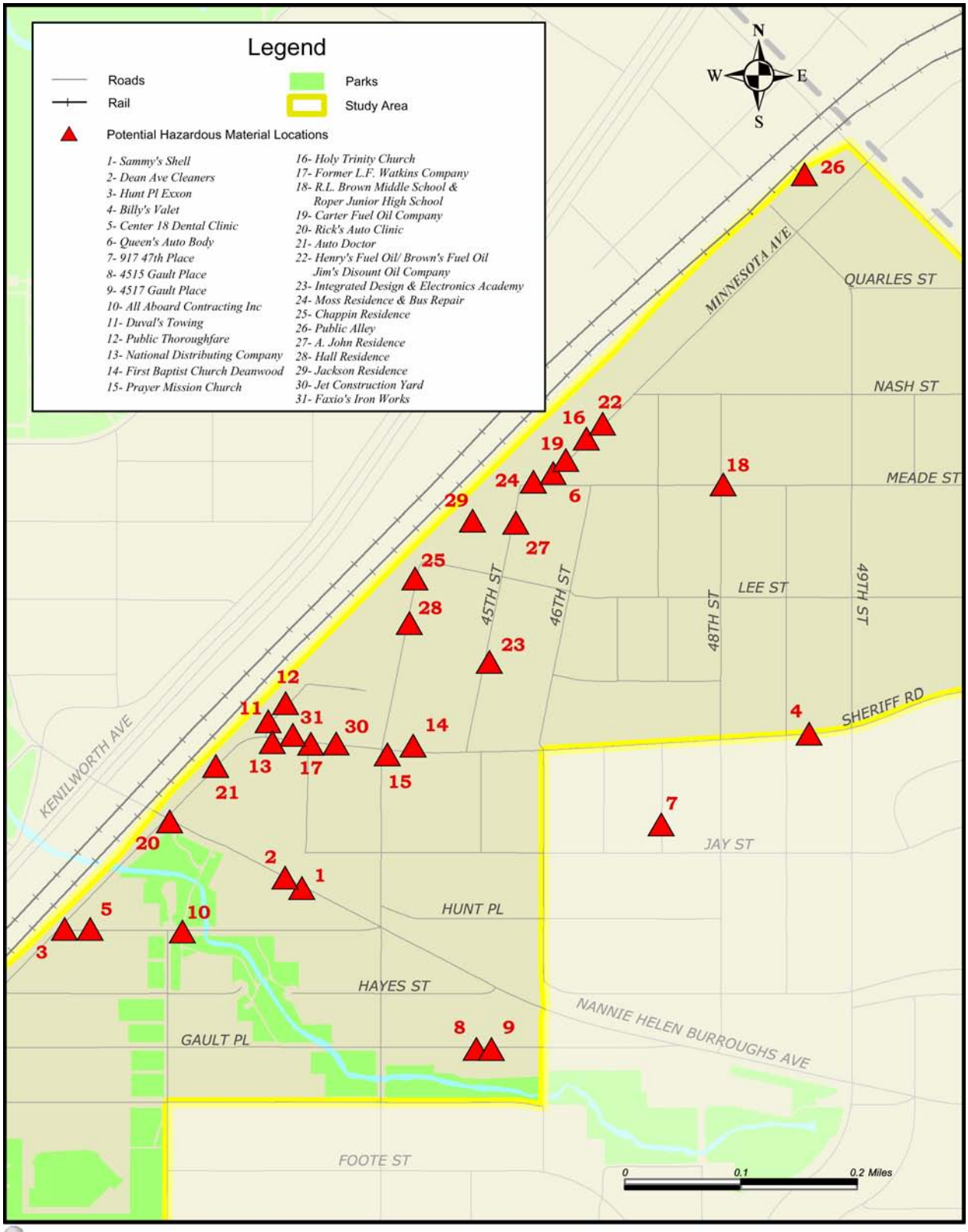
The FHWA Technical Advisory 6640.8A recommends a review of potential hazardous materials in the vicinity of the project area to assess potential impacts from construction activities resulting from a federal action that includes acquisition of additional right of way to implement Build Alternatives.

The Resource Conservation and Recovery Act (RCRA) and the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) regulate hazardous waste sites under federal laws. The Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERLCA), also known as Superfund, was created to provide the authority and a source of funding for cleaning up hazardous substances released into the environment.

A Phase I Environmental Site Assessment (ESA) is a written report used to identify and analyze the potential environmental risks and liabilities associated with a real estate transaction. It has two basic components: a site inspection, and a historical records search and public agency file review. A Phase II ESA is generally required if the results of the Phase I indicate the possible presence of contaminated substance(s), or the need for additional information. The purpose of the Phase II is to confirm the presence of contamination, determine its type(s), outline the amount of remedial actions required and list any risks to current/future users. They will also identify how much the remediation can cost and how long it may take to complete. During preliminary design, it may be desirable to conduct an ESA prior to acquisition of new right-of-way or any title transfer action. A thorough ESA (Phase I and/or II, as applicable) would be required to quantify the contamination potential or degree of potential risk to public health resulting from known, or suspected oil or hazardous material (OHM), and/or toxic substances documented within the study area. An OHM source refers to a site or incident where there is a documented or suspected potential source of contamination from oil and hazardous materials. Others, as appropriate, will complete an ESA during the design or construction phases of the project.

The methods for this study combined records searches and limited field investigations and interviews with persons encountered during surveys. Federal, state and local agency database information received from Environmental Data Resources, Inc. (EDR), a commercial environmental risk management contractor, was reviewed to determine locations in the general study area where hazardous materials-related activities were reported. Later in the process, a smaller hazardous materials study area was determined, using EDR *Report* data and other research to refine the area where impairment of the environmental quality of the Candidate Build Alternatives and adjacent properties subject to right-of-way acquisition could be compromised.

After matching accurate municipal address information with the sites identified using the database search information, a hazardous materials study area was established to delineate anticipated construction zones associated with the candidate build alternatives (**Figure 3-15**). Thereafter, limited field investigations were conducted within the established hazardous materials study area to identify any OHM sources included in the database search reports. Additional personal interviews with property



MINNESOTA AVE EXTENSION

POTENTIAL HAZARDOUS MATERIAL LOCATIONS
FIGURE 3.15

managers/tenants/owners who were encountered during field surveys were conducted to help determine property conditions, with emphasis on hazardous materials and observed releases of OHM in visually accessible areas to identify any additional OHM sources not reported in the EDR *Report.* Sites identified using these combined methods that could potentially represent a threat to public health are individually mapped within the project's hazardous materials study area (Figure 3.15), and are described in Appendix A.

3.11.1 Records Search Results

A total of 378 hazardous materials related records/incidents were identified within the study area by EDR's search of reasonably ascertainable government records (Appendix A). Of these records, 251 are identified as sites that have potential for possible project area contamination. Based on records analysis of these 251 sites/incidents, there are only 15 sites mapped within 0.25-mile radius of the target property (see Appendix A, Detail Map) with potential of possible project area contamination. These mapped sites represent the highest priority as reported potential contamination sources per applicable ASTM E 1527-00 standards for the project area. Additional research, field reconnaissance/verification and mapping analyses determined there are a total of 31 identified OHM sources within the project's hazardous materials study area.

Eight other miscellaneous sites, representing additional potential environmental risk sources, were identified via website research and/or field methods, but are not considered significant OHM sources based on their transient nature and ability to be eliminated using proper disposal methods. The findings for OHM sources within the project's hazardous materials study area are summarized in Appendix A.

3.11.2 Impacts

The project's hazardous materials study area contains 31 OHM sources. All detailed data for each OHM source is found in Appendix A. Each of these sites is mapped in Appendix A – Detail Map.

Of these 31 OHM sources, only 5 are located within the footprints of Build Alternatives. Alternative 4A has a larger number of OHM sources (5), while Alternative 5 has (4) OHM sources. Details regarding the OHM sources within the project footprints are provided below.

Good Success Christian Church/Duval's Towing - 4300 Minnesota Avenue

This area was formerly utilized by Duval's (or Duvall's) Towing as an auto storage and salvage lot (Figure 3.15, Site 11, labeled Duval's Towing), whose corporate physical address was 4300 Minnesota Avenue NE. Based on Appendix A and ECHO database research, Duval's Towing appears in the FINDS, PCS and NPDES federal databases, so there exists a reasonable suspicion that OHM products were stored, disposed and used at this location. The former owner, was cited in July 1999 for lack of required stormwater (NPDES) permit to discharge lot runoff (oil/grease-laden waste waters) into DC's stormwater system. Compliance reporting for the site continued through August 1, 2000.

There is a reasonable possibility that the site has, or may have had, an undocumented UST or AST somewhere on the parcel now owned by the Good Success Christian Church. Older, well-established auto repair and/or salvage operations frequently maintained unlined, metallic USTs for the storage of waste oil, solvents and other OHM products used in routine operations at their establishments, prior to enactment of modern storage tank regulations. Further detailed investigation would be required to ascertain whether undocumented USTs remain on this property.

Debris and Stump Dump, Public Thoroughfare - 4300 Block Minnesota Avenue, Between Nannie H. Burroughs Avenue NE and Minnesota Avenue

Several small debris accumulations were identified adjacent to and approximately 300 feet southwest of the Good Success Christian Church property along (Figure 3.15, Site 12). Piles contained woody debris, larger stumps, broken glass, oily textiles, white goods (washing machine, refrigerator), discarded lumber

and building demolition materials, Containers with residue OHM materials were also found in the solid waste piles including household cleaners, solvents, household, industrial and automotive OHM containers such as motor oil, lubricants, hydraulic oil, auto batteries, and abandoned compressed gas cylinders. Additionally, there is evidence of former structures (razed concrete slab foundations) along this vacant section of Minnesota Avenue. This elevates the possibility for undocumented USTs to be present. Although believed to be minor in extent, further investigation would be required at this location to quantify the observed OHM contamination at this site.

Moss Residence and Bus Repair Facility - 4600 Minnesota Avenue

This property, controlled by A. L. Moss and family, occupies two parcels (Figure 3.15, Site 24). One parcel is a residence/office, and another occupies the fenced lot located at the intersection of 45th and Meade Streets NE. At this location, commercial buses and other vehicles are repaired, maintained and refurbished. During surveys, numerous small (less than five square feet) and some larger (over five square feet) staining of recently released OHM (motor oil/brake fluid) were observed. Other OHM stains were observed on the Moss Property within the secured fenced area. Based on the nature of the business conducted on the site, there is also a potential for undocumented ASTs and USTs. Although believed to be potentially minor, additional field and file investigation and ESA would be necessary to determine the risk

Chappin Residence Garage - 44th & Lee Streets, 1070 44th Street

This fenced residential property, located at 44th and Lee Streets, has a number of inoperative automobiles, and serves as a backyard repair area (Figure 3.15, Site 25). Overt evidence of OHM dumping (possibly used/waste motor oil, oily rags, and oily parts) was observed on the outdoor repair area, in the street and in a municipal storm sewer on Lee Street near the residence on August 21, 2003. Although believed to be relatively minor, additional site investigation would be necessary to determine the risk potential to a portion of the project area resulting from any long-term dumping of OHM at this location.

Minnesota Avenue Public Right of Way

At this location, at least five abandoned/inoperative vehicles, two boats, and other automotive-related debris were observed in the Minnesota Avenue dead-end and on the residential parcel owned by Clarence Jackson. Evidence of automotive repair and maintenance activity was observed in publicly accessible areas (Figure 3.15, Site 29). Additionally, small (less than three square feet) releases of OHM and discarded OHM containers were observed in debris piles and vegetated brambles on lot edges and fencerows. Although believed to be minor in extent, further investigation would be required at this location to quantify the OHM contamination at this site.

Additional research, file inspections, and the completion of an ESA would be required to better define the threats and environmental risks associated with OHM sources identified within the Build Alternative rights-of-way, or future construction zones, and/or associated staging/storage areas.

No-Build Alternative

There would be no impacts to hazardous materials under the No-Build Alternative.

Alternative 4A

Alternative 4A would potentially impact the following properties with current or former hazardous materials producers, spill locations or subsurface contamination:

- Good Success Christian Church Property (Former site of Duval's Towing) – 4300 Minnesota Avenue
- Debris and Stump Dump – 4300 Minnesota Avenue

- Moss Residence and Bus Repair – 4600 Minnesota Avenue
- Chappin Residence – 1077 44th Street
- Minnesota Avenue Public Right of Way

Alternative 5

Alternative 5 would potentially impact the following properties with current or former hazardous materials producers, spill locations or subsurface contamination:

- Good Success Christian Church Property (Former site of Duval's Towing) – 4300 Minnesota Avenue
- Debris and Stump Dump – 4300 Minnesota Avenue
- Chappin Residence – 1077 44th Street
- Minnesota Avenue Public Right of Way

3.11.3 Mitigation

No subsurface testing for contaminated soils has been conducted in association with this assessment. A visual examination of the property cannot be expected to reveal all hazardous materials or situations that may be present on-site; some hazardous materials or conditions may exist and not be detected in the absence of subsurface testing. A phase 1 investigation for contaminated materials is recommended prior to construction due to the previous use of land in the study area as a dumping site and for industrial uses. If contaminated soils are identified during construction activities mitigation measures will be instituted to comply with federal, State, and local regulations. Both alternatives have potential OHM facilities and involve direct takings of land used for dumping and/or automotive repair facilities (for the sites along Minnesota Avenue and the Chappin Residence). However, only the site at 4300 Minnesota Avenue appears on federal databases and has since been cleaned of the automotive repair facilities. Alternative 4A has a minimal interaction with the bus repair facility at 4600 Minnesota Avenue, requiring only partial acquisition at the edge of the property, so minimal interaction with the main area with potential OHM deposits exists. For the other properties, the potential for OHM sites is considered minimal, since they represent informal, small scale dumping sites and/or automotive repair sites and not more complex hazardous material waste sites that would require extensive clean-up. As currently identified, these small-scale operations that have potential for OHM sites may involve some limited abatement, but not abatement to the level that would interfere with the construction of either alternative.

3.12 CONSTRUCTION IMPACTS

No-Build Alternative

Because there would be no change to existing Minnesota Avenue under the No-Build Alternative, there would be no construction impacts as the result of this alternative.

Alternatives 4A and 5

There would be no difference in construction impacts as the result of the two build alternatives. Therefore construction impacts for both alternatives are discussed in this section.

Air Quality

Alternatives 4A and 5 would cause short-term air-quality impacts, primarily from fugitive dust generated during demolition and construction operations. These short-term impacts are expected to be minimal.

To mitigate potential air-quality impacts, construction contractors would be directed to utilize common dust-suppression measures:

- Where possible, water would be used to control dust generated by demolition activities, construction activities, or grading of roads.
- Asphalt, oil, water, or suitable chemicals would be applied to dirt roads, materials stockpiles, and other surfaces that may create airborne dust. Paved roadways should be maintained in a clean condition.
- Hoods, fans, and fabric filters would be installed to enclose and vent the handling of dusty materials.
- Adequate containment methods should be employed during sandblasting or other similar operations.
- Soils exposed for more than short periods would be seeded with fast-growing grasses.

Noise

While noise levels could increase substantially for short periods during construction, the impacts are expected to be short-term and concentrated near the area under construction. Impacts on ambient noise levels would include noise from demolition and construction equipment operating at the site as well as from construction or delivery vehicles traveling to and from the site. Noise impacts would vary widely depending on the construction phase (demolition, land clearing and excavation, foundation and capping, construction of new building walls, etc.), the specific task being undertaken, and distance from the activity.

It is not yet known what type of equipment would be used during development of the site. Normally involved are bulldozers and jack hammers during demolition; bulldozers, scrapers, backhoes, and trucks during excavation and grading; backhoes during utility construction; and pile drivers, concrete mixers and pumps, saws, hammers, cranes, and forklifts during construction. Based on typical noise levels generated by such equipment (ranging from 76 to 101 dBA at 15 meters from the equipment), noise-sensitive land uses, such as residences near the construction site, could experience high noise levels.

To mitigate potential major construction-noise impacts, construction activities would comply with District regulations. Standard construction-noise specifications, which require the contractor to make every reasonable effort to minimize noise through abatement measures, would be incorporated in the development of construction plans. Abatement measures could include:

- Equipping all construction equipment powered with internal combustion engines with properly-maintained mufflers.
- Ensuring that air compressors meet current U.S. EPA noise-emission standards.
- Using new construction equipment as much as possible, since it is generally quieter than older equipment.
- Minimizing potential nighttime construction activities.

Aesthetics and Viewsheds

Aesthetics and viewsheds would be temporarily affected by the visibility of construction activity and materials, such as fencing, detour signs, and construction equipment.

Community Facilities

Construction during Alternatives 4A and 5 might lead to short-term, negative impacts by increasing response times for fire, EMS, and police services as a result of traffic detours and construction-related delays. Careful planning for maintenance of traffic flow during construction would minimize disruptions and largely mitigate these potential negative effects on emergency services.

Transportation

Any construction impacts to traffic and transportation systems are anticipated to be short-term in duration. Analysis of potential impacts is not possible at this time due to the lack of information regarding construction staging and phasing. Impacts will be minimized however through the use of best management practices and maintenance and protection of traffic.

3.13 ENVIRONMENTAL JUSTICE IMPACTS

Minority and low-income groups are often located in areas already experiencing the effects of multiple development projects resulting in social and/or environmental degradation. These areas are likely to be adversely affected by existing industrial, commercial or transportation facilities, and populations in these areas are often not politically organized sufficiently to prevent further adverse development. Typically project impacts could affect areas that are vulnerable due to these factors and impacts that occur in these areas are likely to be considered more severe than the same impacts that would occur in areas not already subject to these conditions.

According to DOT Order 5680.1, a disproportionately high and adverse effect on minority and low-income population is an adverse effect that "(1) is predominately borne by a minority and/or a low-income population, or (2) will be suffered by the minority population and/or low-income population and is appreciably more severe or greater in magnitude than the adverse effect that will be suffered by the non-minority population and/or non-low-income population."

No-Build Alternative

No construction activities would occur under the No-Build Alternative and therefore no impacts would occur under the No-Build Alternative.

Alternative 4A and 5

All environmental impacts identified in Sections 3.1 through 3.12 would be predominantly borne by minority populations (there are no Block Groups that meet poverty thresholds). Because there are no study area populations that are non-minority however, these impacts cannot be characterized as more severe or greater in magnitude than impacts to non-minority and/or low-income populations.

Mitigation

The U.S. Environmental Protection Agency (EPA) guidance suggests a range of mitigation measures for disproportionate impacts to minority and/or low-income communities. Among the mitigation measures suggested under EPA guidance that are most appropriate for highway alignments are:

- Providing assistance to an affected community to ensure that it receives its fair share (i.e., proportional) of anticipated benefits of the proposed action (e.g., job training, construction contracts, and infrastructure improvements).
- Relocating affected residents, upon request or with concurrence from the affected individuals.

- Establishment of a community oversight committee to monitor progress and identify potential community concerns.

According to Council on Environmental Quality (CEQ) guidance, "Throughout the process of public participation, agencies should elicit views of the affected populations on measures to mitigate a disproportionately high and adverse human health or environmental effect….and should carefully consider community views in developing and implementing mitigation strategies." An extensive public involvement program has been developed for this project. This program includes outreach efforts to Environmental Justice (EJ) communities in the affected environment.

Public/Community outreach is a critical element in the assessment of EJ impacts. It is a proactive process that seeks out-of-the-ordinary non-traditional stakeholders. A well-developed public involvement program as well as DDOT outreach community groups on an on-going basis serves as mechanism for mitigation of environmental justice impacts. For this Environmental Assessment, several mechanisms were used to develop alternatives with the support of the local community. Two public workshops were held in the community to discuss the project as well as individual meetings with the Marshall Heights Community Development Organization, local ANC members, and stakeholders in the study area. A mailing list was developed for the project that included over 350 residents and stakeholders. The first public workshop was used to develop the scope of alternatives to be considered and to solicit concerns from the local community. Twenty-seven citizens attended the kick-off meeting. A second meeting was held to present the preliminary concepts and nineteen citizens attended. At this meeting the community provided input into the alternatives and identified community priorities to be used in screening the concepts. As a result of the second meeting, the alternatives were revised to minimize any impacts to commercial properties and to be located along the alignment traditionally supported by the local community. In this manner, the public involvement process was used to design alternatives that reflected the input of the local community.

4

AGENCY COORDINATION AND PUBLIC INVOLVEMENT

4.1 AGENCY COORDINATION

In the process of preparing this draft environmental assessment, Federal and local agencies were contacted to inform them about the proposed extension, identify issues of concern, and obtain information about environmental resources within the project study area. Coordination with the agencies listed in **Table 4.1** was initiated in September 2003. Each agency received a scoping letter introducing the project, listing the specific project elements proposed to be included in the extension, and requesting that they identify any concerns. A map of the study area was enclosed with each letter. Agencies and organizations listed in Table 4.1 will also be provided the opportunity to review and comment on the Environmental Assessment, which is the primary point of coordination with the agencies.

This early notification and coordination provided the opportunity for timely identification, evaluation, and resolution of environmental and regulatory issues. None of the federal or local agencies contacted submitted a formal response to the scoping letter. Additional coordination was conducted with several agencies, including WMATA, the DCHPO, Marshall Heights Community Development Organization Inc. (MCHDO), ANC 7, and CSX Transportation, Inc. WMATA was contacted to discuss transit operations in the study area and provided feedback on the potential for routing bus service more directly on the proposed extension between the Minnesota Avenue and Deanwood Stations. The DCHPO was sent scoping information to initiate the Section 106 process, including identification of the Area of Potential Effect (APE) and they also were provided an early internal draft copy of the EA. Several presentations have been made to the local community, including representatives of ANC 7 and the MCHDO. Local meetings include the following:

- Far N.E. and S.E. Council Meeting in October 2003
- Advisory Neighborhood Commission, (ANC) 7D in November 2003
- Deanwood Citizens Association in November 2003
- ANC 7C in February 2004
- Minnesota Avenue, N.E. Benning Road, N.E. Government Center Community Meeting in June 2004
- Fort Dupont Park Citizens Association Meeting in December 2004
- ANC 7C in February 2005
- Councilmember Vincent Gray's Ward 7 Leadership Meeting in April 2006
- ANC 7C in October 2006
- Councilmember Vincent Gray's Ward 7 Leadership Meeting in October 2006, and
- ANC 7D in November 2006

Table 4.1 AGENCIES AND OFFICIALS CONTACTED DURING AGENCY COORDINATION

FEDERAL AGENCIES	**DISTRICT OF COLUMBIA AGENCIES**
Advisory Council on Historic Preservation	District of Columbia Department of Health
Commission of Fine Arts	Environmental Health Administration
U.S. Army Corps of Engineers, Baltimore Regulatory Branch	District of Columbia Department of Consumer and Regulatory Affairs
U.S. Department of Agriculture	District of Columbia Department of Housing and Community Development
- Natural Resources Conservation Service	District of Columbia Department of Recreation and Parks
U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Marine Fisheries Service	District of Columbia Office of Planning
Northeast Region	District of Columbia Water and Sewer Authority
U.S. Department of Housing and Urban Development, Acting Field Office Director	District of Columbia Office of Historic Preservation
U.S. Department of Interior	
- Fish and Wildlife Service, Northeast Region	**OTHER INTERESTED PARTIES**
- National Park Service, National Capital Region	Marshall Heights Community Development Organization, Inc.
- Office of Environmental Compliance and Policy	National Trust for Historic Preservation
U.S. Department of Transportation	Sierra Club
- Coast Guard, Fifth District	Advisory Neighborhood Commission 7A
U.S. Federal Emergency Management Administration	Advisory Neighborhood Commission 7B
	Advisory Neighborhood Commission 7C
REGIONAL AGENCIES	Advisory Neighborhood Commission 7D
Metropolitan Washington Council of Governments	Fort Dupont Civic Association
National Capital Planning Commission	Benning Ridge Civic Association
Northern Virginia Transportation Commission	Capitol View Civic Association
Washington Metropolitan Area Transit Authority	Central Northeast Civic Association
Virginia Railway Express	CSX Transportation, Inc.

CSX Transportation, Inc. was contacted because their tracks run just outside of the proposed improvements in the rail corridor that abuts the proposed location for the extension (although WMATA owns the rail lines closest to the alignments). CSX indicated that they do not comment on local projects or improvements that do not involve some direct interaction with their facilities or land so they would not be commenting on impacts of this project specifically since it has no direct interaction.

One local organization, the Marshall Heights Community Development Organization Inc. (MHCDO), did respond to the scoping letter. MHCDO expressed its full support of the extension project and cited the following reasons:

- Improved access to the Deanwood Metrorail station.
- Reduction of through-traffic on Deanwood's residential streets, particularly 44th, 45th, 46th, Lee, and Meade Streets.
- Elimination of blight in the area (currently Minnesota Avenue on maps).
- Provision of an alternative route to Benning Road bridge, the Minnesota Avenue Metrorail station, and the proposed Government Center that would reduce the need to widen Benning Road.

4.2 PUBLIC INVOLVEMENT

Public involvement has been a full-fledged component of the Minnesota Avenue Extension Project from its inception. Two public information meetings have been held within the project study area, and a formal public meeting is scheduled to be held following the publication of the Environmental Assessment. By these means DDOT has kept the public informed about the progress of the study and provided a conduit for input from interested citizens. All local residents along the proposed extension were included in all

mailings for the project and invited to the local community meetings. Details regarding the public meetings are provided below and information is included in Appendix B.

4.2.1 August 13, 2003 Meeting

The first public information meeting was held on Wednesday, August 13, 2003, at First Baptist Church of Deanwood from 6:00 PM to 9:00 PM. The primary goal of this meeting was to solicit general comments and opinions on the project from interested members of the public. The purpose of the meeting was to introduce the extension project to the public. Attendees were given information regarding the scope of the study, the study goals and objectives, details regarding the NEPA process, a map of the project study area, a project schedule, and contact information.

The meeting was advertised in *The Washington Post*, and *The Washington Afro-American*, and the *East of the River* newspapers. Notices were mailed to the 350 persons, agencies, businesses, and organizations on the project's mailing list. A total of 27 people signed in, and 5 written comment sheets were received. The written comments focused primarily on the consideration of measures to protect pedestrian safety. Topics verbally discussed during the meeting primarily fell into the following categories:

- Right- of- way concerns
- Alignment considerations
- Potential relocations
- Project schedule
- Project costs

4.2.2 February 17, 2004 Meeting

The second public information meeting was held on Tuesday, February 17, 2004, at Holy Trinity Worship Center from 6:30 PM to 8:30 PM. As with the previous meeting, advertisements were placed in *The Washington Post*, and *The Washington Afro-American*, and the *East of the River* newspapers. Notices were mailed to the 222 persons, agencies and businesses or organizations on the revised project mailing list. The primary goal of this meeting was to obtain feedback on alignment concepts and environmental constraints. Attendees were given information regarding the purpose and need for the project, the project development process, alignment concepts, potential traffic impacts, and environmental constraints.

A total of 19 people signed in, and 3 written comment sheets were received. Written comments focused on the desire to minimize residential impacts and the desire for continued public involvement. Topics verbally discussed during the meeting primarily fell into the following categories:

- Alternative alignments
- Modifications to concept right-of-ways
- Public safety considerations
- Traffic control measures
- The property acquisition process

The public involvement process has been used to refine the alternatives under consideration. As discussed in Chapter 2 of this assessment, Alternative 4A was developed to eliminate impacts to a locally-owned business in the community which was one of the goals identified at the local meetings. In addition, the community also expressed concern about Alternative 3, which would re-route Minnesota Avenue onto existing roads in order to avoid private property impacts. The local community expressed a preference for the extension to be located along the previously identified route adjacent to the rail lines and this input was taken into consideration as well in the decision to carry Alternatives 4A and 5 forward into the detailed assessments for this EA.

5

PREPARERS

This environmental study was prepared by Parsons Transportation Group for the District Department of Transportation. Personnel who were instrumental in the preparation of this document include:

Parsons Transportation Group

Kenneth R. Mobley, AICP	Project Manager	M.S., Public Management and Policy; B.A. Political Science; 15 years of transportation planning and consulting engineering experience, including 10 years of experience in NEPA documentation for transportation projects (rail, bus, and roadway environmental impact evaluations and statements).
William B. Kerr, Jr., AICP	Deputy Project Manager	M.A., Urban and Regional Planning; B.A., Political Science; 15 years of experience analyzing socioeconomic, land use, and environmental justice impacts, including 10 years of experience in the preparation of NEPA documents for site development and transportation projects.
Joshua S. Wade, P.E.	Design Engineer	B.S., Civil Engineering; 10 years of consulting experience in civil engineering, alternatives development, transportation planning, and environmental documentation for corridor studies, feasibility studies, and final design projects
Simone Monteleone Moffett	Cultural Resources, Parklands, Visual and Aesthetic Resources	M.S., History; B.A. English; 5 years of experience in the preparation of NEPA and Section 106 documents for transportation projects and site developments, including 5 years of experience in identification and evaluation of National Register of Historic Places eligible resources.
Maureen J. Mills	Natural Environment	B.S., Biology; 18 years of consulting experience in ecological, natural resource, and environmental management work for transportation, government, and urban development projects, including 10 years of experience in preparing EISs and EAs for rail and highway projects and 20 years of experience in technical editing, writing, and document preparation/production.
Robert A.S. Wright, P.W.S., C.F.W.C.	Natural Resources, Hazardous Materials	M.S. and B.S., Environmental Science; B.S., Natural History; 15 years of field and management experience in NEPA documentation, including land use planning, natural resource management, and environmental site assessment.
R. Trent Ebersole, P.E.	Traffic and Transportation	M.S. Environmental Engineering; B.S. Civil Engineering; 15 years of transportation planning and traffic engineering experience including the preparation of traffic impact sections for NEPA documents.
Peter Spisszak	Land Use and Zoning, Socioeconomic and Community Features, Traffic and Transportation	B.A., Geography/Environmental Planning; 2 years of experience in the preparation of environmental documents for site development and transportation projects.
Mike Pinkoske	Geographic Information Systems (GIS) Specialist	B.A., Geography; 3 years of experience in environmental planning, focusing on the application of CADD, GPS, GIS for alternatives development and analysis as well as public involvement activities for transportation projects.
Kevin Chrisman	Graphics	B.S., Advertising Design; 13 years of experience in illustration and graphics design.

Stephen C. Walter	QA/QC, Technical Review	M.S., Environmental Science; B.S., Environmental Conservation; 26 years of experience in the preparation of environmental planning and assessment documents for major public works projects (primarily transportation projects).
Mary Pickens	Technical Editor	B.A., English; 27 years of experience in editing, writing, and reporting, with an emphasis on transportation planning and engineering documents, including NEPA documentation, for Federal and state agencies.

6

LITERATURE CITED

SOCIAL AND ECONOMIC FEATURES, ENVIRONMENTAL JUSTICE

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, February 1994.

D.C. Comprehensive Plan, Council of the District of Columbia, December, 1998.

Round 6.2 Cooperative Forecasting. *D.C. Department of Human Services, Planning and Public Safety; Metropolitan Washington Council of Governments, 2000.*

Neighborhood Cluster 31: District of Columbia Strategic Neighborhood Action Plan, DC Office of Planning, Summer 2002.

TRAFFIC AND TRANSPORTATION

Highway Capacity Manual, Transportation Research Board, 2000.

Union Station Parking Garage Feasibility Study for Expansion, June 2000, Timothy Haas and Associates.

Requests for Proposals for Final Design Services for the Expansion and Renovation of the Union Station Car/Bus Parking Facility, August 18, 2003, Union Station Redevelopment Corporation.

CULTURAL RESOURCES, PARKLANDS, VISUAL & AESTHETICS

Artemel, Janice, Elizabeth Crowell, Edward Flanagan, Francine Bromberg. *Barney Circle Phase II Archaeological Studies*. Prepared by Engineering-Science, Washington, D.C., 1989.

Baist, George William. *Baist's Real Estate Atlas Of Surveys Of Washington*, District of Columbia: complete in three volumes, Volume 3. GW Baist Publishers, Philadelphia, Pennsylvania, 1903.

Baist, George William. *Baist's Real Estate Atlas Of Surveys Of Washington, District of Columbia: complete in four volumes, Volume 4*. GW Baist Publishers, Philadelphia, Pennsylvania, 1907.

Baist, George William. *Baist's Real Estate Atlas Of Surveys Of Washington, District of Columbia: complete in four volumes, Volume 4*. GW Baist Publishers, Philadelphia, Pennsylvania, 1913.

Baist, George William. *Baist's Real Estate Atlas Of Surveys Of Washington, District of Columbia: complete in four volumes, Volume 4*. GW Baist Publishers, Philadelphia, Pennsylvania, 1919.

Baist, George William. *Baist's Real Estate Atlas Of Surveys Of Washington, District of Columbia: complete in four volumes, Volume 4*. GW Baist Publishers, Philadelphia, Pennsylvania, 1924.

Baist, George William. *Baist's Real Estate Atlas Of Surveys Of Washington, District of Columbia: complete in four volumes, Volume 4*. GW Baist Sons Publishers, Philadelphia, Pennsylvania, 1943.

Baist, George William. *Baist's Real Estate Atlas Of Surveys Of Washington, District of Columbia: complete in four volumes, Volume 4*. RH Baist Publishers, Philadelphia, Pennsylvania, 1950.

Barber, Russell. *A Summary and Analysis of Cultural Resources Information on the Continental Shelf from the Bay of Fundy to Cape Hatteras*. Final Report, Vol. II, ICA, Peabody Museum, Harvard University, 1979.

Boschke, A. Topographical map of the District of Columbia / surveyed in the years 1856 '57 '58 & '59. Published by D. McClelland, Blanchard & Mohun, Washington, D.C., 1861.

Bromberg, Francine Weiss, Ray Wood, Catharine Toulmin, Elizabeth Crowell, Janice G. Artemel, Madeline Pappas, Cynthia Pfanstiehl, and Teresa Kacprowicz. *Anacostia Park from a Historical and Archaeological Perspective*. Prepared for Fleming Corporation of Washington, D.C. Prepared by Engineering Science, Washington, D.C., 1989.

Carpenter, B.D., *Map of the real estate in the county of Washington, D.C. outside of the cities of Washington and Georgetown*. Washington, DC, Carpenter and Co., 1881.

Custer, Jay F. B*roadspears and Netsinkers: Late Archaic Adaptation Indicated in Depositional Sequences from Four Middle Atlantic Sites of the Ridge and Valley Province*. Paper presented at the Middle Atlantic Archaeological Conference, Rehoboth Beach, Delaware, 1978.

Custer, Jay F. *Prehistoric Cultures of the Delmarva Peninsula: An Archaeological Study*. University of Delaware Press, Newark, 1989.

Far East Community Services, *Final Report of Historical and Building Investigation of the Northeast Washington, DC Community of Deanwood, Phase I*. Prepared by Far East Community Services, Inc. of Washington, D.C., 1987.

Flanagan, Edward J., Janice G. Artemel and Elizabeth A. Crowell. Five *Barney Circle Phase II Archaeological Studies*. Prepared for Fleming-DeLeuw, Washington, D.C. by Engineering-Science, 1985.

Gardner,William. *The Flint Run Paleo-Indian Complex: A Preliminary Report 1971-73 Seasons*. Editor, William M. Gardner, Occasional Publication Number 1, Archeology Laboratory, Department of Anthropology, The Catholic University of America, Washington, D.C., 1974.

Gardner,William. A Comparison of Ridge and Valley, Blue Ridge, Piedmont and Coastal Plain Archaic Period Site Distribution, an Idealized Transect. Paper presented at the Middle Atlantic Archaeological Conference, Rehoboth, Delaware, 1978.

Gardner,William. Paleo-Indian Settlement Pattern and Site Distributions in the Middle Atlantic. Paper presented at the meeting of the Anthropological Society of Washington, Washington, D.C. January, 1979.

Gardner,William. *Early and Middle Woodland In the Middle Atlantic* Occasional Paper 3, edited by R. Moeller, pp. 53-86. American Indian Archaeological Institute, Washington, Connecticut, 1982.

Hopkins, Griffith Morgan. Atlas of fifteen miles around Washington, including the county of Montgomery, Maryland. GM Hopkins, Philadelphia, Pennsylvania, 1879.

Hopkins, Griffith Morgan. *A Complete Set of Surveys and Plats of Properties in the City of Washington, District of Columbia*. Philadelphia. Located at the Geography and Maps Division, Library of Congress, Washington, D.C., 1887.

Humphrey, Robert L. and Mary E. Chambers. "Ancient Washington: American Indian Cultures of the Potomac Valley." *George Washington University Washington Studies* No. 6, Second edition. Washington, D.C., 1985.

Joyce, A.A. Early and Middle Holocene Environments in the Middle Atlantic Region: a Revised Reconstruction. In *Holocene Human Ecology in Northeastern North America*, edited by G.P. Nicholas, pp. 185-214. Plenum Press, New York, 1989.

McDowell, Irwin. *Map of N. Eastern Virginia and Vicinity of Washington*. Published by J. Schedler, New York; online at http://lcweb2.loc.gov/; keyword search under map section – McDowell, 1862.

National Railway Historical Society, Washington D.C. Chapter. *Washington DC Railway History*. Online at the chapter website at http://www.dcnrhs.org/dc_rail_history.htm., 2003.

Smith, Kathryn Schneider. *Washington At Home.* Windsor Publishing, Inc.: Northridge, California, 1988.

Snyder, K., and W.M. Gardner. *A Preliminary Archaeological Resource Reconnaissance of Proposed Sewer Lines in the Rock Run Area, Montgomery County Md*. On file, Maryland Historical Trust, Crownsville, 1979.

AIR QUALITY

National Primary and Secondary Ambient Air Quality Standards (NAAQS), 40 CFR 50

Determining Conformity for General Federal Actions to State or Federal Implementation Plans, 40 CFR 51

USEPA AQS Database (http://www.epa.gov/air/data/)

State Implementation Plan (SIP), "Severe Area SIP", Demonstrating Rate of Progress for 2002 and 2005; Revision to 1990 Base Year Emissions; and Severe Area Attainment Demonstration for the Washington DC-MD-VA Nonattainment, MWCOG, September 2003.

User's Guide to MOBILE6.1 and 6.2, Mobile Source Emission Factor Model, USEPA Office of Transportation and Air Quality, #EPA420-R-02-028, October 2002.

SCREEN3 Model User's Guide, USEPA OAQPS, Research Triangle Park, NC, September 1995.

User's Guide to Cal3QHC Version 2.0: A Modeling Methodology for Predicting Pollutant Concentrations Near Roadway Intersections, USEPA #EPA-454/R-92-006, OAQPS, Research Triangle Park, NC, September 1995.

NOISE

Noise Policy For Federal Aid Transportation Projects, D.C. Department of Public Works, May 7, 1997

Municipal Noise Control Title 20, of the District of Columbia Code of Municipal Regulations (DCMR), Chapter 30

Procedures for Abatement of Highway Traffic Noise and Construction Noise, 20 CFR 772

FRA Railroad Noise Emission Compliance Regulations, 40 CFR 210

NATURAL ENVIRONMENT

Johnston, P. M. 1964. *Geology and Ground-water Resources of Washington, DC, and Vicinity. Geological Survey Water Supply Paper 1776*, US Government Printing Office, Washington, Dc.

U.S. Geological Survey (USGS), 1994. Washington West, DC, MD, VA 7.5-minute Quadrangle Map. Reston, VA. 1:24,000 scale.

USGS, 1967. *Engineering Geology of the Northeast Corridor, Washington, DC to Boston, Massachusetts: Coastal Plain and Surficial Deposits*, USGS Miscl. Inv. Map I-514-B, sheet 1 of 8, Scale 1: 250,000.

Southworth, S., W. Newell, T. Armstrong and P. Hyde. 1998. *Geologic Map of Aggregate Resource Units for the Baltimore –Washington Urban Corridor in the Mid-Atlantic Region*. USGS Open File Report 98-349. Reston, VA.

Lyttle, P.T., J. Aleinkoff, A. Drake Jr., A. Froelich, J. Horton Jr., G. Kasselas, L. McCartan, R. Mixon, A. Nelson, L. Pavlides and R. Weems. In Press (unpublished). *Geologic Map of the Washington West 30 X 60 minute Quadrangle*. Reston, VA. Scale 1: 100,000.

Porter, C.H., J.F. Dertling, J.H. Elder, and E.S. Henry 1963. *Soil Survey of Fairfax County, Virginia.* United States Department of Agriculture, Soil Conservation Service, Washington, D.C. .

Fairfax County Department of Public Works and Environmental Services. 2001. *Ratings of Soils for Urban Development in Fairfax County.*

http://www.co.fairfax.va.us/gov/dpwes/environmental/soilrating.htm

Executive Order 13112, Invasive Species, February 3, 1999.

Anacostia Watershed Network. 2003. *Watts Branch Watershed Summary* [Online WWW]. Available URL: http://www.anacostia.net/maps/summary_wattsbranch.htm [Accessed November 17, 2003]

Cowardin, L., V. Carter, F. Golet, and E. LaRoe 1979. *Classification of Wetlands and Deepwater Habitats of the United States.* Report FWS/OBS-79/31, Office of Biological Services, U.S. Fish and Wildlife Service, Washington, DC.

District of Columbia Department of Health 2003a. Known Wetlands Within the District of Columbia. Bureau of Environmental Quality, Water Quality Division Website Report, 3 pages. [Online WWW]. Available URL:http://dchealth.dc.gov/services/administration_offices/environmental/services2/water_division/pdf/wetland.shtm [Accessed November 15, 2003].

District of Columbia Department of Health 2003b. District of Columbia Water Quality Asssessment Executive Summary. Website Report, 9 pages. [Online WWW]. Available URL: http://dchealth.dc.gov/services/administration_offices/environmental/services2/water_division/pdf/00-305bexsumm.shtm. [Accessed November 17, 2003].

District of Columbia Department of Health 2003c. Final Total Maximum Daily Loads for Suspended Solids in Watts Branch. June 2003 Website Report, 24 pages. Bureau of Environmental Quality, Water Quality Division Website Report, 3 pages. [Online WWW]. Available URL: http://dchealth.dc.gov/services/administration_offices/environmental/services2/water_division/pdf/TMDL_TSS.shtm. [Accessed November 15, 2003].

District of Columbia Department of Health 2003d. District Municipal Groundwater Regulations, Title 21, Section 1150, *et seq.* [Online WWW]. Available URL: http://dchealth.dc.gov/services/administration_offices/environmental/services2/water_division/pdf/GroundWaterQuality.shtm. [Accessed November 17, 2003].

Environmental Laboratory 1987. *Corps of Engineers Wetland Delineation Manual*. Technical Report Y-87-1, Waterways Experiment Station, Vicksburg, MS.

Fairfax County Department of Public Works and Environmental Services. 2003a. *Ratings of Soils for Urban Development in Fairfax County* [Online WWW]. Available URL: "http://www.co.fairfax.va.us/gov/dpwes/environmental/soilrating.htm" [Accessed October 2, 2003]

Fairfax County Department of Public Works and Environmental Services. 2003b. *Naturally Occurring Asbestos in Fairfax County* [Online WWW]. Available URL: http://www.co.fairfax.va.us/service/hd/asbintro.htm [Accessed August 23, 2003).

Federal Emergency Management Agency--National Flood Insurance Program. November 15, 1985. *Flood Insurance Rate Map, District of Columbia-Washington, D.C., Panel 30 of 30 (Community-Panel Number 110001-0030-B).*

James, R. W., R. W. Saffer, R.H. Pentz and A. J. Tallman. 2003. *Water Resources Data Maryland, Delaware, and Washington, DC, Water Year 2002, Volume 1: Surface Water Data*. Water Data Report MD-DE-DC-02-1, U. S. Geological Survey, Reston, VA [Accessed November 17, 2003].

Johnston, P. M. 1964. *Geology and Ground-water Resources of Washington, DC, and Vicinity*. Geological Survey Water Supply Paper 1776, US Government Printing Office, Washington, DC.

Lyttle, P.T., J. Aleinkoff, A. Drake Jr., A. Froelich, J. Horton Jr., G. Kasselas, L. McCartan, R. Mixon, A. Nelson, L. Pavlides and R. Weems. In Press (unpublished). *Geologic Map of the Washington West 30 X 60 minute Quadrangle*. Reston, VA. Scale 1: 100,000.

Maryland Geological Survey. 2003. *Coastal & Estuarine Geology: Physiographic Provinces of Maryland Map* [Online WWW]. Available URL: http://www.mgs.md.gov/coastal/maps/g1.html [Accessed September 16, 2003].

Maryland Geological Survey. 1968. *Geologic Map of Maryland.*

Mitchell, J. C.and R. A. and Beck, 1992. *Free-Ranging Domestic Cat Predation on Native Vertebrates in Rural and Urban Virginia.* Va. Jour. Sci. 43(1B): 197-206.

Moore, J.E. and J.A. Jackson, eds. 1989. *Geology, Hydrology, and History of the Washington D.C. Area.* American Geological Institute, Alexandria, VA. 114 pages.

Pagels, J., S. Erdle, and K. Uthus 1992. *Small Mammal Diversity in Forested and Clearcut Habitats in the Virginia Piedmont*. Va. J. Sci. 43(1B): 171-176.

Robinson, W. L. and E. C. Bolen. 1984. *Wildlife Ecology and Management*. MacMillan Publishing Company, New York.

Smith, Horace 1976. *Soil Survey of District of Columbia*. United States Department of Agriculture, Soil Conservation Service, Washington, DC. 194 pages plus plates.

Southworth, S., W. Newell, T. Armstrong and P. Hyde. 1998. *Geologic Map of Aggregate Resource Units for the Baltimore –Washington Urban Corridor in the Mid-Atlantic Region*. USGS Open File Report 98-349. Reston, VA.

U. S. Department of the Army. *Memorandum for Clarification and Interpretation of the 1987 Manual*, March 6, 1992.

U.S. Department of Agriculture—Natural Resources Conservation Service--Soil Survey Division. *Official Soil Series Descriptions* [Online WWW]. Available URL: http://ortho.ftw.nrcs.usda.gov/osd/ [Accessed October 29, 2003].

U.S. Environmental Protection Agency. 2003. *EPA: Surf Your Watershed. Middle Potomac-Anacostia-Occoquan Watershed-02070010* [Online WWW]. Available URL: http://cfpub.epa.gov/surf/huc.cfm?huc_code=02070010 [Accessed September 16, 2003].

U. S. Geological Survey. 2001. *Geologic Radon Potential Maps for Counties in the Washington, D.C. Metro Area* [Online WWW]. Available URL: http://sedwww.cr.usgs.gov:8080/radon/rncounty.html [Accessed August 23, 2003]

U. S. Geological Survey. 1967. *Engineering Geology of the Northeast Corridor, Washington, DC to Boston, Massachusetts: Coastal Plain and Surficial Deposits*, USGS Misc. Inv. Map I-514-B, sheet 1 of 8, Scale 1: 250,000.

U.S. Geological Survey 1979 Washington East, DC, MD, VA 7.5-minute Quadrangle Map. Photorevised 1965 version, Reston, VA. 1:24,000 scale.

Virginia Department of Conservation and Recreation--Division of Natural Heritage. 2003. *Invasive Alien Plant Species of Virginia* [Online WWW]. Available URL: http://www.dcr.state.va.us/dnh/invlist.pdf [Accessed November 2, 2003]

Virginia Water Resources Research Center 1999. A Guide to Virginia's Groundwater. Technical report, revised by J. A. Poff. Virginia Water Resources Research Center, Blacksburg, Virginia. [Online WWW]. Available URL: http://www.vwrrc.vt.edu/publications_Guide_Virginia's_Ground_Water.pdf. [Accessed August 23, 2003].

Watts, B. D. and B. J. Paxton. 2000. *The Influence of Thorny Elaeagnus on Automobile-Induced Mortality.* Report VTRC01-CR2, Virginia Transportation Research Council, Richmond, VA. 18 pages.

HAZARDOUS MATERIALS

Johnston, P. M. 1964. Geology and Ground-water Resources of Washington, DC, and Vicinity. Geological Survey Water Supply Paper 1776, US Government Printing Office, Washington, DC.

Southworth, S., W. Newell, T. Armstrong and P. Hyde. 1998. Geologic Map of Aggregate Resource Units for the Baltimore -Washington Urban Corridor in the Mid-Atlantic Region. USGS Open File Report 98-349. Reston, VA.

Lyttle, P.T., J. Aleinkoff, A. Drake Jr., A. Froelich, J. Horton Jr., G. Kasselas, L. McCartan, R. Mixon, A. Nelson, L. Pavlides and R. Weems. In Press (unpublished). Geologic Map of the Washington West 30 X 60 minute Quadrangle. Reston, VA. Scale 1: 100,000.

Smith, Horace 1976. *Soil Survey of District of Columbia.* United States Department of Agriculture, Soil Conservation Service, Washington, DC. 194 pages plus plates.

A

HAZARDOUS MATERIALS DATA SEARCH

B

PUBLIC INVOLVEMENT PROCESS

DDOT held two public open houses on August 13, 2003 and February 17, 2004. Notice was provided in advertisements in *The Washington Post*, the *Afro American*, and other newspapers; flyers were also posted in various locations. Five comment forms and one letter, dated October 9, 2003, was received from Marshall Heights Community Development Organization, Inc. were received at the first workshop. Three comment forms were received at the second workshop. This appendix contains copies of the advertisements and flyers notifying the public of each open house as well as the comment forms and letter received from the public for each open house.