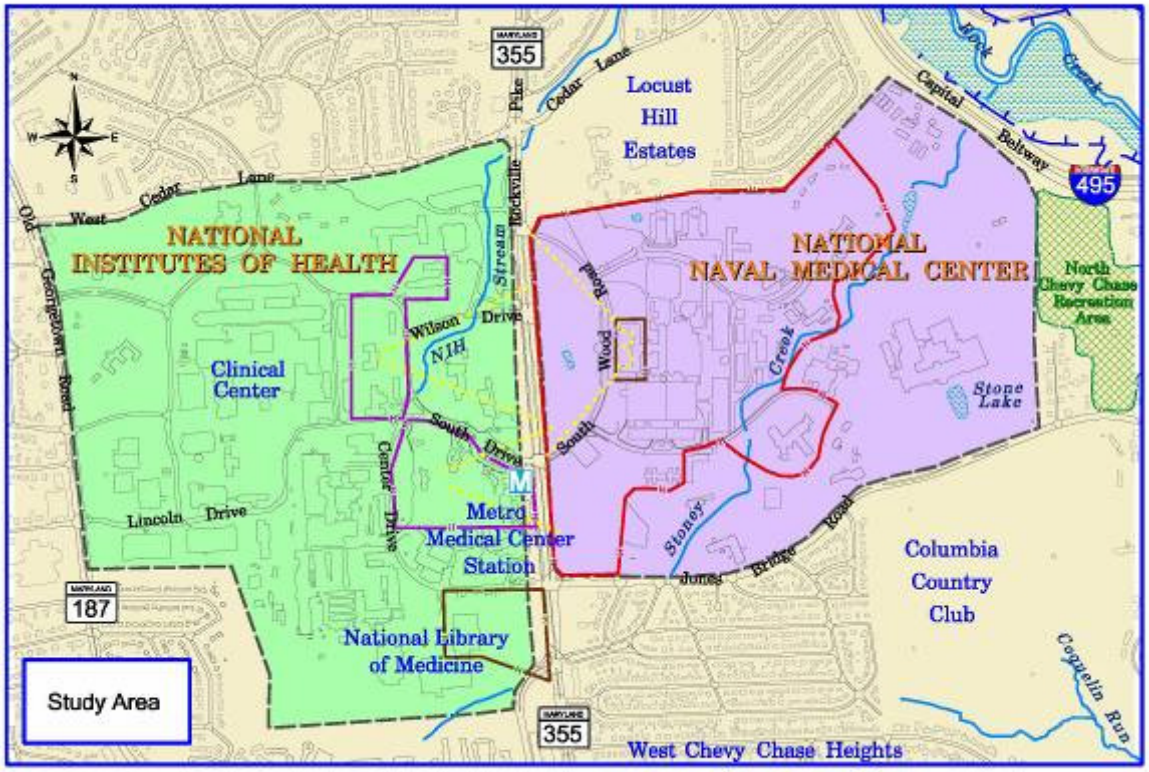
MD 355/ROCKVILLE PIKE CROSSING PROJECT

DRAFT

PURPOSE AND NEED STATEMENT

Montgomery County Department of Transportation

June 2010



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A. Project Location

The MD 355/Rockville Pike Crossing Project is located in Bethesda, Maryland, a densely populated and developed area in the National Capital Region, inside the Capital Beltway (I-495), and adjacent to two large federal campuses, the National Institutes of Health (NIH) and the National Naval Medical Center (NNMC). The area is comprised of a vibrant urban district, and established residential neighborhoods. The study area limits, shown on the Study Area Map (**Figure 1**), extend along MD 355 from Cedar Lane to Jones Bridge Road. The project area is focused on the intersection of MD 355/Rockville Pike and South Wood Road/South Drive. An environmental inventory was collected for this study to document the natural, social, and cultural resources presented in the study area and can be found in **Appendix A**.

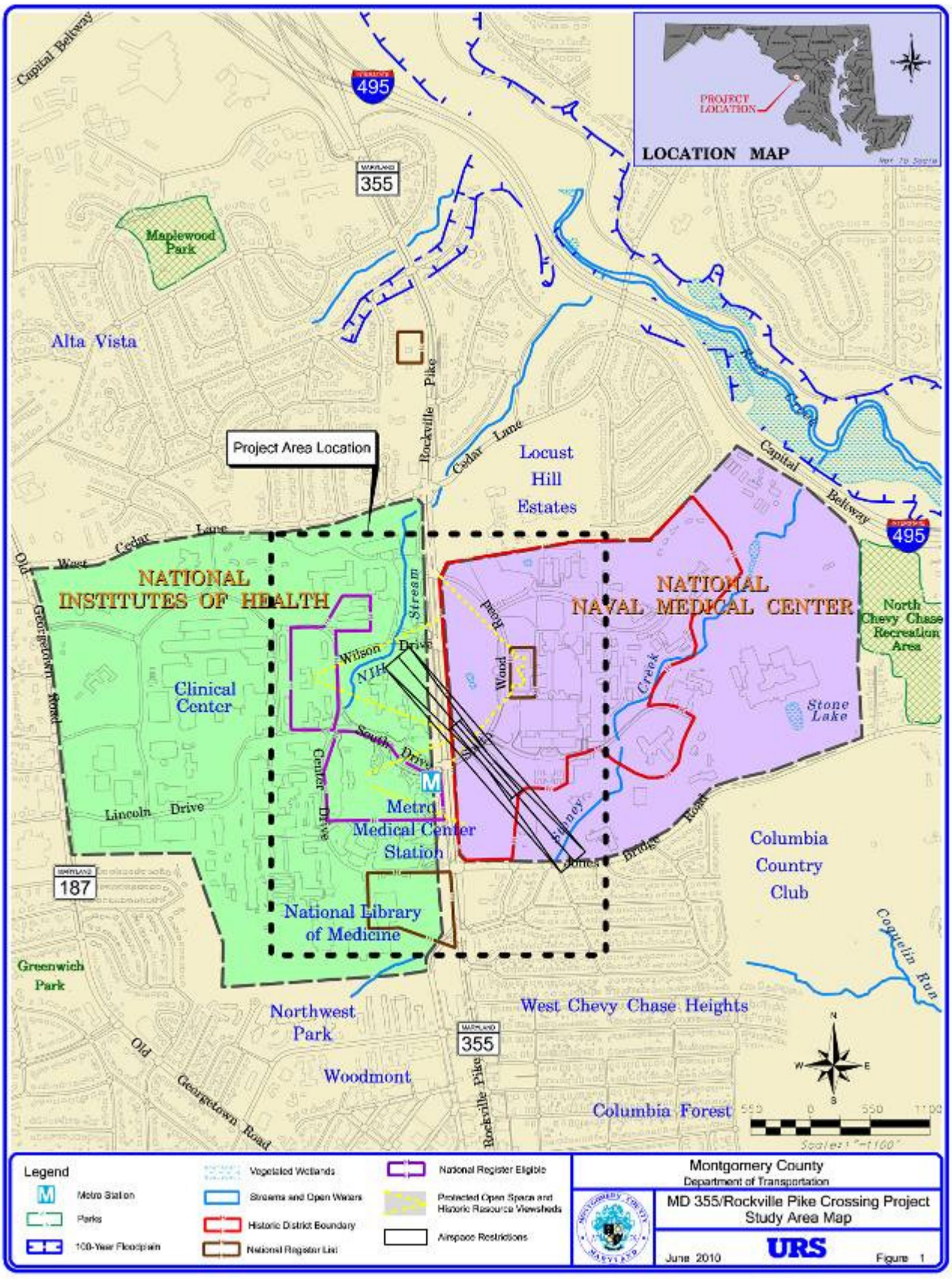
B. Project Background

The Montgomery County Department of Transportation initiated the current National Environmental Policy Act (NEPA) study in 2009. The federal lead agency for this NEPA study is the Federal Highway Administration (FHWA) and the cooperating agencies include NNMC and NIH. The stakeholder team established for this project also includes the following agencies:

- FHWA Delaware-Maryland (DelMar) Division
- Defense Access Road (DAR)
- Maryland State Highway Administration (SHA)
- Maryland Historical Trust (MHT)
- Maryland Department of Transportation (MDOT)
- Maryland-National Capital Park & Planning Commission (M-NCPPC)
- National Capital Planning Commission (NCPC)
- Washington Metropolitan Area Transit Authority (WMATA).

This study, and the associated improvements, are geared towards South Wood Road/South Drive Metrorail access and are being conducted in conjunction with 2005 Base Realignment and Closure Act (BRAC) actions. BRAC is the congressionally authorized process that the U.S. Department of Defense (DoD) has used to reorganize and consolidate its base structure to more efficiently and effectively support the military. In November 2005, Congress voted to approve the final recommendations of the BRAC Commission and Maryland benefited by gaining additional military and civilian positions.

The 2005 BRAC will realign tertiary care and additional activities from Walter Reed Army Medical Center (WRAMC) in Washington, DC to NNMC. The new center will be known as the Walter Reed National Military Medical Center at Bethesda (WRNMMC). According to the Department of the Navy's March 2008 Final Environmental Impact Statement (FEIS) for Activities to Implement 2005 Base Realignment and Closure Actions at NNMC, one goal associated with the proposed WRNMMC is to improve


LOCATION MAP
PROJECT LOCATION
Project Area Location
NATIONAL INSTITUTES OF HEALTH
NATIONAL NAVAL MEDICAL CENTER
Clinical Center
Metro Medical Center Station
National Library of Medicine
Maplewood Park
Alta Vista
Locust Hill Estates
North Chevy Chase Recreation Area
Stone Lake
Columbia Country Club
Greenwich Park
Northwest Park
Woodmont
West Chevy Chase Heights
Columbia Forest
Coquelin Run
Capital Beltway
Rockville Pike
Cedar Lane
Old Georgetown Road
Wilson Drive
South Drive
Linden Drive
Lincoln Drive
Jones Bridge Road
Wood Road
Stream Valley
Legend
Metro Station
Parks
100-Year Floodplain
Vegetated Wetlands
Streams and Open Waters
Historic District Boundary
National Register List
National Register Eligible
Protected Open Space and Historic Resource Viewsheds
Airspace Restrictions
Montgomery County
Department of Transportation
MD 355/Rockville Pike Crossing Project
Study Area Map
June 2010
URS
Figure 1

pedestrian access and mobility between the campus and the Medical Center Metrorail Station.

The BRAC action will result in the relocation of up to 2,500 employees from the Walter Reed Army Medical Center to the NNMC by September 2011, increasing employee population to 10,500. BRAC related relocations are expected to also increase the number of NNMC patient appointments and other visitors from the current level of approximately 497,000 annually (1,912 per weekday) to approximately 981,000 annually (3,773 per weekday) a total increase of 484,000 annually (1,862 per weekday) (Source: Department of the Navy's March 2008 FEIS For Activities to Implement 2005 BRAC Actions At NNMC). The Medical Center Metrorail Station serves several thousand NIH and NNMC employees and visitors, plus serves a significant amount of local area commuters. Ridership is expected to increase in the future and NNMC and NIH employees are expected to comprise about 72 percent of the total Medical Center Metrorail Station passengers by 2020, with patients and visitors expected to comprise an additional five percent of the Metrorail station's total boardings and alightings (Source: WMATA's July 2009 "Medical Center Station Access Improvement Study").

The Navy's FEIS includes an analysis that supports improved pedestrian connections between the campus and the Medical Center Metrorail Station that would make Metrorail and bus service more convenient and appealing to patients, visitors, and staff of NNMC. Because Metrorail serves a large portion of the metropolitan Washington D.C. area, many NNMC employees can choose Metrorail to make transit their primary mode of transportation. The 2008 NNMC Transportation Study in Support of Environmental Impact Statement states that providing a pedestrian connection (in the form of a bridge or tunnel) between the Metrorail station and NNMC would significantly reduce pedestrian exposure to unsafe crossing conditions along Rockville Pike in the vicinity of the NNMC South Gate/Metrorail station access. These findings correlate with the Navy's November 2008 NNMC Transportation Management Plan, which notes that future primary pedestrian movements will continue across Rockville Pike between the South Wood Road Gate and the Medical Center Metrorail Station.

In addition, the study area is situated within the boundaries of the April 1990 Bethesda/Chevy Chase Master Plan, which includes recommendations for a significant shift of transportation modes from auto use to transit and other mobility alternatives, along with providing improved access and safety for pedestrians and bicyclists.

In September 2009, the County applied for a Transportation Investment Generating Economic Recovery (TIGER) grant to fund the MD 355/Rockville Pike Crossing Project. In February 2010, the U.S. Department of Transportation announced that the Bethesda BRAC projects were not awarded TIGER Grant funding (50 TIGER grants totaling $1.5 billion, the total TIGER funding available, were awarded from over 1,400 applications requesting $56.5 billion). However, in December 2009, the U.S. Congress approved an appropriation for BRAC-related transportation projects at NNMC and Fort Belvoir under the FY2010 Defense Appropriations bill, which could serve as a source of funding for BRAC projects in Bethesda. Additionally, DAR funding in DoD's budget would be

available. The projects listed in the May 2008 DAR Needs Report for NNMC include a bank of elevators on the east side of MD 355 at the study intersection and roadway improvements to the North Wood Road/MD 355 intersection, north of the study intersection.

C. Project Purpose

The purpose of the MD 355/Rockville Pike Crossing Project is to improve the movement of the traveling public between the west and east sides of MD 355/Rockville Pike at its intersection with South Wood Road and South Drive in Bethesda, Maryland. This transportation project is intended to: (1) enhance/improve access to mass transit facilities; and (2) improve the mobility and safety of pedestrians and bicyclists crossing MD 355/Rockville Pike and improve traffic operations at the existing intersection of South Wood Road/South Drive/MD 355.

D. Need for the Project

Currently, the majority of the transit facilities are located on the west side of MD 355/Rockville Pike, adjacent to (or in some cases on) the NIH campus. The only entrance to the Medical Center Metrorail Station (on the Red Line of WMATA's Metrorail System) is on the west side of MD 355, near the intersection of South Drive and MD 355. Due to potential safety concerns resulting from conflicts between pedestrians and vehicles, access to these facilities is challenging and inconvenient for the large number of transit riders traveling to and from NNMC who must cross MD 355 either on foot or by bicycle to access the Medical Center Metrorail Station, buses, or Kiss & Ride lot. In addition, ridership on Metrorail and bus is anticipated to increase in the future.

The NNMC 2008 FEIS and the WMATA "Medical Center Metrorail Station Access Improvement Study" raise concerns regarding conflicts between pedestrians and vehicles at the intersection of Rockville Pike and South Wood Road/South Drive during the shared signal phase. An existing at-grade Rockville Pike crosswalk links NNMC to the Medical Center Metrorail Station at South Wood Road. The current at-grade pedestrian crossing of MD 355 poses potential safety concerns and causes delays for pedestrians and vehicles. In the morning peak period, vehicles turning east into NNMC's South Wood Road gate from northbound Rockville Pike experience traffic delays. In the evening peak period, conflicts between pedestrians and vehicles cause delays and on-post backups for vehicles exiting NNMC westbound from the South Wood road gate turning south onto Rockville Pike. Likewise, similar conflicts occur on the west side of Rockville Pike because the pedestrians cross Rockville Pike while vehicles exiting NIH are turning onto Rockville Pike. In the morning and afternoon peak periods, this conflict results in potential safety concerns and traffic delays and backups on the NIH Campus. Approximately 3,000 pedestrians cross MD 355 each day, and it is estimated that this number of pedestrians will increase to at least 6,700 by 2020 (Source: WMATA's July 2009 "Medical Center Metrorail Station Access Improvement Study").
Access to mass transit facilities in the study area is important to the thousands of transit patrons who work in or visit the study area. Transit users (Metrorail, Metrobus, Ride On,

Kiss & Ride, NIH shuttles, and NNMC shuttles) and pedestrians and bicyclists from the surrounding community wishing to cross MD 355 to get to NNMC from the Medical Center Metrorail Station or NIH must compete with very high volumes of traffic traveling on MD 355, along with traffic turning into and out of NIH and NNMC. Enhancing the mobility (e.g. ease of travel) and safety of pedestrians and bicyclists would encourage walking and bicycling as a transportation choice.

Improving access to mass transit facilities, the mobility and safety of pedestrians and bicyclists crossing MD 355/Rockville Pike, and traffic operations at the existing intersection of South Wood Road/South Drive/MD 355 is needed to address the following specific factors:

- Accommodating the existing and future transit riders who visit, live, or work in the study area
- Providing a safe and efficient crossing of MD 355/Rockville Pike at South Wood Road/South Drive for all pedestrians and bicyclists
- Improving traffic flow into and out of NIH and NNMC at the intersection of South Wood Road/South Drive/MD 355.

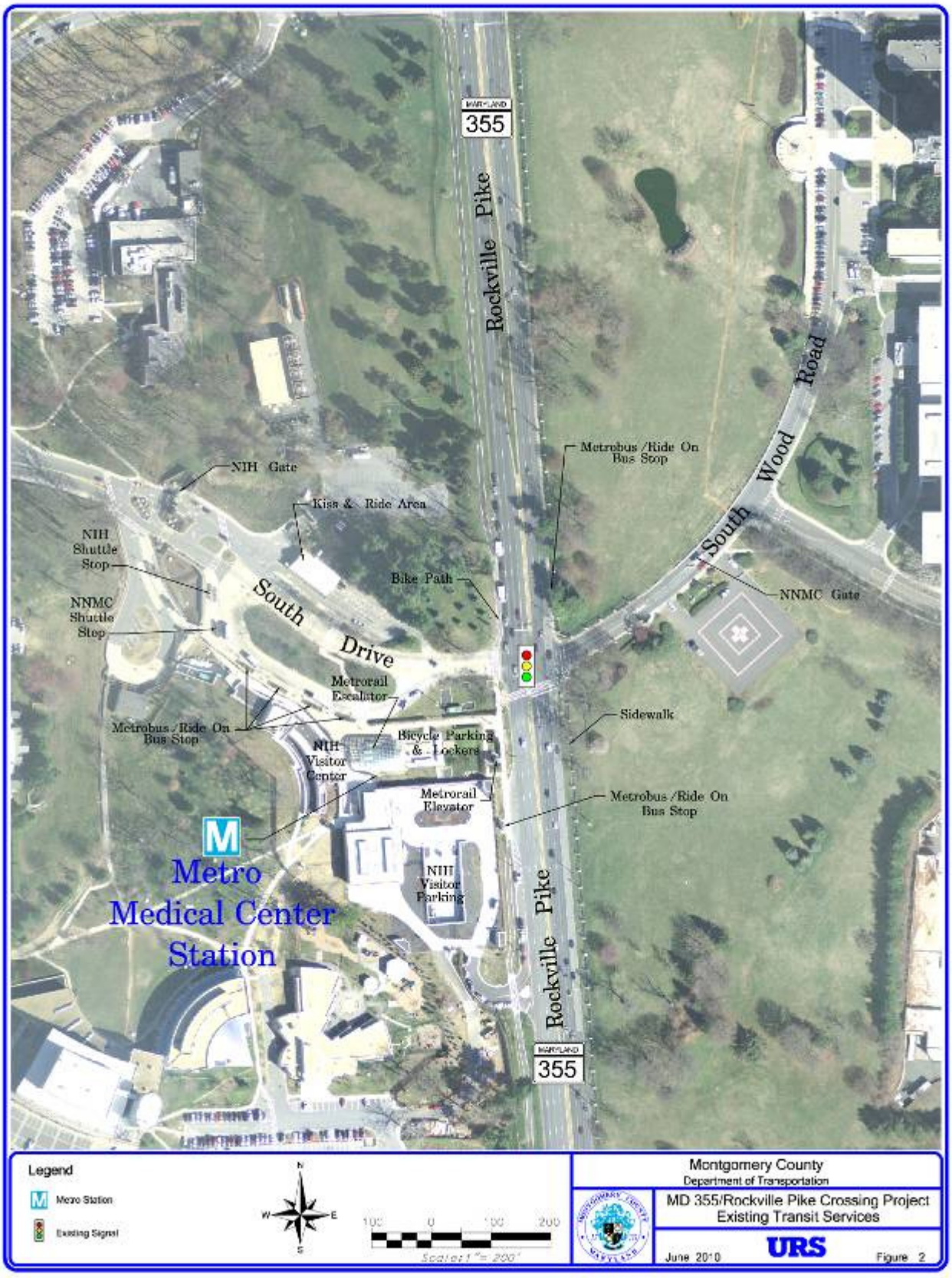
E. Existing Conditions

1. Mass Transit Facilities and Services

Various transit services are currently offered in the study area, including Metrorail, Metrobus, Ride On, NIH shuttles, NNMC shuttles, and Kiss & Ride. Existing transit services are shown in **Figure 2**.

WMATA Metrorail service is provided to the Medical Center Metrorail Station, located on the Metrorail Red Line. The station has a single entrance, located at the southwest corner of the intersection of MD 355/Rockville Pike and South Drive. Parking is not available at the station. The first Metrorail trains depart the station at 5:12 AM on weekdays (7:12 AM on weekends) and last trains depart the station at 12:25 AM on weekdays (3:25 AM on weekends). WMATA Metrobus service is provided at six bus bays in the study area – four near the entrance to NIH on South Drive and one on each side of MD 355/Rockville Pike near the Medical Center Metrorail Station. All Metrobuses are fully accessible and are equipped with lifts or ramps for wheelchair accessibility.

Montgomery County operates Ride On bus service for five routes within the study area, sharing the six bus bays with WMATA near the entrance to NIH on South Drive and on MD 355/Rockville Pike. All of Ride On's buses are wheelchair accessible.


MARYLAND
355
Rockville Pike
South Wood Road
NIH Gate
Kiss & Ride Area
NIH Shuttle Stop
NNMC Shuttle Stop
South Drive
Bike Path
Metrobus /Ride On Bus Stop
NNMC Gate
Metrorail Escalator
Metrobus /Ride On Bus Stop
Bicycle Parking & Lockers
NIH Visitor Center
Sidewalk
Metrorail Elevator
Metrobus /Ride On Bus Stop
Metro Medical Center Station
NIH Visitor Parking
Rockville Pike
MARYLAND
355
Legend
Metro Station
Existing Signal
N
W
E
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100 0 100 200
Scale: 1" = 200'
Montgomery County
Department of Transportation
MD 355/Rockville Pike Crossing Project
Existing Transit Services
June 2010
URS
Figure 2

Shuttles operated by NNMC and NIH provide transportation for patients and staff within each facility. Additionally, NNMC provides "Metro Line Shuttle" service from the Medical Center Metrorail Station to the main hospital and is intended to primarily serve patients, but also serves employees and visitors as space permits. The weekday-only "Metro Line Shuttle" operates continuously between 5:30 AM and 6:30 PM with an average headway of four to seven minutes, depending on traffic conditions and security clearance at the gate. All shuttles comply with Americans with Disabilities Act (ADA) accessibility requirements and have an 18-24-passenger capacity. Likewise, NIH operates seven different shuttle routes, six of which serve the Medical Center Metrorail Station, including a variable after-hours route. NIH shuttles generally operate with 10 to 25 minute headways between 6:00 AM and 7:00 PM. In order to connect between the two campuses, a shuttle transfer is required. NNMC and NIH shuttle route maps are shown in **Figure 3**.

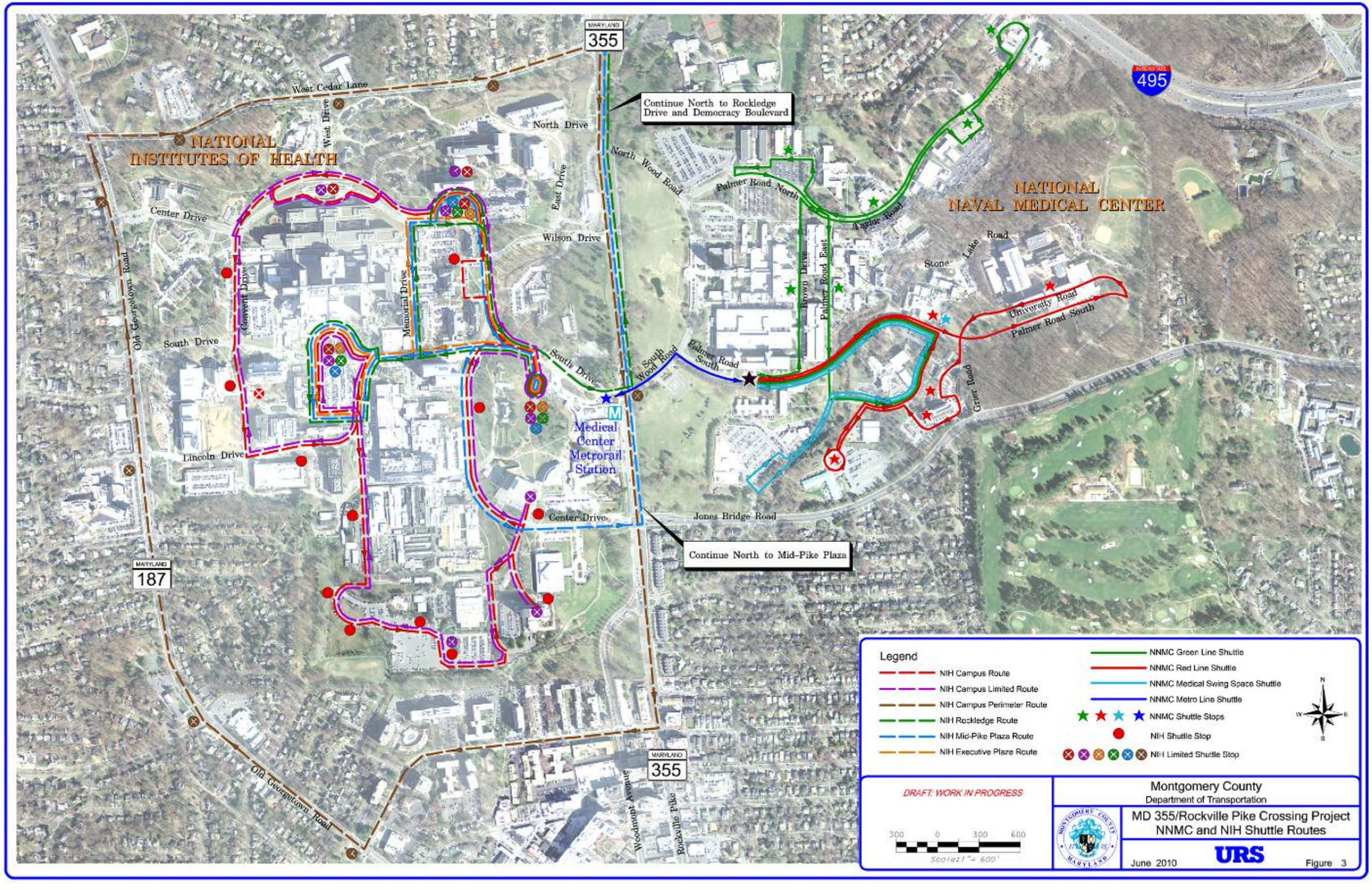
A public WMATA Kiss & Ride lot is located on the north side of South Drive, with pedestrian access to NIH, NNMC, the Medical Center Metrorail Station, and all bus/shuttle bays. Based on field observations, the Kiss & Ride lot is utilized, but not overwhelmed. Users of the Kiss & Ride lot generally access the Medical Center Metrorail Station but not the other transit services.

2. Pedestrian Facilities

The MD 355 and South Wood Road/South Drive intersection is signalized with pedestrian actuated crossing signals. The crossing of MD 355 is on the south leg of the intersection. Both sides of MD 355 feature sidewalks. The west side of MD 355 includes a paved eight-foot shared bike and pedestrian path. A five-foot concrete sidewalk runs along the east side of MD 355..

3. Bicycle Facilities

Several nearby trails provide bicycle access to the Medical Center Metrorail Station. A paved multi-use path skirts the southern perimeter of the NIH campus, connecting the station to Old Georgetown Road. The North Bethesda Trail runs between the NIH campus and the Twinbrook Metrorail Station on exclusive right-of-way and shared sidewalks. The segment of the North Bethesda Trail closest to the study area is directly on Old Georgetown Road. The Capital Crescent Trail connects Georgetown to downtown Bethesda via a paved trail along a former railroad right-of-way. An unpaved section of the Capital Crescent Trail also connects downtown Bethesda to downtown Silver Spring. In addition, the Rock Creek multi-use trail just east of NNMC is an asset to area cyclists commuting to the Medical Center Metrorail Station. There are 88 bicycle racks and 38 bicycle lockers located at the Medical Center Metrorail Station. The bike racks and bike lockers at this location are highly used.


NATIONAL INSTITUTES OF HEALTH
NATIONAL NAVAL MEDICAL CENTER
MARYLAND 355
INTERSTATE 495
MARYLAND 187
West Cedar Lane
West Drive
North Drive
East Drive
North Wood Road
Wilson Drive
Center Drive
Convent Drive
Memorial Drive
Old Georgetown Road
South Drive
South Wood Road
Palmer Road South
Palmer Road North
Palmer Road East
Taylor Road
Brown Drive
Stone Lake Road
University Road
Grier Road
Lincoln Drive
Medical Center Metrorail Station
Jones Bridge Road
Woodmont Avenue
Rockville Pike
Continue North to Rockledge Drive and Democracy Boulevard
Continue North to Mid-Pike Plaza
Legend
NIH Campus Route
NIH Campus Limited Route
NIH Campus Perimeter Route
NIH Rockledge Route
NIH Mid-Pike Plaza Route
NIH Executive Plaze Route
NNMC Green Line Shuttle
NNMC Red Line Shuttle
NNMC Medical Swing Space Shuttle
NNMC Metro Line Shuttle
NNMC Shuttle Stops
NIH Shuttle Stop
NIH Limited Shuttle Stop
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Scale: 1" = 600'
Montgomery County
Department of Transportation
MD 355/Rockville Pike Crossing Project
NNMC and NIH Shuttle Routes
June 2010
URS
Figure 3

4. Roadway Facilities

In the project area, MD 355/Rockville Pike is classified by the MD SHA Highway Location Reference as a Primary Arterial with curbed median, no access control, and a posted speed limit of 35 mph. MD 355 has a total of eight travel lanes at the signalized intersection with South Drive/South Wood Road – two 11-foot through lanes, one 12-foot through/right-turn lane, and a separate 11-foot left turn lane accessing the entrances to NIH and NNMC in each direction. In the left turn lanes, there is approximately 230 feet of storage on southbound MD 355 for vehicles turning left into NNMC and 460 feet of storage on northbound MD 355 for vehicles turning left into NIH. The raised concrete median at the intersection is four feet wide. South Drive and South Wood Road are both three-lane roadways at their intersection with MD 355, with one westbound lane (14 feet wide) entering the NIH campus and one eastbound lane (11 feet wide) entering the NNMC campus. The NIH gate is located west of the bus bay area and the NNMC gate is located just east of the MD 355/South Drive/South Wood Road intersection. In addition, each eastbound and westbound leg includes an 11-foot left turn lane and an 11-foot through/right turn lane exiting the campuses. Approximately 85 feet of left turn storage exists on eastbound South Drive exiting NIH and 125 feet of left turn storage length exists on westbound South Wood Road exiting NNMC.

The approach to South Drive from southbound MD 355 and the approach to southbound MD 355 from South Drive contain restricting curb radii, which make right turns into and out of the Medical Center Metrorail Station somewhat difficult for buses. The existing curb radii are 35 feet, while the minimum design turning radius for an inter-city bus is 45 feet, based on *AASHTO-Geometric Design of Highways and Streets* standards. Southbound buses making the turn from MD 355 into the Medical Center Metrorail Station frequently either swing left prior to their turn, which can create conflicts with southbound through vehicles, or run over the adjacent sidewalk, which can create conflicts with pedestrians and adversely impact mobility at the intersection.

Existing geometric conditions are shown in **Figure 4**.

While the South Wood Road leg of the intersection currently has one lane entering NNMC and two lanes exiting (one left turn lane and one through/right turn lane), future NNMC improvement plans call for its gate to be moved closer to the intersection (approximately 105 feet from the MD 355 curb line) with a reversible center lane that would be used for both entering and exiting traffic, depending on the time of day.

F. Transit Ridership Analysis

1. Existing Ridership

As reported by WMATA in the July 2009 "Medical Center Metrorail Station Access Improvement Study," the Medical Center Metrorail Station served an average of 10,422 Metrorail passengers per weekday in 2007, including 5,240 boardings and 5,182 alightings at the station. As WMATA has experienced a seven percent daily ridership


MARYLAND
355
Rockville Pike
Bike Path
TO NNMC
South Wood Road
TO NIH
South Drive
Sidewalk
Metro
Medical Center
Station
Rockville Pike
MARYLAND
355
Legend
Metro Station
Existing Signal
N
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E
S
50 0 50 100
Scale: 1" = 100'
Montgomery County
Department of Transportation
MD 355/Rockville Pike Crossing Project
Existing Conditions
June 2010
URS
Figure 4

growth since 2007, existing (2010) Metrorail ridership is estimated at 11,152 passengers per weekday (5,607 boardings and 5,545 alightings).

2. Projected Ridership

Based on WMATA's study, ridership is anticipated to increase by 56 percent by 2020 (16,227 Metrorail passengers per weekday) with NNMC's commitment to increase employee transit mode usage from 11 percent to 30 percent by that time. For the MD 355/Rockville Pike Crossing Project, the horizon year for analysis is 2030. It is expected that the transit ridership forecasts for 2030 will remain the same as those for 2020 because growth at NIH and NNMC will be stabilized before 2020. It is expected that the majority of Medical Center Metrorail Station users will be traveling to or from NIH or NNMC. Data presented in the July 2009 WMATA "Medical Center Metrorail Station Access Improvement Study" suggests that approximately 10 percent of the station's daily users transfer at the Medical Center Metrorail Station. Of the remaining 90 percent, based on transit ridership information provided by both NNMC and NIH, it is estimated that under existing conditions approximately 13 percent are traveling to NNMC and 77 percent are traveling to NIH. Under 2030 No Build conditions, it is estimated that approximately 29 percent will be traveling to NNMC and 61 percent will be traveling to NIH. Existing and projected Metrorail ridership volumes, based on these percentages, are shown below in **Table 1**:

Table 1: Existing and Forecasted 2030 Metrorail Transit Ridership

	Existing (2010) Daily Ridership	Projected (2030) Daily Ridership
Transfers	1,115	1,623
To/From NNMC	1,450	4,706
To/From NIH	8,587	9,898
Total	11,152	16,227

The 2008 NNMC Master Plan Update provided Metrobus and Ride On ridership data at the Medical Center Metrorail Station. Per weekday, Metrobus averages 461 westbound boardings, 463 westbound alightings, 419 eastbound boardings, and 394 alightings at the Medical Center Metrorail Station. Per weekday, Ride On averages 1,098 boardings and 1,131 alightings at the Medical Center Metrorail Station. Based on the Metrorail ridership percentages presented previously, 258 of the 1,988 total existing alightings cross MD 355 to go to NNMC.

A study on ridership conducted by NIH showed that between March 17, 2009, and March 23, 2009, a total of 1,335 passengers boarded and 891 were dropped off at the Medical Center Metrorail Station by NIH shuttle service. Based on the most recent data, the NNMC "Metro Line Shuttle" serves approximately 415 riders daily, including employees and visitors.

WMATA reported in the July 2009 "Medical Center Metrorail Station Access Improvement Study" that, according to the capacity analysis, the Medical Center Metrorail Station is not expected to be capacity constrained under Build or No Build conditions in 2020. As NIH and NNMC are the generator of the majority of the transit traffic at the Medical Center Metrorail Station, and since all of the growth at NIH and NNMC is expected to occur before 2020, the capacity assessment is assumed valid for 2030, as well.

The Medical Center Metrorail Station bus stops and Kiss & Ride lot generally serve employees, patients, and visitors to NNMC and NIH, or patrons transferring to other transit services or destined to other places of employment in the study area. Access to the transit facilities described above is made by Metrorail, bus, walking, or bicycling. The Medical Center Metrorail Station bus loop and Kiss & Ride facility are very constrained geometrically and the bus bay designated for NIH and NNMC shuttle use is located farthest from the station entrance. This bus bay is less accessible for those who are mobility challenged, because pedestrians must travel down a hill to access this bus bay.

Based on anticipated increases to transit ridership, improved access to mass transit facilities in the project area is necessary to better integrate connectivity between rail, bus, car/vanpool, and pedestrian/bicycle commuters. By providing a safe crossing of MD 355 that links the existing north-south bike path along the west side MD 355 with the sidewalk on the east side, an improved crossing of MD 355/Rockville Pike could contribute to the use of pedestrian and bicycle paths for local residents, thereby reducing the overall use of single occupancy vehicles. Improved access to the Metrobus and Metrorail facilities at the Medical Center Metrorail Station would likely increase the attractiveness of transit as an alternate mode of travel.

G. Analysis of Pedestrian and Bicycle Activity

1. Existing Pedestrian and Bicycle Activity

During the AM peak period, 78 percent of the passengers exiting the station walk to their destination and in the PM peak period, 85 percent of riders walk to the station. Morning access and evening egress reveal high cycling activity, which are seven and five percent of the trips during these time periods, respectively.

At the intersection of MD 355 and South Wood Road/South Drive, the traffic signal has a three-minute cycle during the AM and PM peak periods with a maximum of 29 seconds allocated for South Wood Road/South Drive through and turning movements and east-west pedestrian traffic per cycle. Pedestrians and bicyclists make up a substantial portion of the traffic at the MD 355/Rockville Pike and South Wood Road/South Drive intersection. Currently, NNMC employees and visitors cross MD 355/Rockville Pike at-grade or utilize the NNMC shuttle service to access the Medical Center Metrorail Station. Based on count data collected for this study in December 2009, approximately 320 pedestrians cross MD 355 at this intersection in the AM peak hour. In the PM peak hour, approximately 260 pedestrians cross MD 355 at this intersection. During the three hour

AM (6:00AM to 9:00AM) and PM (3:00PM to 6:00PM) peak periods, 695 and 780 pedestrians cross MD 355, respectively. Based on transit usage data provided in the 2008 NNMC Transportation Study in Support of Environmental Impact Statement, a total of 2,440 pedestrians currently cross MD 355 per day.

Field observations confirm that the 29-second maximum pedestrian walk cycle provides sufficient time for non-disabled pedestrians, moving at the Manual on Uniform Traffic Control Devices (MUTCD) standard of 3.5 feet per second, to cross MD 355 under existing conditions. Montgomery County crosswalk design standards require a maximum walking speed of 3.5 feet per second. This equates to a walk cycle of 22 seconds. The existing signal timing provides an additional seven seconds of time for a pedestrian to cross MD 355. The pedestrian crossing phase of MD 355 coincides with the signal phase of the minor approaches (South Drive and South Wood Road) and pedestrians may also experience up to a 2.5-minute wait at the intersection per signal cycle. During mid-day, when traffic is relatively light, some pedestrians were observed crossing MD 355 during the northbound/southbound green phase. Similarly, in the PM peak, when there was little southbound MD 355 traffic and northbound MD 355 traffic was congested to the point of being gridlocked, a small number of pedestrians were observed crossing during the mainline green phase and weaving through the stopped northbound traffic.

As would be expected, disabled pedestrians travel in the study area throughout the day. The duration of the walk cycle to cross MD 355 requires that pedestrians travel at approximately 2.6 feet per second, which is adequate time for most pedestrians with restricted mobility. The Medical Center Metrorail Station provides elevators and ramps and NNMC and NIH shuttles are ADA-compatible.

Approximately 30 bicyclists per day were counted at the project location, with most utilizing the north-south trail alongside MD 355 and not crossing the MD 355/South Wood Road/South Drive intersection. Currently, NIH supports a strong bicycle commuter population and NNMC has stated its support for encouraging bicycling to its campus. Metrobuses can accommodate bicycles, but during peak hours, bicycles are not allowed on the Metrorail. Based on data collected, those bicyclists are not passing through the MD 355/South Wood Road/South Drive intersection. Bicyclists who approach the Metrorail station from the south and enter using the walkway just south of South Drive were not counted as passing through the intersection. Bicyclists who arrive at the Metrorail station via bus or Metrorail also do not pass through the intersection and therefore were not included in the count. In terms of available bicycle facilities, of the station's 88 bicycle racks, 35 percent were utilized in 2006 and of the 38 bicycle lockers, 100 percent were utilized, according to WMATA.

2. Projection of Future Pedestrian and Bicycle Activity

As reported in the NNMC 2008 FEIS, BRAC related relocations are expected to increase the number of NNMC patient appointments and other visitors from 1,912 per weekday to approximately 3,773 per weekday. To understand the pedestrian traffic operations, the study team performed pedestrian peak period counts and developed forecasts based on

the existing counts, along with NNMC personnel increases (from approximately 8,000 to 10,500) and transit usage goals (from 11 percent to 30 percent) for the future. It is estimated that pedestrian crossings of MD 355 in 2030 will increase from 320 to 990 in the AM peak and increase from 260 to 805 in the PM peak. During the three hour AM and PM peak periods, 2,150 and 2,415 pedestrians are expected to cross MD 355, respectively, in 2030. Based on future transit usage data provided in the 2008 NNMC Transportation Study in Support of Environmental Impact Statement, a total of 7,530 pedestrians are projected to cross MD 355 per day in 2030. With regard to non-motorized use of the intersection, bicyclists are included with pedestrians in the projections. This projection is greater than the 2020 estimate of 6,700 pedestrians presented in the WMATA "Medical Center Metrorail Station Access Improvement Study," but is consistent with the transit goals and personnel increases at NNMC. This growth in pedestrian traffic will increase safety concerns in the study area, as conflicting vehicular traffic will compete with the existing 29-second maximum pedestrian walk cycle. As the signal at the intersection of MD 355 and South Wood Road/South Drive is part of a system of signals along the MD 355 corridor, changing the signal timing at this location, even by a few seconds, could significantly affect delays for vehicles throughout the MD 355 corridor.

In addition, based on current usage, the complete utilization of bicycle lockers today at the Metrorail station indicates that more lockers could be necessary to accommodate both existing passengers and future growth at the station.

H. Traffic and Safety Analysis

1. Existing and Future Travel Demand

To assess the existing (2010) and future (2030) traffic operations at the existing intersection of South Wood Road/South Drive/MD 355, the study team used the field observed existing volumes and the forecasted future No Build volumes in the study area. The evaluation provided the study team with Levels of Service (LOS), delay, and queue lengths for the movements at this intersection. The study team collected information on existing traffic volumes in the study area. Traffic volume data was collected at the intersection in December 2009, during which vehicular movements and pedestrian counts for the AM and PM peak periods were tabulated. Once acquired, the existing AM and PM peak hour traffic data and the average daily traffic (ADT) data were balanced throughout the study area network. This data represents 2010 existing conditions.

Based on trends for MD 355 in the MWCOG travel demand forecasting model (Version 2.2, Round 7.2a) and the M-NCPPC travel demand forecasting model (Version 2.1d, Round 7.2a), the study team determined the background annual growth rate (0.3 percent), which was applied to the existing turning movement volumes to generate future 2030 background volumes. The team then developed forecasts for traffic in and out of NIH and NNMC using information gathered from the following reports.

- NIH Master Plan 2003 Update (March 2005)
- FEIS for NIH Master Plan 2003 Update (March 2005)
- NNMC Master Plan Update 2008 (November 2008)
- NNMC Transportation Management Plan (November 2008)
- NNMC Transportation Study in Support of Environmental Impact Statement (March 2008).

Although the models were used to compute the background growth rate in the study area, they did not provide detailed forecasts for the NIH and NNMC gates. These documents provided information that was used to develop detailed projections on employment growth, increases in the number of patients and visitors, and goals for increases in employee carpooling and transit usage, which allowed the team to develop forecasts with a greater level of precision for the NIH and NNMC land uses than the models could.

It is estimated that approximately 18,800 people work at the NIH main campus today. Based on agency needs and the capacity of local and regional infrastructure, NIH has projected a campus population of 22,000 for the planning horizon of 2020. For this study, the study team estimated that the NIH population would reach 22,000 by 2020 and remain at that number through 2030. Also, NIH is committed to maintaining peak hour traffic volumes at or below the volumes experienced in 1992, a volume which they are currently well below. Therefore, while the NIH gates are expected to experience increased traffic volumes in 2030, those increases are expected to be relatively small.

It is estimated that approximately 8,000 people work at NNMC today. The BRAC action is expected to add approximately 2,500 new employees, and almost double the number of patients and visitors traveling to NNMC each year. However, while NNMC is growing, the institution is also enacting measures to increase transit ridership and carpool usage, thereby greatly decreasing the potential number of vehicles arriving at NNMC. If NNMC's travel mode goals are met by 2030, the significant increase in trips to NNMC each day (due to the BRAC action) will result in a relatively minor increase in the daily number of vehicles passing through the NNMC gates by 2030.

The study team applied the background growth rate and the land use and trip distribution data from the aforementioned documents to the existing conditions volumes to compute 2030 No Build forecast volumes. **Table 2** shows the existing and 2030 No Build forecasted approach volumes for each leg of the MD 355/Rockville Pike and South Drive/South Wood Road intersection during the AM and PM peak hours. The volumes include all through and turning movements on each intersection leg.

Table 2: Existing and Forecasted 2030 No Build Peak Hour Volumes

Intersection Leg	Existing Volume (AM Peak Hour)	Existing Volume (PM Peak Hour)	2030 No Build Volume (AM Peak Hour)	2030 No Build Volume (PM Peak Hour)
NB MD 355	1,440	2,660	1,545	2,835
SB MD 355	2,680	1,885	2,870	2,020
EB South Drive (NIH)	175	305	195	335
WB South Wood Road (NNMC)	140	425	145	445
TOTAL	4,435	5,275	4,755	5,635

As shown in **Table 2**, eastbound and westbound traffic must compete with very high volumes of traffic traveling on MD 355. Transit users, pedestrians, and bicyclists wishing to cross MD 355 to get to NNMC from the Medical Center Metrorail Station or NIH must compete with traffic turning southbound from South Drive and South Wood Road.

Additionally, the NNMC 2008 FEIS notes that NNMC staff carpools are strongly encouraged. Participants in the carpool program must register for a parking pass and are allotted reserved parking, whereas other employee parking areas are on a first-come, first-serve basis. The NNMC Transportation Management Plan states that the average vehicle occupancy is 1.12 persons per vehicle and the goal is for average vehicle occupancy to be 1.5 persons per vehicle. The NIH Master Plan 2003 Update calculates average vehicle occupancy to be approximately 1.18 persons per vehicle, which is not expected to change.

Queues on South Drive from vehicles exiting the Kiss & Ride lot and from vehicles exiting NIH block the exit from the bus bay area, causing bus delays and creating conflicts as the buses attempt to join the travel stream. Additionally, the bus pull-off area on southbound MD 355 just south of the intersection is utilized as a Kiss & Ride area by some vehicles even though a Kiss & Ride lot is provided on South Drive.

Based on data provided by NNMC, **Table 3** shows inbound traffic volumes and percent distributions at each NNMC security gate with and without BRAC volumes:

Table 3: Inbound NNMC Security Gate Traffic Volumes (Existing and 2011 with BRAC)

Gate	Gate #	AM Peak Hour Volume	% of Total	PM Peak Hour Volume	% of Total
Existing Inbound Traffic					
North (North Wood Road)	1	913	46	29	9
South (South Wood Road)	2	400	20	194	62
Navy Exchange (Jones Bridge Road)	3	360	18	90	29
Navy Lodge (Jones Bridge Road)	4	21	1	0	0
USU (Jones Bridge Road)	5	310	15	0	0
TOTAL		2004		313	
Projected 2011 Inbound Traffic (with BRAC)					
North (North Wood Road)	1	1073	42	108	15
South (South Wood Road)	2	538	21	262	37
Navy Exchange (Jones Bridge Road)	3	448	18	79	11
Navy Lodge (Jones Bridge Road)	4	234	9	0	0
USU (Jones Bridge Road)	5	260	10	259	37
TOTAL		2552		708	

In addition to pedestrians, bicyclists, automobiles and transit vehicles, fire and rescue operations and emergency patient transport are sometimes required between the two medical facilities. These vehicles must use the same congested roadway system used by all regular vehicular traffic in the area, and are therefore impacted by existing traffic queues and delays, even with emergency vehicle procedures in place. South Wood Road serves as the entrance to the emergency room at NNMC, and is also used for emergency vehicles to travel between NNMC and NIH. There are approximately five NNMC emergency vehicle responses to the NIH campus per month and approximately 17 NIH emergency vehicle responses to the NNMC campus per month.

Improving the mobility of Emergency Response vehicles between facilities has been identified as a goal to ensure a rapid response during emergencies. The Bethesda Hospitals' Emergency Preparedness Partnership, consisting of NNMC, the NIH Clinical Center, and Suburban Hospital Healthcare System identified in 2004 a critical need for improved transportation access between the three medical facilities during emergency events (such as 9/11) to support the partnership's current emergency preparedness initiatives. One of the major goals of the partnership is to respond rapidly and successfully during a major disaster incident/catastrophic event and to sustain operations when hospitals have reached maximum surge capacity and local, state, and county resources have been depleted.

2. Traffic Operations

Under existing conditions, South Drive provides access to the Medical Center Metrorail Station Kiss & Ride lot, the NIH South Drive Gate, and a bus loop for Metrobuses and Ride On buses. Essentially, South Drive is a two-way road that leads to the NIH gate, with a Kiss & Ride lot on the north side, and a bus loop on the south side. Vehicles destined to the Kiss & Ride lot enter South Drive and take an immediate right turn into

the Kiss & Ride lot. These vehicles then proceed through the Kiss & Ride lot to an exit near the NIH gate, then turn left onto South Drive to approach MD 355. Buses destined for the bus loop proceed on South Drive beyond the bus loop exit, then turn left into the loop to approach their appropriate stop locations. The buses then proceed to the end of the bus loop and turn right onto South Drive to approach MD 355. Vehicles destined to the NIH gate simply proceed on South Drive, past the Kiss & Ride lot and bus loop, to the NIH gate beyond.

The study team used the traffic volumes developed for this study to evaluate the traffic operations at the MD 355/South Wood Road/South Drive intersection. The study team used the simulation modeling software Synchro and SimTraffic to assess the existing and future traffic operations at this intersection. The study team developed, validated, and calibrated a Synchro/SimTraffic model of the study area network for the AM and PM peak hours using the existing traffic volumes, traffic signal data, and field observation data to provide a reasonable replication of actual existing traffic operations. The Synchro/SimTraffic model, once calibrated for existing conditions, was used in the assessment of future No Build conditions to obtain LOS, delay, and queuing information.

The LOS is a qualitative measure of operational conditions within a traffic stream. LOS ranges from A to F, where a LOS A represents optimal conditions and a LOS F represents saturated or failing conditions. However, when an intersection is functioning at a LOS F it may not be possible to quantify the degree of failing operations. In this case, delay can be used as a metric that is more meaningful and easier to compare across movements and scenarios. Delay is defined as the average time between stopping and clearing an intersection per vehicle over the peak hour.

The highest volumes at the intersection of MD 355 and South Wood Road/South Drive are along southbound MD 355 in the AM and northbound MD 355 in the PM. With the existing signal timing in place, which prioritizes the mainline, the movements on the east and west approaches experience the worst levels of service.

Today, the MD 355/South Wood Road/South Drive intersection operates at LOS C in the AM peak period with an average delay of 34.0 seconds and LOS F in the PM peak period with an average delay of 115.4 seconds. When examined in isolation, with optimized signal timings, the intersection operates at LOS D in the PM peak, even though certain legs operate at LOS F. When examined as part of a system, as this intersection currently operates, the intersection operates at LOS F in the PM peak with existing signal timings. In 2030, this intersection is forecasted to operate at LOS D in the AM peak period with an average delay of 37.8 seconds and LOS F in the PM peak period with an average delay of 131.4 seconds.

Specifically, in the AM peak hour, vehicles traveling through the intersection of MD 355 at South Drive/South Wood Road experience congestion and delay, particularly on the southbound approach. In the southbound through/right turn lanes, the queues are relatively short and do not appear to create conflicts with any other access points. However, the southbound left turn queue extends beyond its available storage, into one of

the southbound through lanes during several signal cycles throughout the AM peak hour. Left turning vehicle queues are stationary while the through lanes are moving. Based on forecasted demand in 2030, conditions at this intersection are expected to worsen. The traffic operations at the intersection, given in LOS and delay at each leg for the AM and PM peak hours, as modeled with Synchro/SimTraffic software, are summarized in **Table 4**.

Table 4: Existing and 2030 No Build Peak Hour Level of Service and Delay Per Vehicle (in seconds)

	NB MD 355		SB MD 355		EB South Drive		WB South Wood Road	
	Left	Through/ Right	Left	Through/ Right	Left	Through/ Right	Left	Through/ Right
AM Peak Hour (Existing)	D/37.9	C/23.0	D/49.7	C/31.5	E/75.7	F/80.6	E/78.1	E/71.2
PM Peak Hour (Existing)	A/7.6	C/28.5	D/37.1	B/17.7	F/-	E/72.7	E/71.7	F/204.0
AM Peak Hour (2030)	D/40.6	C/23.7	E/67.7	C/34.3	E/79.4	F/98.3	F/88.5	E/71.8
PM Peak Hour (2030)	A/8.4	C/32.8	D/42.7	B/18.5	F/-	F/89.6	F/84.0	F/222.9

Because of the congestion on northbound MD 355, the opposing left turn delay on eastbound South Drive is too large for the Synchro model to quantify in the PM peak hour for both existing and 2030 No Build conditions. The software has limitations under congested conditions and when queues exceed a certain distance (which varies by the nature of the approach), as a result of the number of arrival pattern variables.

The traffic signals along MD 355 have been coordinated to optimize traffic flow throughout the corridor during the AM and PM peak periods. Due to the very high traffic volumes flowing into the corridor, significant delays are still being experienced. However, those delays are experienced more as a few long stops with some flushing of the system in between, rather than a long series of stops and starts.

Intersection queuing distance, or queue length, is another indicator of traffic operations and was obtained from the Synchro/SimTraffic analysis. This value is the 95th percentile queue, which is the maximum queue expected during all but the worst five percent of the peak hour. **Table 5** presents the existing and 2030 No Build maximum queuing distance for each leg of the MD 355/Rockville Pike and South Drive/South Wood Road intersection during the AM and PM peak hours. The existing queuing distances computed using Synchro appear to be consistent with field observations.

Table 5: Existing and 2030 No Build Maximum Queuing Distance (in feet)

	NB MD 355	SB MD 355	EB South Drive		WB South Wood Road	
	Left	Left	Left	Through/ Right	Left	Through/ Right
AM Peak Hour (Existing)	165	450	145	205	105	180
PM Peak Hour (Existing)	30	105	650	200	120	850
AM Peak Hour (2030)	185	575	165	275	110	185
PM Peak Hour (2030)	30	120	-	250	135	875

Like the delay calculation, the eastbound South Drive 2030 No Build PM peak hour left turn queuing distance is too large for the analysis to quantify using Synchro. Relative to the existing volume, an estimate of the future queue length for the eastbound left turn would be approximately 715 feet. However, this length depends significantly upon the storage available on northbound MD 355. If there is no storage available on MD 355 to allow the eastbound left turning vehicles to depart South Drive, the queue may be significantly longer.

As shown in **Table 5**, queuing deficiencies are present under existing conditions and are projected to worsen by 2030 if no improvements are made. Southbound MD 355 left turn queuing is currently 450 feet in the AM peak, while only 215 feet of storage currently exists. This queuing length is projected to increase to 575 feet by 2030 in the AM peak. Queuing beyond the available storage forces vehicles to queue in the MD 355 through lanes, which prohibits them from flowing through the intersection. Vehicles making left turn onto MD 355 from eastbound South Drive currently have 85 feet of storage for the 650 feet of queuing that the movement experiences in the PM peak. Also, the exit from the bus pickup/drop-off area is located approximately 125 feet away from the intersection and the through/right turning vehicles queuing on eastbound South Drive provides a barrier to buses in both the existing AM and PM peaks. For westbound South Wood Road, the existing 125 feet of storage length for vehicles making left turn onto southbound MD 355 will not be adequate for the queues anticipated in the 2030 No Build PM peak. Additionally, Palmer Road South is located approximately 400 feet away from the intersection and is currently blocked in the PM peak due to queuing of through and right turning vehicles.

It should be noted that National Security threat levels could drastically affect the existing and future queuing distances of vehicles entering both federal facilities. If the threat level reaches "high" or "severe," different screening practices would be put in place, including vehicle inspections and personnel ID checks. These screening practices would increase the queuing of vehicles entering both facilities.

3. Safety Analysis

Pedestrian, bicyclist, and motorist safety is an important concern in the study area. As discussed previously, large numbers of pedestrians and vehicles conflict with one another at the MD 355/South Wood Road/South Drive intersection, leading to decreased pedestrian mobility. The study team obtained recent crash history for the study area to analyze these conflicts with respect to crash rate. Crash data for the period of January 1, 2003 to December 31, 2007 (the latest data available) was provided by the Montgomery County Department of Transportation's Division of Traffic Engineering and Operations. This data represents only those crashes for which police reports were prepared. There were a total of 64 reported accidents at the intersection of MD 355 and South Drive/South Wood Road, including the approaches. Based on the number and severity of crashes, this intersection has not been identified by SHA as a Candidate Safety Improvement Intersection (CSII) during the analysis years. A detailed summary of the crash data is presented in **Table 6**.

Some key points include:

- Rear-end collisions were the most common type, followed by left turn collisions
- Six single vehicle-pedestrian related collisions were reported
- 25 percent of the accidents resulted in injury, with six of those resulting in serious injury. There were no fatalities reported.
- Of the 113 vehicles involved in the accidents, 73 were passenger cars and 12 were transit buses.

With the high volumes on MD 355 during peak hours, it is likely that congestion is a factor that contributes to rear-end collisions being the most common type of accident.

Of the six crashes involving pedestrians, only one citation was given to a driver that illegally proceeded through the intersection and hit an emergency responder that was present for a response call to an earlier crash. A second pedestrian crash involved a vehicle failing to yield right-of-way to a pedestrian legally in the crosswalk. Three pedestrian crashes resulted from pedestrians failing to follow existing traffic controls (e.g. crossing against the WALK signal or crossing outside of the crosswalk). The last crash involved a bicyclist in the northbound direction that failed to move with the flow of vehicular traffic and changed lanes unexpectedly.

Yellow times, as well as the stopping and intersection sight distances for the northbound and southbound approaches, were reviewed and determined to be adequate for the vehicles. Based on *AASHTO-Geometric Design of Highways and Streets* standards, the minimum required stopping sight distance is 360 feet. Northbound MD 355 has a measured sight distance greater than 500 feet and southbound MD 355 has a measured sight distance of 445 feet. Meeting the requirements for stopping sight distance also

Table 6: Crash Summary for MD 355 at South Drive/South Wood Road (1/1/03 to 12/31/07)

Severity	# of Crashes	Crash Type	# of Crashes
Fatality	0	Rear-end	26
Disabled	6	Left-turn into Opposing Traffic	15
Injured	10	Single Vehicle (pedestrian related)	6
Possible Injury	8	Sideswipe with Traffic	5
Not Injured	40	Head-on	1
		Turning Right Into Traffic	1
		Rear end into Left Turning Veh	2
		Other Involving Left Turning Veh	3
		Unknown	1
		Fixed Object	1
		Other	3
Total	**64**	**Total**	**64**
Time of Day	**# of Crashes**	**Day of the Week**	**# of Crashes**
12:00 AM to 3:00 AM	1	Weekday	52
3:00 AM to 6:00 AM	1	Weekend	12
6:00 AM to 9:00 AM	9	**Total**	**64**
9:00 AM to 12:00 PM	9	**Reported Year**	**# of Crashes**
12:00 PM to 3:00 PM	16	2003	15
3:00 PM to 6:00 PM	16	2004	13
6:00 PM to 9:00 PM	6	2005	11
9:00 PM to 12:00 AM	6	2006	12
		2007	13
Total	**64**	**Total**	**64**
Vehicle Type	**# of Vehicles Involved**	**Direction of Movement**	**# of Vehicles**
Passenger Cars	73	SB (L, T, R)	(12,45,0)
Transit Bus	12	NB (L, T, R)	(7,42,1)
Recreational Vehicle	11	EB (L, T, R)	(1,0,1)
Van	7	WB (L, T, R)	(3,1,1)
Pickup Truck	5		
N/A	15		
Other	5		
Total	**128**	**Total**	**(23,88,3)**
Weather	**# of Crashes**	**Surface Conditions**	**# of Crashes**
Clear/Cloudy	50	Wet	18
Raining	13	Dry	46
Snow/Sleet	1		
Total	**64**	**Total**	**64**
Illumination	**# of Crashes**	**Condition of Drivers**	**# of Crashes**
Daylight	47	Normal	58
Dark-Lights On	14	Drinking / Drugs	4
Dawn/Dusk	3	Other or N/A	2
Total	**64**	**Total**	**64**

fulfills the requirement for left-turn sight distance from MD 355. Factors such as speeding, congestion, and/or selection of less than adequate gaps may contribute to the predominant rear-end and left-turn collisions.

I. Consistency with Smart Growth and Related Studies

1. Maryland Smart Growth Law

Subsequent to the 1992 Planning Act, Maryland established the Priority Funding Act (1997) to direct State funded growth-related projects to areas designated by local jurisdictions as Priority Funding Areas (PFAs). The study area is located inside the Capital Beltway and is within the Priority Funding Area (PFA).

2. Related Projects and Studies

Various other projects in the study area correspond with the project purposes of enhancing/improving access to mass transit facilities, improving pedestrian and bicyclist mobility and safety, and improving traffic operations. Some of these projects are discussed below.

a. WMATA Medical Center Metrorail Station Access Improvement Study

In July 2009, the Washington Metropolitan Area Transit Authority (WMATA), in collaboration with the Maryland Department of Transportation (MDOT) and MC-DOT completed the Medical Center Metrorail Station Access Improvement Study. This study examined access improvements for the Medical Center Metrorail Station by assessing existing station access for all travel modes, including pedestrian, bicycle, bus, and personal automobile, as well as the station's ability to accommodate both general and BRAC-related growth in the immediate area. Five station access alternatives were analyzed in the study: (1) improved at-grade crossing; (2) east-side elevator access; (3) shallow pedestrian tunnel; (4) east-side elevator access and shallow pedestrian tunnel; and (5) pedestrian bridge. The study findings were used by Montgomery County to apply for DAR certification to request project funding from the Department of Defense.

b. Maryland State Highway Administration Intersections Improvement Project

In the vicinity of the study area, SHA is implementing intersection improvement projects that are focused on maintaining the existing or slightly improved LOS. These projects include capacity improvements at the intersections to accommodate the increases of BRAC-related traffic and include upgrades to adjoining bicycle and pedestrian paths. The design phase is in progress with scheduled project completion in late 2011.

The four major intersections of the SHA Intersections Improvement Project are:

- MD 355 (Rockville Pike) and Cedar Lane
- MD 187 (Old Georgetown Road) and Cedar Lane
- MD 355 (Rockville Pike) and Jones Bridge Road
- MD 185 (Connecticut Avenue) and Jones Bridge Road.

c. Montgomery County Facilities Study

Montgomery County is conducting a Facilities Study of the construction of new and renovation of existing pedestrian and bicycle paths in the area surrounding NNMC, to accommodate BRAC-related growth. Reconstruction of the MD 355 bike path is underway and other improvements are being designed for East Cedar Lane, West Cedar Lane, Battery Lane and Glenbrook Parkway, and Jones Bridge Road. All projects are scheduled for construction completion no later than September 2011.

d. Maryland Transit Administration Purple Line

The Purple Line is a 16-mile east-west high capacity rapid transitway extending from Bethesda in Montgomery County to New Carrollton in Prince George's County, proposed by the Maryland Transit Administration (MTA). If constructed, the Purple Line would enhance transportation to the Medical Center Metrorail Station by connecting communities in Prince George's and Montgomery counties, as the Bethesda endpoint would be accessible to and from the Bethesda Metrorail Station, which is located one stop away from the Medical Center Metrorail Station on the Red Line. The MTA anticipates receiving permission from the Federal Transit Administration (FTA) to enter the next phase of the Purple Line Project, which is Preliminary Engineering, in 2010.

The MD 355/Rockville Pike Crossing Project stands alone from these other area projects and will address safety and capacity issues for those who access NNMC and NIH from the Metrorail station and the community. The limits of the study are centered on the intersection of MD 355 with South Wood Road and South Drive because that is the existing location of (1) access to the Medical Center Metro Station and (2) where a large number of pedestrians and bicyclists cross MD 355. The SHA intersection improvements, while in close proximity from a traffic and access standpoint, are far too distant to deal with the focused issue of safe and efficient pedestrian and bicycle crossing and increased access to the transit hub.

J. Summary of Project Purpose and Needs

The purpose of the MD 355/Rockville Pike Crossing Project is to improve the movement of the traveling public between the west and east sides of MD 355/Rockville Pike at its intersection with South Wood Road and South Drive in Bethesda, Maryland. This transportation project is intended to: (1) enhance/improve access to mass transit facilities; and (2) improve the mobility and safety of pedestrians and bicyclists crossing MD

355/Rockville Pike and improve traffic operations at the existing intersection of South Wood Road/South Drive/MD 355.

Currently, transit users, pedestrians, and bicyclists wishing to cross MD 355 to get to NNMC from the Medical Center Metrorail Station or NIH must compete with very high volumes of traffic traveling between South Wood Road, South Drive, and MD 355. This project is needed to improve the mobility and safety of pedestrians and bicyclists crossing MD 355/Rockville Pike and improve traffic operations at the intersection of South Wood Road/South Drive/MD 355 by reducing existing conflicts between pedestrians and vehicles.

Existing (2010) Metrorail ridership is estimated at 11,152 passengers per weekday and is anticipated to increase to 16,227 passengers per weekday by 2020 with NNMC's commitment to increase employee transit mode usage from 11 percent to 30 percent by that time. Based on the anticipated increases to transit ridership, improved access to mass transit facilities in the project area is necessary to accommodate and integrate connectivity between all commuters.

Approximately 30 bicyclists per day were counted at the project location, with most utilizing the north-south trail alongside MD 355 and not crossing the MD 355/South Wood Road/South Drive intersection. Bicyclists who approach the Metrorail station from the south and enter using the walkway just south of South Drive and those who arrive at the Metrorail station via bus or Metrorail also do not pass through the intersection and therefore were not included in the count. It is estimated that pedestrian crossings of MD 355 in 2030 will increase from the existing number of 320 to 990 in the AM peak and increase from 260 to 805 in the PM peak. During the three hour AM and PM peak periods, 2,150 and 2,415 pedestrians are expected to cross MD 355, respectively, in 2030. In total, 7,530 pedestrians are projected to cross MD 355 per day in 2030. With regard to non-motorized use of the intersection, bicyclists are included with pedestrians in the projections.

This growth in pedestrian and bicycle traffic will increase safety concerns in the study area, as vehicular traffic will compete with the existing 29-second maximum pedestrian walk cycle. By providing a safe crossing of MD 355 that links the existing north-south bike path along the west side MD 355 with the sidewalk on the east side, an improved crossing of MD 355/Rockville Pike could contribute to the use of pedestrian and bicycle paths for local residents.

Existing peak hour traffic volumes at the intersection are 4,435 in the AM and 5,275 in the PM and are projected to increase to 4,755 and 5,635 in the 2030 AM and PM peak hours, respectively. Today, the MD 355/South Wood Road/South Drive intersection operates at LOS C in the AM peak period with an average delay of 34.0 seconds and LOS F in the PM peak period with an average delay of 115.4 seconds. In 2030, this intersection is forecasted to operate at LOS D in the AM peak period with an average delay of 37.8 seconds and LOS F in the PM peak period with an average delay of 131.4 seconds. Due to congestion along the MD 355 corridor in the AM and PM peak periods,

eastbound and westbound traffic must compete with very high volumes of traffic traveling on MD 355. Transit users, pedestrians, and bicyclists wishing to cross MD 355 to get to NNMC from the Medical Center Metrorail Station or NIH must compete with traffic turning southbound from South Drive and South Wood Road.

The study team used the most recent crash data available (from 2003 to 2007), collected by Montgomery County, to evaluate the safety issues in the project area associated with vehicular and pedestrian traffic. The safety analysis shows that there were a total of 64 accidents at the intersection of MD 355 and South Drive/South Wood Road, including the approaches. Injuries were reported in 16 of the accidents, with six of those resulting in serious injury, and eight accidents resulted in possible injury. Six accidents involved pedestrians and there were no fatalities reported. Of the 113 vehicles involved in the accidents, 73 were passenger cars and 12 were transit buses.

The safety concerns in the project area associated with pedestrian and vehicular traffic supports the need for improved access to mass transit facilities, improved mobility and safety of pedestrians and bicyclists crossing MD 355, and improved traffic operations at the intersection of MD 355 and South Drive/South Wood Road.

The MD 355/Rockville Pike Crossing Project would improve access to mass transit facilities in one of the most congested areas in the region. It would better integrate connectivity between rail, bus, car/vanpool, and pedestrian/bicycle commuters. Increasing transit usage is part of the approach to mitigate forecasted congestion levels in this area of Montgomery County associated with BRAC impacts. Improved access to the Medical Center Metrorail Station would likely increase the attractiveness of Metrorail as an alternate mode of travel. It is also anticipated that this project will promote the use of pedestrian and bicycle paths for local residents, thereby reducing the use of single occupancy vehicles.

K. Project Goals and Objectives

Based on the study area needs documented in this study, the following primary goals and objectives related to the Purpose and Need were identified for this project:

- Improve pedestrian mobility between NNMC, NIH, and Medical Center Metrorail Station facilities through improved crossing of MD 355
- Improve pedestrian safety within the project area by minimizing conflicts with vehicular traffic
- Improve traffic operations to and from NNMC and NIH/Medical Center Metrorail Station at the MD 355/South Wood Road/South Drive intersection

The following secondary goals and objectives are not central to the Purpose and Need, but are still important considerations. These attributes will not be used as the main factor in determining which alternatives should be analyzed or carried forward, but will be used to support selection of a Preferred Alternative:

- Promote alternative modes of transportation such as rail, bus, car/vanpools, pedestrians and bicycle commuting
- Improve efficiency with which emergency and transit vehicles move between the NIH and NNMC campuses.

APPENDIX A: ENVIRONMENTAL INVENTORY

L. Introduction

Using available data, the study team conducted a preliminary investigation of the natural and human environmental and cultural resources in the study area. The following sections summarize the results of the environmental inventory of socio-economic, cultural, and natural resources within the study area.

M. Cultural Resources

Section 106 of the National Historic Preservation Act of 1966, as amended, requires federal agencies to consider the impacts of undertakings on historic properties (including architectural properties and archaeological sites) that are either listed in the National Register of Historic Places (NR) or eligible for listing (36 CFR 800). If projects are federally permitted, licensed, funded, or partially funded, the project must comply with Section 106. This project is expected to utilize United States Department of Defense (DoD) funding, and as such, would need to comply with Section 106 of the National Historic Preservation Act (NHPA).

1. Historic Properties in the Project Area

A site visit was conducted to identify potential historic properties in the project area. Reviews were conducted of readily available published sources both online and at the Maryland Historical Trust (MHT) library and archives in Crownsville, Maryland – the repository for the Maryland State Historic Preservation Office. In addition, the 1878 G.M. Hopkins Montgomery County Map, Bethesda District No. 7, was reviewed for site history information. The review activity was directed towards locating all previously identified above-ground historic or potentially historic properties within a half-mile radius of the project location, and all previously-identified archaeological sites within a one-mile radius of the project location.

a. Archeological Resources

Research identified 16 documented archaeological sites within a one-mile radius of the project location. In accordance with MHT policies, no map of these sites or specific location information is provided (**Table A-1**). Of these sites, 11 are prehistoric and five are multicomponent sites that exhibit evidence of both prehistoric and historic occupation. The prehistoric sites date from the Paleoindian Period (10,000 BC to 7,500 BC) through the Late Woodland (AD 900 to AD 1650) and consist of short-term resource procurement and seasonal occupation camps with many of the sites represented by lithic scatters. The historic sites date from the late 18th century through the early 20th century and represent the occupation of owners before the development of the NIH and NNMC.

Table A-1: Documented Archaeological Sites within One Mile of Study Area

Site Number	Location	Quad Map	Type	Context	Eligibility
18MO35	NIH	Wash. West	Prehistoric	Paleoindian-Woodland	Undetermined
18MO243	NIH	Wash. West	Prehistoric	Late Archaic-Woodland	Eligible
18MO332	MNCPPC*	Kensington	Prehistoric	Unknown	Undetermined
18MO462	NIH	Kensington	Prehistoric & Historic	Late Archaic & Woodland, 18th/19th C	Not Eligible
18MO463	NIH	Kensington	Prehistoric & Historic	Early-Middle Woodland, 19th to 20th C	Not Eligible
18MO464	NIH	Kensington	Prehistoric & Historic	Middle Woodland and 20th C	Not Eligible
18MO465	NIH	Kensington	Prehistoric & Historic	Late Archaic & Woodland, 20th C	Not Eligible
18MO469	NIH	Kensington	Prehistoric	Early Woodland	Not Eligible
18MO555	NNMC	Kensington	Prehistoric & Historic	Unknown and 19th C	Undetermined
18MO556	NNMC	Kensington	Prehistoric	Late Archaic	Undetermined
18MO644	NNMC	Kensington	Prehistoric	Unknown	Not Eligible
18MO645	NNMC	Kensington	Prehistoric	Unknown	Not Eligible
18MO646	NNMC	Kensington	Prehistoric	Unknown	Not Eligible
18MO647	NNMC	Kensington	Prehistoric	Unknown	Not Eligible
18MO648	NNMC	Kensington	Prehistoric	Unknown	Not Eligible
18MO654	NIH	Wash. West	Prehistoric	Unknown	Not Eligible
*MNCPPC Rock Creek Stream Valley Park					

None of the recorded sites on either the NIH or NNMC properties are located within the immediate area of ground disturbance for the proposed project and would not be affected. The archaeological site nearest the project area is 18MO35, a prehistoric site of undetermined temporal association with materials suggesting long-term occupation from the Paleoindian (10,000 BC to 7,500 BC) to the Woodland Period (1,000 BC to AD 1600). The site is located approximately 2,640 feet (800 meters) due west of the proposed project area and is within the NIH property. The site was first documented in 1971 and has not been evaluated for NR eligibility.

Many of the prehistoric sites located on both NIH and NNMC have been formally evaluated for eligibility for listing in the NRHP and were determined not eligible due to previous disturbance or lack of diagnostic cultural materials. However, the existence of documented prehistoric archaeological sites near the project area suggests a moderate probability of encountering sites in areas previously undisturbed by development.

b. Above-Ground Resources

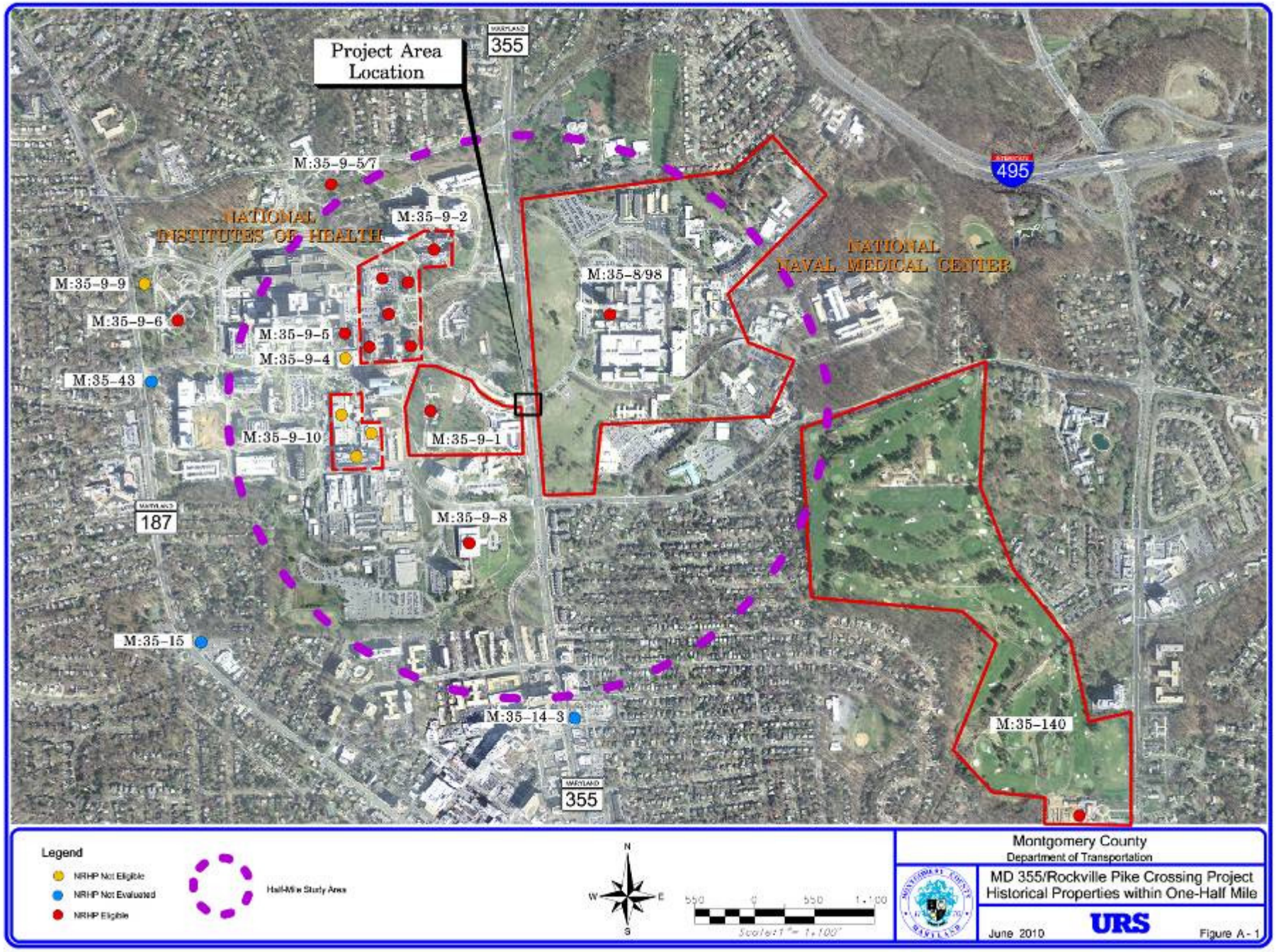
Research revealed twenty documented above-ground properties within a one-half mile radius of the project area (**Figure A-1**). The majority of these properties are located within the NIH or NNMC complexes. The NIH undertook a cultural resource inventory of its property in 1997 and determined 20 buildings are eligible for listing in the NR, either individually or as contributing resources to a historic district. Eighteen of these buildings are beyond the immediate project area and are not likely to be affected by the proposed project.

One historic property located on the NIH property, "The Stone House," also known as the George Peter Freeland Estate (M:35-9-1), is located in the proposed project area. The George Peter Freeland Estate was determined eligible for listing in the NR in 1985. The property has been designated a "Master Plan Historic Individual Site" by the Maryland National Capital Park and Planning Commission – Montgomery County (M-NCPPC). The south side of South Drive and the west side of Wisconsin Avenue are included within the site boundary.

The landscape associated with the George Peter Freeland Estate was regarded as an integral design feature that contributed to the historic character of the property as recently as 2000; as indicated in a historic resource inventory form prepared by NIH for the property. This documentation describes the east lawn as a "visual approach to the house…articulated by a series of stone wall terraces of the same bluestone as the house: a row of bushes atop one of the walls acts as a stage front to the grand portico."[1] The inventory form describes the site as retaining the feeling of the original property, noting "This portion of the Peter estate (east lawn) between the Stone House and Rockville Pike remains open and landscaped, providing a broad and elegant vista which continues to evoke the setting and atmosphere of the 1930s estate."[2] However, subsequent Metro-related construction at the southwest intersection of Wisconsin Avenue and South Drive has compromised the integrity of setting of the east lawn, as described in the 2000 inventory form.

The proposed project area will also encroach on the National Naval Medical Center Historic District, listed in the NRHP in 1998 and consists of 131 acres and 18 contributing buildings. The district's landscape fronts Wisconsin Avenue and is identified in the NRHP nomination form as contributing to the historic character of the property. The nomination defines the significance of landscaped areas as "An integral part of Building 1 (Bethesda Naval Hospital Tower)…its front landscape area and monumental flagpole set directly on center with the main tower. The formal landscape immediately west of Building 1 is semicircular in appearance, shaped by the formal semi-circular drive (Wood Road) that leads visitors into the site from the north and from the south."[3] The nomination emphasizes the role the landscape plays in defining the architectural

[1] NIH Historic Resources Inventory Form, M: 35-9-1, "The Stone House"; The George Peter Freeland Estate, Section 7, pg 5.
[2] Ibid., Section 8, pg 5.
[3] NRHP Registration Form, M: 35-98, National Naval Medical Center Historic District, Section 7, pg 11.


Project Area Location
MARYLAND 355
495
NATIONAL INSTITUTES OF HEALTH
NATIONAL NAVAL MEDICAL CENTER
M:35-9-5/7
M:35-9-2
M:35-9-9
M:35-9-6
M:35-9-5
M:35-9-4
M:35-43
M:35-9-10
M:35-9-1
M:35-8/98
MARYLAND 187
M:35-9-8
M:35-15
M:35-14-3
M:35-140
MARYLAND 355
Legend
NRHP Not Eligible
NRHP Not Evaluated
NRHP Eligible
Half-Mile Study Area
N
W
E
S
550 0 550 1,100
Scale: 1" = 1,100'
Montgomery County
Department of Transportation
MD 355/Rockville Pike Crossing Project
Historical Properties within One-Half Mile
June 2010
URS
Figure A-1

experience of the building: "the extensive greensward surrounding the monument remains much as it appeared after its initial development. The experience, therefore, of entering a prominent and distinguished naval facility is clear and one is compelled to acknowledge and admire that which remains of its architectural character."[4] These properties are listed in **Table A-2**.

Table A-2: Documented Historic Properties within One-Half Mile of the Project Area

Site Number	Location	Resource Name	Construction Date	Eligibility Status
M:35-8	NNMC	Bethesda Naval Hospital Tower	1942	NR Listed 1977
M:35-9-1	NIH	George Freelander Peter House Estate (Buildings 16 and 16A)	1931	Eligible 1985
M:35-9-2	NIH	NIH Historic Core (Buildings 1-6)	1936-1941	Eligible 2000
M:35-9-3	NIH	Tree Tops (Building 15)	1926	Eligible 1995
M:35-9-4	NIH	Animal Building (Building 9)	1943	Not Eligible 2000
M:35-9-5	NIH	Memorial Laboratory (Building 7)	1947	Eligible 2000
M:35-9-6	NIH	Convent Sisters of Visitation (Building 60)	1922	Eligible 2000
M:35-9-7	NIH	Officer's Quarters (Buildings 15 B1-G2, 15 H and 15 I)	1940	Eligible 1997
M:35-9-8	NIH	National Library of Medicine (Building 38)	1962	Eligible 2000
M:35-9-9	NIH	Caretaker's Cottage (Building 61)	1920s	Not Eligible 1996
M:35-9-10	NIH	NIH Buildings 11, 12 and 13	1954	Not Eligible 2003
M:35-15	E of NIH	Old Schoolhouse	1800-1899	Not Evaluated
M: 35-14-3	S of NNMC	Little Tavern	1940	Not Evaluated
M:35-43	W of NIH	Bethesda Community Store	1900-1924	Not Evaluated
M:35-98	NNMC	NNMC Historic District*	1939-1942	NR Listed 1998
M:34-140	SE of NNMC	Columbia County Club	1911	Eligible 2002
* The NNMC Historic District consists of 131 acres of the 242-acre complex, which contains 90 buildings. 36 buildings are in the NNMC Historic District and 18 are contributing.				

2. Project Implications

Because the proposed project could potentially have an adverse affect on historic properties and will utilize Federal funding; compliance with Section 106 of the NHPA is required. Compliance with Section 106 requires the consideration of alternatives in consultation with MHT and other relevant stakeholders. The compliance processes may require any or all of the following:

[4] Ibid. Section 7, pg 4.

- Additional archeological investigation to determine if archaeological resources are present in the project area. This may include focused research to determine the level of ground disturbance in the project area or on-site testing to identify the presence of archaeological features or artifacts.
- Preparation of a Section 106 Memorandum of Agreement (MOA) to resolve adverse effects on historic properties (NNMC Historic District, archaeological sites). An MOA may include mitigation measures such as Phase III archaeological data recovery (should NRHP-listed or eligible archaeological sites be adversely affected by the project).

N. Section 4(f)

Section 4(f) of the U.S. Department of Transportation Act of 1966 requires that the proposed use of land from a publicly-owned parkland, recreation area, wildlife and/or waterfowl refuge, or any significant historic or archaeological site, as part of a federally funded or approved transportation project, is permissible only if there is no feasible and prudent alternative to the use. Final action requiring the taking of such land must also document and demonstrate that the proposed action includes all possible planning to minimize harm to the property resulting from such use.

There are no publicly-owned parklands, recreation areas, wildlife and/or waterfowl refuges present in the study area. Data collection to determine whether significant historic or archaeological sites are present and their eligibility is underway. An effects determination through consultation with the Maryland Historical Trust (MHT) will be completed in conjunction with the alternatives development process.

The proposed project will not utilize USDOT funds, therefore, a Section 4(f) evaluation will not be required.

O. Section 6(f)

The Land and Water Conservation Fund Act of 1965 (16 USC 460) established a fund to subsidize State and Federal acquisition of lands and waters for recreational and conservation purposes. Section 6(f) of the Land and Water Conservation Fund Act requires that the Secretary of the U.S. Department of the Interior (USDOI) approve any conversion of lands purchased or developed with assistance under this act to a use other than public, outdoor recreation use.

According to previous studies, there are no Section 6(f) lands in the study area.

P. Waters of the U.S./Wetlands

Waters of the United States (U.S.), including wetlands, are regulated under Sections 401 and 404 of the Clean Water Act, the Maryland Tidal Wetlands Act, and the State of Maryland Nontidal Wetlands Protection Act.

Based on previous wetlands/waters investigations completed for the project area, the following resources were identified:

1. NNMC

Lake Eleanor is located in the lawn area between MD 355 and the Naval Hospital Tower (Palustrine Open-Water).

No wetlands are associated with the existing stream system (Stoney Creek) which is located beyond the study area (Wetland Investigation Report, NNMC FEIS).

2. NIH

No wetlands are present on the NIH campus and the NIH stream is located to the west of the study area (NIH Master Plan 2003 Update, March 2005).

No impacts to waters of the U.S., including wetlands, are anticipated for this project.

Q. Rare, Threatened, and Endangered Species

No federal or State listed rare, threatened, or endangered (RTE) species have been identified on the NNMC property according to previous studies conducted in the project study area.

No RTE species are known to exist in the study area according to a January 7, 2010 U.S. Fish and Wildlife Service (USFWS) letter. According to the Maryland Department of Natural Resources (MDNR) in their letter dated January 13, 2010, no RTE species have been documented within the study area.

R. Floodplains

While the 100-year floodplain of Stoney Creek is located on the NNMC facility, it is beyond the project area. The floodplain associated with the NIH stream is also located beyond the project area.

No impacts to designated 100-year floodplains are anticipated for this project.

S. Air Quality

Project effects will be determined during the alternatives development phase (including the relevance of PM 2.5 and Mobile Source Air Toxics).

T. Noise

Project effects will be determined during the alternatives development phase.

U. Forest Conservation

According to previous studies, no forest resources are present in the project area. Five of Montgomery County's champion trees are located on the NIH campus; however, they are beyond the project area. Roadside trees may be located within the publicly-owned right-of-way along MD 355. These specimens will be identified during field surveys and avoided if possible during the alternatives development phase. Any unavoidable removal of trees within the publicly-owned right-of-way will require a Roadside Tree Permit from MDNR Forest Service. Land development in the project area is also subject to Forest Conservation Act (FCA) approval administered by M-NCPPC. Both FCA and Roadside Tree Permit authorizations will be completed following selection of an alternative

1. NNMC

Vegetation on the NNMC property along MD 355 consists of "formal plantings found around developed areas." Wooded areas are located along the eastern portion of the property beyond the study area.

2. NIH

According to available resources, wooded areas on the NIH campus do not meet the definition of forest established by Montgomery County and MDNR.

V. Relocations

No displacement or relocation of residences and businesses are anticipated for this project.

W. Environmental Justice

Based on the population diversity and average incomes in the census tracts surrounding the NNMC and the NIH, the area does not contain an identifiable minority or low income community and disproportionate impacts are therefore not anticipated (NIH Final EIS for the Master Plan 2003 Update).

X. Hazardous Materials

Previous studies completed for the study area do not identify any past releases of hazardous materials in the project area. Supplemental database searches will be conducted to determine if there have been any recent releases of hazardous materials in the study area and their closure status.

Y. Smart Growth

The study area is located inside the Capital Beltway and is within the Priority Funding Area (PFA). The proposed project is consistent with the 1992 Planning Act and 1997

Priority Funding Areas Act relative to its enhancement of transit-oriented, bicycle-friendly, and walkable streets.

Z. Indirect and Cumulative Effects

Project effects will be determined during the alternatives development phase.

AA. References

Final Environmental Impact Statement (FEIS) for the Master Plan 2003 Update for the National Institutes of Health (NIH) Campus in Bethesda, Maryland.

Final Environmental Impact Statement for Activities to Implement 2005 Base Realignment and Closure Actions at National Naval Medical Center, Bethesda, Maryland

Medical Center Station Access Improvement Study, Final Report July 2009, Washington Metropolitan Area Transit Authority

Purple Line Alternatives Analysis and Draft Environmental Impact Statement, US Department of Transportation, Maryland Department of Transportation and the Maryland Transit Administration, September 2008

US Census, American Community Survey, 2006 – 2008